Research Paper

Volume 9, Issue 2
Spring, 2024

Journal of Teaching English Language Studies

Accepted: March 24, 2024 **Published:** May 01, 2024

Research Article

ESLE Game-based English Vocabulary Learning App for Exceptional Iranian Students: Teacher's point of view

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ABSTRACT

The aim of this study was to investigate the effectiveness of (ESLE) Exceptional Students English Learning game-based app to help students with English vocabulary learning disabilities to gain vocabulary skills in and after school program. To this end, 40 exceptional students with intellectual and physical disabilities (20 in each group), grade 7th to 9th junior high school, 30 special needs education teachers, and 30 parents of exceptional students were selected. The four exceptional students' teacher who worked in special education schools were interviewed to elicit the needed information for the purposes of the study. The first part of the semi-structured interview used in this study was related to ESLE app. The second part of the interview was related to their perceptions about collaboration with families. To this purpose, parents' and teachers' perceptions and practices of game-based app to support exceptional students were examined. Thus, the study addressed the issue of students with disabilities by reviewing the challenges faced by teachers who teach students with disabilities and how they overcome these challenges. A mixed-method design by extending with follow-up phase to measure whether exceptional students retained the knowledge they learned while engaging with the app was used. The results of the study showed that all of the exceptional students improved vocabulary skills after engaging with the game-based app. Findings have illuminative implications for many EFL teachers in applying an effective method in teaching new words. Also, the present research can offer implications for EFL exceptional students in that, instead of the traditional rote learning of words, they can try a mixture of different strategies like ESLE application in their own learning experiences. The course designers can also benefit from the findings of this study. They can supplement their courses for young learners with instructional strategies.

Keywords: exceptional students, Game-based App, English vocabulary learning, technology, parental scaffolding.

1.INTRODUCTION

English vocabulary knowledge and skills are needed for success in schools and many careers. Vocabulary Learning often seems to be of practical importance to the typical language learner (Zimmeman, 2001). Nation (2001) claims that knowledge of vocabulary implies knowing a word in the spoken form, and the spoken form can be realized and recognized in the context and out of context. The word meaning knowledge and the ability to access that knowledge efficiently is understood as important factors in reading and listening comprehension and writing and speaking. However, for students with a large amount of vocabulary knowledge is essential for language comprehension.

Also, vocabulary helps the language production of students. Nation (2006) stated that one way to decide on learning vocabulary goals in an English language-learning program is to realize the native speakers' size of vocabulary (Siyanova & Webb, 2016). Vocabulary researchers have advocated teaching approaches that capitalize on 'many forces,' primarily through teaching contextual, structural, and morphemic analysis skills (Brusnighan & Folk, 2012; Edwards et al., 2003), using channels of spoken language (Beck & McKeown, 2007), using texts to facilitate interaction and discussion (Lennox, 2013), and teaching for word consciousness and appreciation (Graves & WattsTaffe, 2008).

It seems that Game-based App, among other means, can also play a significant role. Recently, mobile technologies have been gradually integrated into learning. The extensive use of smartphones and wireless devices has changed learning in many contexts, including English language learning (Kukulska-Hulme, 2009). Various mobile applications (apps) have been developed to support different aspects of second/foreign language learning, including speaking, listening, reading, writing, grammar, and vocabulary. Although these apps, usually with sound, images, and interactions, are certainly appealing to learners, the second language pedagogy that underpins these resources and activities should never be ignored.

Until recently, the evaluation of using mobile apps for English learning from language learners' perspective is still at an early stage. Therefore, this study is intended to investigate how we might draw on existing learning theories to help us analyze and evaluate the current mobile app for English vocabulary learning.Twenty-first-century classrooms are increasingly embracing new technologies for their potential to facilitate learning for students of all abilities. The flexibility of technology gets the teacher's ability to differentiate their teaching in such ways that were not possible when limited to traditional classroom media (Meyer & Rose, 2005). While technology has well-documented use in general education classrooms, it also presents many benefits for students with exceptionalities. However, in classrooms that consist of students with various exceptionalities, technology can maximize educational opportunities and improve outcomes (Jenson, Taylor, & Fisher, 2010). One-way teachers can aid exceptional language learners in their attempts to absorb more vocabulary items in a foreign language is by using different technologies available to students. One of the technologies that can be conveniently employed to help learners is the ESLE Game-based application, which is dominating most of the students' lives and is not just a communication app. ESLE Game-based app is easy to sign up and use. It is a collection of funny images that can be used in learning vocabulary besides text. Through it, we can share various document types. ESLE Game-based app is a multiple platform app that can run on android, iOS, Windows Phone, Mac, and Windows OS. Moreover, the ESLE Game-based app account can be accessed from multiple devices, even at a given time, and messages appear simultaneously on all devices. In other words, this technology has brought about a new type of language learning. ESLE Game-based app tends to expand access to education. Through the ESLE Game-based app, learning can occur anytime and anywhere. Since exceptional students are actively involved in the English vocabulary learning processes in ESLE Game-based app classrooms, they are recognized by the teacher to make decisions and plans (Lu, Hou & Huang 2010). ESLE Game-based app, therefore, provides both learners and instructors with more educational affordances and possibilities. In order for students to be life-long learners, schools need to change what and how teachers teach to match “what people need to understand, how they can learn, and where and when they learn and change our perception of who needs to learn” (ISTE, 2015, p.3). Although the Office of Education Technology suggests

that special attention should be given to learners with disabilities, “struggling readers are frequently denied access to online experiences because their offline literacy skills are understood to be insufficient to allow success” (Castek, Zawilinski, McVerry, O'Byrne, & Leu, 2011, p.91). When technology is used in special education settings, the tools appear in the form of “assistive or instructional and seldom used to produce digital artifacts” (Pandya & Avila, 2017, p.123). When students receive enough education for collaborating better with families, they can better understand how to interact with families (Bruine, Willemse, D'Haem, Griswold, Vloebergs & Eynde, 2014). All exceptional students will benefit from teachers who academically and developmentally collaborate with families (Epstein, 2011; Desforges & Abouchaar, 2003; Jeynes, 2007; Uludag, 2008; Henderson & Mapp 2002; Hattie, 2009; Evans, 2013).

The use of mobile technologies turns out to be well aligned with educational goals such as extending learning opportunities, improving student achievement, supporting differentiation of learning needs, goals, and learning styles, and deliver authentic learning materials to students who would otherwise have no access to them (Kukulska-Hulme, 2009). Although it seems to be ubiquitous, there is no agreed definition of 'mobile learning' or 'm-learning' (Kim & Kwon, 2012; Kukulska-Hulme, 2009). While technology has well-documented use in general education classrooms, it also presents many advantages for exceptional students. In other word, assistive technology consists of various devices and services specifically designed to help exceptional students. However, in classrooms with various students with disabilities, technology can maximize opportunities for education and improve outcomes (Jenson, Taylor, & Fisher, 2010). The teacher's role is an often over-looked determinant in discussions about technology integration (Bitner & Bitner, 2002). As teachers hold the responsibility for classroom operation, this is problematic. Therefore, their perception of technology will influence how regularly and effectively technology will be used to support student learning. Students’ differences may be related to language, physical, psychological, emotional, cognitive, or social factors, or a combination of these. Teachers are among the key contributors to the success of technology integration for learning and instruction (Wang & Reeves, 2003). Notably, teachers of exceptional students are expected and required to demonstrate competency by integrating and using technology into their exceptional students' educational programming when necessary (Dell, Newton, & Petroff, 2008). Research has shown that vocabulary knowledge is essential for any language proficiency. It is the basis of any language learning skill. It was beneficial to better understand ELT teachers' challenges with students who have disabilities so that recommendations based on these data and best practices can be introduced to the school administrators for possible improvements to address the problem in the research setting. As stated above, this study provides insights into how technology can support learning activities at the classroom level and into the practical and organizational factors that promote or hinder technology implementations within schools. For this reason, research questions specify at both the classroom and the teacher levels.

RQ1: *Is there a significant difference in vocabulary achievement between exceptional Iranian EFL students who learn vocabulary through the game-based app and conventional method?*

RQ2: *What do parents perceive to be the pros and cons of using the game-based ESLE app to Iranian EFL exceptional students?*

The following hypothesis is formulated to achieve the aims of the study:

H01: There is no significant difference in vocabulary achievement between exceptional students who learn vocabulary through game-based applications and exceptional students who learn vocabulary in the conventional method.

2.LITERATURE REVIEW

2.1.Learning Disabilities in vocabulary learning, Dyslexia

There are two kinds of learning disabilities in vocabulary learning. One is in necessary reading skills and involves the essential skills needed to realize the relationship between the alphabet, sounds, and the words

they represent. The second one is reading comprehension disabilities, which requires complex thinking skills such as understanding words, phrases, and more significant meanings of passages. Dysgraphia or Learning Disabilities in Writing include neurologically based difficulty with producing written words and letters. Expressive writing disabilities may involve comprehending and organizing written thoughts on paper. These can be in terms of Learning Disabilities in Basic Writing Skills, Expressive Writing Disabilities. If the child struggles with vocabulary meaning or problem-solving, one can suspect a type of learning disability. These learning disabilities could be in basic vocabulary, applied vocabulary skills, and other disorders like dyscalculia.

2.2. Learning Disability (LD) in Basic English Skills

There are various types of learning disabilities in language. Students with language-based learning disabilities may have difficulty with understanding or producing spoken word, or both. A disorder of receptive language is a type of learning disability affecting the ability to understand spoken, and sometimes written, language.

2.3. English vocabulary learning disability

Several studies have been published since the last comprehensive review of the research was located. Four instructional methods were introduced to be practical: mnemonic instruction, learning strategies that utilized morphemic analysis, direct instruction, and multimedia instruction. Moreover, peer-mediated guidance was found to be a practical approach to supporting vocabulary learning. However, it was not possible to analyze the effects of peer mediation from the instructional methods used. Similar to reviews of vocabulary instruction for secondary-age students with LD by Bryant et al. (2003) and Jitendra et al. (2004), in a study by Kuder found that vocabulary teaching for secondary-age students with a learning disability could lead to advantages in vocabulary knowledge. Most of the studies were conducted in general education classrooms, included exceptional students. The remaining review (Terrill et al., 2004) was implemented in a self-contained special education classroom. The survey conducted by Terrill et al. (2004) used words from a vocabulary workbook designed to prepare students for the SAT. Another study (Harris et al., 2011) used vocabularies selected by the researchers with at least one high-frequency Greek or Latin root and a suffix or a suffix. Researchers claimed the intervention in two of the studies; teachers instructed the other studies. Five of the seven studies explained the use of treatment fidelity procedures (Harris et al., 2011; Hughes & Fredrick, 2006; Kennedy et al., 2015; Kennedy et al., 2014; Seifert & Espin, 2012). Various interventions were utilized in the studies, such as mnemonic methods (Terrill et al., 2004), strategies of learning (Harris et al., 2011), peer-mediated methods (Shook et al., 2011), direct instruction (Seifert &Espin, 2012), repeated reading (Seifert & Espin, 2012), and a multimedia approach using podcasts (Kennedy et al., 2015; Kennedy et al., 2014). Learning has been described in different ways. Based on Farrant (1996:107), education is "the process by which we achieve and maintain knowledge, understanding, attitudes, skills, and capabilities that cannot be attributed to inherited behavior patterns or physical growth." Learning results should be considered based on an understanding of the core processes within the specified content standards. Farrant (1996) explains that as far as learning is concerned, the teacher must efficiently help the learner go through each learning stage. Therefore, Efficient learning requires readiness, motivation, and involvement on the part of the student. These factors are explained as follows:

a) Readiness: Readiness for learning depends on physical and mental maturation and the accumulation of experience as the basis for new learning. An eager response often shows readiness in a child to learning tasks and is always accompanied by rapid progress.

b) Motivation: This is a requirement that examines how much effort an individual put into learning. There are less effort, energy, and enthusiasm to learn if it limited the student's motivation. The desire and interest of the student is his or her motivation. (Curzon, 1996)

2.4. Exceptional students with learning vocabulary Difficulties

Lewis and Doorlag (1983) describe that if learning difficulties are suspected, the teacher should refer students for individual education assessment. Parents are notified of the reasons for the referral and presented with an assessment plan prepared by the educational team. If consent is given for individual education evaluation, a group of experts must begin to collect information about the student. There are several strategies for exceptional students with vocabulary learning difficulties. Thus, Koppitz (1973) explains that there are no specific techniques and methods for teaching or technology, which can be utilized as a cure; thus, teachers should apply a wide range of instructional materials and methods. Many years ago, Bryant, Goodwin, Bryant, and Higgins (2003) started reviewing the research literature on vocabulary teaching to secondary-level exceptional students with vocabulary learning disabilities (LD) by noting the increased requirements for reading the secondary level.

A review of evidence-based interventions for adolescents with difficulty reading by Scammacca et al. (2007) introduced five kinds of interventions that have been found to improve reading outcomes: comprehension strategies, word study, fluency, vocabulary, and multi-component methods. Of all of these approaches, vocabulary interventions yielded the most significant effect size (1.62). Mainly, vocabulary instruction has been found to improve reading comprehension outcomes, particularly for exceptional students with reading difficulties (Elleman, Lindo, Morphy, & Compton, 2009). for instance, Bos and Anders (1990) reported that the use of interactive vocabulary strategies such as semantic mapping and semantic/syntactic feature analysis resulted in significant improvements in short- and long-term recall of information from science texts. All of these factors —age students with disabilities, the documented literacy difficulties of this population, the effectiveness of evidence-based vocabulary instruction, and the association between vocabulary instruction and improvements in reading comprehension—suggest that it is essential to determine the most effective methods for teaching vocabulary to secondary-age students with LD. Despite the importance of vocabulary instruction for the reading success of adolescents with reading difficulties, there has been only one review that specifically targeted vocabulary instruction for this population (Bryant et al., 2003). At that time, Bryant and her colleagues were able to identify only six research articles that conducted eight studies on vocabulary instruction with middle or high school-aged students with LD. Despite the limited research base, the authors reported that vocabulary instruction such as computer-assisted instruction, fluency-building vocabulary practice activities, mnemonic strategy instruction, and conceptual enhancement instruction could improve the learning meanings as well as reading comprehension, especially when students were interactively engaged through the use of mnemonics, semantic feature analysis, and semantic mapping. Jitendra, Edwards, Sacks, and Jacobson (2004) reviewed the research on vocabulary instruction for students with LD from 1978–2002.

Although Jitendra et al. reported positive results for activity-based instruction, the only study utilized this method with secondary-age students (Scruggs, Mastropieri, Bakken, & Brigham, 1993) said no improvement on measures of vocabulary. Like Bryant et al., Jitendra et al. also found that the most effective interventions could be implemented efficiently in the classroom. The results of both the Bryant et al. (2003) and the Jitendra et al. (2004) reviews indicate that specialized vocabulary instruction can improve the vocabulary acquisition of secondary students with LD and do so with relatively limited instructional time.

2.5. Technology

The importance of technology in education Learning with technology has become essential in today's schools. Recent literature has challenged these suggestions and accept that, although exceptional students today may have been live in a technologically rich world, they may not be avid and skillful users of technology (Bennett, Maton & Kervin, 2008). Incorporating technology into the curriculum came about through a concern that we may have been teaching about and teaching how to use technology without addressing how students can apply technology-related knowledge and skills. The critical role that

technology plays in education allows teachers to create meaningful learning experiences. This situation is not new for teachers; we have always considered the tools and resources that best support students' learning activities. However, the improvement and accessibility of technologies have made the possibilities seem almost endless. A teacher has many concentrations and effects in creating learning experiences for exceptional students, and the proper use of technology is but one of those considerations. Resources of Digital learning support information processing by helping students to develop mental representations through the mix of media elements presented to them. They combine multimedia elements, including text, image, video, and audio, to give information. Research on multimedia learning has described more positive outcomes for exceptional students who learn from resources that usefully combine words and pictures, rather than those that include words alone (Mayer, 2008). English vocabulary teaching and learning activities are useful when using media connected with technology to improve students' understanding and interest in the topic. Information technology is a crucial way to make the multiplier effect of learning (Wu & Tai, 2016). Technology is a secondary tool for improving innovative teaching models. Considering the popularity of technology in our society, especially for students, many educators try to design their integration into reality (Ekmekci & Gulacar,2015). Game-based learning, on mobile devices, is an alternative learning media being developed by researchers to create a fun learning that is simple to recognize and available. Mobile devices are leads to the use of mobile phones as a learning media. Learning based on mobile devices (mobile game-based learning) is an alternative learning service that can be implemented anywhere and anytime (Darmawan, 2012).

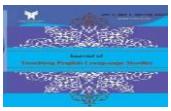
2.6. Mobile Learning

Franklin (2011) defined mobile learning (M-Learning) as "learning that happens anywhere, anytime" on any devices (p.261). With M-Learning, people can reach the content faster and efficiently. M-Learning does not require people to be any specific location for the learning process; it brings the material to people. Students participate in learning activities, such as drills and practices (most of the applications for mobile devices have been created for these activities) in the education field, using the critical accessibility and portability features of mobile devices (Cakir, 2011). M-Learning also supports group work, increases the opportunity of communication and cooperative learning by improving students' motivation to engage with learning activities in classrooms.

Mobile devices such as phones, smartphones, mp3, mp4 players, iPods, netbooks, laptops, tablets, iPads, and e-readers have become very popular for different users all over the worlds (El-Hussein & Cronje, 2010; Franklin, 2011; Kalinic, Arsovki, Stefanovic, Arsovski, & Rankovic, 2011). The younger population is known as digital natives since these devices are commonly used among them, specifically the tools especially prevalent among students at universities (Cheon, Lee, Crooks, & Song, 2012; Kalinic et al., 2011; Park, Nam, & Cha, 2012). Therefore, this common usage of mobile devices changed learning patterns and activities, and the idea of learning by using these devices became a trend in many fields (Jeng, Wu, Huang, Tan, & Yang, 2010). Applications on mobile devices help all learners from different ages, levels, and even abilities. Mobile devices increase students' academic achievement, including English (Cumming, Draper Rodrigues, 2013; Farmer, 2013), expand on-task behavior of primary grade students having Emotional Behavior Disorders (EBD) during independent academic activities (Flower, 2014).in other words, support in developing communication skills for second language learners (Demski, 2011). Moreover, it offers to model for students with autism spectrum disorder (Burton, Anderson, Prater, & Dyches, 2013; Hammond, Whatley, Ayres, & Gast, 2010). Mobile learning provides opportunities for learners to build their knowledge in different contexts, and help learners construct their understanding.

2.7. English Vocabulary learning for exceptional students via game-based learning

Knowledge of Receptive vocabulary is recognized and realized its meaning by students when listening or reading the text. Students understand and recognize the meaning of words that lead to perceive the text but



not utilize to write or speak. Receptive vocabulary learning usually in the form in which the teacher will often deliver the definition of the vocabulary, writing the word in a sentence, and request the students to only pronounce and spell (Nagy, Anderson & Herman, 1987; Webb, 2005). knowledge of Productive vocabulary suggested as the words that are realized and can be asserted by the students. Students can utilize the vocabulary in their writing and speaking well. In such a way, productive vocabulary can be observed as an active word process because students can create words to show their feeling and thoughts and understood by others (Webb, 2005). knowledge of Productive vocabulary has assumed the ability to restore the meaning and structure of the word (Laufer et al., 2004; Webb, 2008), or to pass on the word as in the original students' language (Webb, 2009).

2.8. English vocabulary learning

Vocabulary skill is critical to be a competition for success and quality of life. Exceptional Students with English vocabulary learning disabilities need more time to process when teachers introduce new concepts. They need differentiated practices compared to their peers who are not struggling in English. Nevertheless, teachers state a lack of time, although they want to provide instruction based on their needs. When teachers lack knowledge, problems increase (Darling-Hammond, 2010). Because of problems including quality teachers, lack of time, and resources, researchers, such as Ross and Bruce (2009), support the use of technology which "could provide the sequencing and scaffolding that teacher might have difficulty providing" (p. 713). Technology also provides real learning opportunities for people to learn English (Allsopp, Kyger, & Lovin, 2007). More than 603 million people in the world speak English as a foreign or second language (Lewis, Simmons, & Fennig, 2015). The English vocabulary is extensive, with more than one million words, and continues to grow and change daily with neologisms from the ever-evolving technological growth and cultural expansions in the world (Global Language Monitor, 2014).

2.9. Traditional Vocabulary Learning

Traditional teaching methodologies are teacher-centered. The teacher is viewed as the primary source of knowledge and is responsible for transmitting new information to passive receivers of information. Scrivener (2005) described traditional teaching methodology as the "jug and mug" (p.17); the teacher is the jug full of knowledge who pours information into the empty mugs, filling students with new knowledge. Just being in the teacher's presence and active listening is often enough to ensure learning occurs (Boumová, 2008). This direct instruction is followed by repetitive practice and drilling. The use of literal translation from one's native language is often employed, and memorization is stressed rather than the application of the words in context. Traditional teaching and learning methods focus on the written language, rather than incorporating the vocabulary in all four language domains: listening, reading, writing, and speaking (Bromley, 2007). Traditional methods of learning academic vocabulary involve a vocabulary list, looking up words in the dictionary, copying down the definition, and using the new vocabulary words in a sentence (Bromley, 2007). Riahipour and Saba (2012) mentioned that traditional activities such as memorization of long vocabulary lists, derivations, repetition of words, translation, fill-in-the-blank exercises are boring for students. Scrivener (as cited in Riahipour & Saba 2012, p.1259) states that using a long list of words and their translation items makes no guarantee that remembering will occur. By using vocabulary games, the learning process will be more valuable. This method can make vocabulary learning more enjoyable, helping students retain target words more quickly. Teachers employ word lists, in-depth explanations, memorization drills, and vocabulary books or worksheets to teach vocabulary in the traditional sense. Further, Richards (2010) explained traditional methods include memorizing dialogues, question/answer practice, substitution drills, and guided speaking and writing practice with an emphasis on memorization of words rather than the ability to apply the concepts in context and create new sentences using the vocabulary. According to Bromley (2007), these methods ignore current research and theory and are simply outdated.

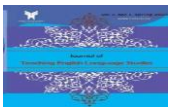
Teachers who use these traditional methods may not get the desired outcomes for academic vocabulary acquisition. "Overuse of dictionary hunting, definition writing, or teacher explanation can turn students off learning new words and does not necessarily result in better comprehension or learning" (Bromley, 2007, p. 532). Another traditional approach is the vocabulary workbook, where words are given in lists with a few activities printed for students to complete. For example, sentences and definitions are given, and students are required to match the words and definitions simply. The workbook approach may not provide a productive learning environment in which students can actively and repeatedly engage. Not all traditional teaching methods for academic vocabulary acquisition are outdated; an example would be using text to introduce and develop the meaning of new words. Kelley et al. (2010) used current scholastic magazines to give students experience with new words in context with familiar and relevant topics. The researchers specified this approach is not the only instructional method they employ, as students require skills from multiple modalities (Kelley et al., 2010). There is enough research approving the use of text to teach academic vocabulary in context. However, by limiting the teaching strategies to these age-old methods, teachers may not be as effective in reaching today's adolescents. Language learning, especially academic language, must be meaningful and relevant and promote both receptive and productive communication.

Alternatively, Aghlara and Hadidi- Tamjid (2011) conducted a study on the effects of using a digital computer game on improving Iranian children's vocabulary learning. The study participants were 40 six to seven-year-old girls with no prior knowledge of English, divided into two groups of experimental and control. Their research indicated that the mean score of the children in the experimental group was higher than that of the control group. This showed the positive effect of using digital games in teaching English vocabulary to children; therefore, they suggested that "Using games in young learners smooths their learning because the games capture their attention and motivate them" (p.555).

Similarly, Aslanabadi and Rasouli (2013) conducted a study on the effect of games on improving Iranian EFL vocabulary knowledge in kindergartens. Their study aimed to find a way to help young EFL learners fix the new vocabulary in their minds.

2.10. Game-based Learning

A game is described as "a creative competition managed base on the rules with the participation in direct opposition to each other" (Merriam-Webster, 2017). Games are fun and engaging and have an intrinsic component that keeps people coming back to play. Gameplay has been on the increase for both boys and girls, and recent estimates say 99% of boys and 94% of girls engage in interactive gameplay (Joiner et al., 2011). Game-based learning is defined as an approach to learning with gameplay that has defined learning outcomes. It is "created to adjust subject matter with gameplay and the player's ability to maintain and use subject matter in reality" (EdTech Review, 2014, para. 1). It also enables students to work cooperatively, encourages participation and interaction, and promotes active learning. This learning strategy uses game-based mechanics, aesthetics, and plans to engage learners, motivate action and communication, and encourage problem-solving (Kapp, 2012). Balci (2015) identified educational games as "a game created to teach a subject in the form of software that runs on a computer such as desktop, laptop, handheld, or game console" (p.1). Game-based software (apps) on mobile devices is popular since they increase students' engagement regarding their motivations (Franklin, 2011; Hill, 2011). Many of these game-based apps were developed for different purposes, but the main goal was to increase students' engagement and increase the time students were exposed to content matter. However, the number of studies examining the effectiveness of mobile devices' applications to deliver elementary vocabulary instruction to improve academic achievements is few, even though many studies indicated a positive correlation between engagement and academic success in English vocabulary (NCTM, 2008). By downloading game-based educational apps, mobile devices can be easily customized to support individuals' particular learning needs. Since these apps provide fun activities, students' on-task behavior increased, which helped them learn difficult content such as fractions (Brown et al., 2011). Teachers meaningfully introduce English vocabulary instruction to



students using game-based apps on mobile devices, which probably increases outcomes. For this assumption, apps have been created to deliver guidance for any content matters that should be tested. Barab, Gresalfi, and Arici (2009) performed numerous quantitative and qualitative studies that regaling the benefits of game-based learning and promoted game-based learning as a means for educating the youth of today. Shaffer, Squire, Halverson, and Gee (2005) described game-based learning as "personally meaningful, experiential, social and epistemological" (p. 105). Foreman (2003) stated, "Games expose players to deeply engaging, visually dynamic, rapidly-paced, and greatly enjoying experiences of pictorial that make almost any sort of conventional schoolwork (especially when mediated by a lecture or text) seem boring by comparison" (p. 15). Game-based learning can create new and powerful ways for students to learn, allow them to play, think, and act ways that will prepare them for meaningful experiences in our "post-industrial, technology-rich, real-world" (Shaffer et al., 2005, p. 111). This statement relates well to the adolescent ELLs who are often too shy or are afraid of sounding foolish or making mistakes and the associated consequences (Halpern, 2001). Games can provide a safe and enjoyable environment for active learning. Similarly, Sobhani and Bagheri (2014) conducted a survey that unanimously showed positive attitudes from teachers and students concerning game-based learning. Educators felt games were "learning lubricants" (p. 1066), helping to activate students' minds to learn and retain materials presented at a higher efficacy rate than traditional teaching methods and learning. Gaming encourages visualization, experimentation, and creativity through play, all of which enhance learning (Amory, Naicker, Vincent, & Adams, 1999). Hwang and Wu (2012) explained that several quantitative studies have reported that educational computer games have increased motivation among students.

However, the area of academic vocabulary acquisition for middle school English language learners is still needed for further research. Therefore, choosing appropriate apps designed to meet the pedagogical needs of students is critical. Using real-world examples by interactive games was suggested since it is natural that students in elementary schools like to play educational games in English (Griffin, 2007); therefore, game-based learning gains popularity among teachers in teaching English vocabulary instruction. The use of English vocabulary games promises exceptional students benefits due to games increasing their engagement and motivation. Considering the features of games and the exceptional students with English vocabulary learning disabilities, the ESLE app might help exceptional students overcome English vocabulary anxiety by increasing their motivation and trying to play English word games repeatedly when they are not successful. Because, while playing a game, "losing is not losing," and "hard is not bad and easy is not good" (Turkay, Hoffman, Kinzer, Chantes, & Vicari, 2014, p. 9).

Since exceptional students have this notion, they never lose their motivation to play. Playing interactive games increases students' excitement and interest in learning English vocabulary (Griffin, 2007). Besides that, gaming in English provides multiple opportunities for exceptional students, such as giving corrective feedback (Allsopp et al., 2007). If the apps offer corrective feedback, they may learn from their errors, which is a necessary form of learning.

2.11. Language learning through Gaming

Vocabulary learning is often boring for language learners, especially for those who grew up in the digital age. In this digital age, the Internet has opened up a world of possibilities for improving learning target vocabularies of learners. By using online games, teachers and parents can ensure that their learners are prepared for the exciting experience of reading and writing. (Turgut & Írgin, 2009). Games are an effective means for language learning and should be used at all stages of language learning development (Tuan & Doan, 2010). Games challenge students with goals to reach and rules to follow; they add an element of fun and serve as an integral part of any language curriculum. Reinders (2012), a proponent of game-based learning for language acquisition, edited and contributed to a book focused on language learning. Gaming forces students to actively participate in their learning while interacting with the language, peers, and

content. Levine (2006) also pointed out that games, more than books, movies, and music, force students to make decisions, which is an essential component of learning. Ragatz (2015) noticed that students are video/instant, and this native technology generation is learning in different ways. Ragatz (2015) found that game-based learning for vocabulary acquisition increased students' motivation to learn and increased overall awareness of target vocabulary in literature. Students also retained their learning from the games and could apply their learning in context (Ragatz, 2015). Many researchers have studied university English language learners to determine the effectiveness of game-based learning for vocabulary acquisition. One such study used non-digital games and found that games, in general, helped with vocabulary acquisition and retention (Hui-Chan & Chen, 2012). Al-Sharafat and Abu-Seileek (2012) studied web-based games with fifth grade English as a foreign language student in Jordan. They found significant gains in reading and writing skills and higher retention of vocabulary with their experimental group than the control group who received traditional instruction (Al-Sharafat & Abu-Seileek, 2012). Taheri (2014) concluded that game-based learning was beneficial for learning English as a second language. Zheng, Young, Brewer, and Wagner (as cited in DeHaan et al., 2010) realized that " learners' attitude and self-efficacy towards their foreign language increased due to the use of devices to speak with native speakers to complete questions in a game-like world. Vahdat and Rasti- Behbahani (2013) researched the influence of video games on Iranian EFL claimed that there is a positive relationship between gender and learning vocabulary through games.In another study, Dolati and Mikaili (2011) measured the influences of instructional games on facilitating students' vocabulary learning. Their study aimed to gain information about the role of the games in the level of vocabulary learning among students. Dolati and Mikaili (2011) realized that "Game has a convincible effect as an educational tool for training, and can engage and motivate students, especially the passive and quiet students in the learning process." Like other studies, Kalaycioglu (2011) investigated the effectiveness of the educational games on the preschool-level English vocabulary learning of four years old. His research revealed an essential difference in English vocabulary attainment in the experimental group, which was taught by the picture vocabulary games with a large effect size. Cornillie, Clarebout, and Desmet (2012) examined the cognitive benefits of the genre of digital role-playing games for foreign language learning, with specific attention to the role of focus-on-form approaches and language-directed feedback. They argued that digital games create opportunities to investigate how technology mediates the language learning process in ways that may have not been conceived of in traditional language learning environments.

In a similar vein, Efendi (2013) conducted a study on the use of games to improve vocabulary mastery. His research aimed to describe the way of "got it game" and "back to the board game" in improving vocabulary mastery of the seventh-grade students. The finding revealed that "the use of "Got It Game" and "Back to the Board Game" with the vocabulary of the topic of daily English communication, people's occupation, and personal care and appearance can improve students' vocabulary mastery achievement." (p.78). Turgut and Írgin (2009) investigated young learners' language learning via computer games. They conducted their research in the Internet cafe. According to (Turgut & Írgin, 2009), online computer games show potential in promoting learning. They also suggested that young learners' who playing online games can improve their language learning and especially vocabulary skills. Therefore, game-based apps facilitate students' problem-solving skills with English vocabulary learning disabilities and understand the app's targeted content (Carr, 2012). Even though thousands of apps are in the market, interestingly, the number of educational based apps is not as extensive as many other categories (Walker, 2011). Besides that, teachers have difficulty identifying the appropriate apps for specific students' needs. However, Yerushalmy and Botzer (2011) stated, "we consider mobile learning to be an important aspect of future changes in the curriculum and like classroom" (p.192). Bearing in mind teachers' claim about lack of time to prepare materials for students who need differentiated instruction, apps can be critical for teachers and students. Increasing the amount of exposure to English vocabulary instructions using game-based app might escalate the likelihood of students' benefits.

2.12. Developing and Application of (ESLE) Mobile Game-Based Learning for exceptional students

Mobile game-based learning is a game that consists of a brief of the lesson topic, is designed by various levels of education, is adjusted to the current curriculum, and can run on mobile devices. Because electronic games play a significant role in student's lives, researchers and educators hope to combine the intrinsic motivation that students show towards electronic games. That contains a summary of the lesson's topic and objectives to make learning more fun and enjoyable (Marina Papastergiou, 2009a). M-GBL has become a new trend in education as most mobile devices, especially smartphones and tablets, can run user-friendly mobile applications. Mobile games-based learning developed for English vocabulary learning, among other uses, is the ESLE application (exceptional Student Learning English Application) being developed. In ESLE, exceptional students can explicitly learn the English alphabet and words. Students can touch the screen to follow new words explicitly. A Multimedia Based game integrated with a scientific approach has enhanced student learning outcomes. The scientific approach to learning by using a multimedia-based game can improve the quality of English vocabulary learning and increase exceptional student understanding. The examples provided here are practical examples where a mobile application has been innovatively designed to enhance the value of e-learning in an educational context. In the form of a quiz containing a summary of the material and practice questions about English vocabulary, mobile game-based learning is operated with the help of a mobile phone with an Android operating system. English vocabulary learning presented as a mobile game will make exceptional students more interested and facilitate their understanding of the description of a word. Gaming activities are a good source of engagement and bring fun into English learning. It provides an instant appraisal for players when tasks are completed successfully, thereby motivating them to reach higher stages in the gameplay (Mathrani, Christian & Ponder-Sutton, 2016). Some researchers believe that teaching materials and techniques are not as good as having children learn via games by having fun and being happy (Norman, 1981). Games are readily accepted and used by exceptional students (Kafai, 1995). Furthermore, games can help exceptional students develop problem-solving skills (Seonju, 2002; Chuang & Chen, 2009; Lee & Chen, 2009; Blumberg, Rosenthal, & Randall, 2008; Shih, Shih, Shih, Su, & Chuang, 2010). Media ESLE is presented as an alternative to help exceptional students understand English vocabulary by using games on mobile devices. The use of ESLE app media in English vocabulary learning relates to students' learning independence. Student learning independence is one of the internal factors in a person that will lead to a sense of responsibility and confidence to achieve. Learning independence is very important for exceptional students because, with this attitude, exceptional students can discipline themselves to be responsible for the learning process. The learning environment with the ESLE app provides a means by which exceptional students can manage their English vocabulary learning (Chen, 2008).

2.13. Scaffolding in the Zone of Proximal Development

Wood, Bruner introduced the term scaffolding, and Ross (2001) to operationalize the concept of teaching in the ZPD (Wells, 2000). In the context of ZPD, scaffolding is utilized to describe the social, participatory, and social nature of teaching and learning, which occurs in the ZPD. Educators and researchers have used the concept of scaffolding as a metaphor to describe and explain the role of adults or more knowledgeable peers in guiding children's learning and development (Hammond, 2002; Daniels, 2001).Vygotsky defined the ZPD as "an area between the actual development level as measured by problem-solving independently and the level of potential development as determined through problem-solving under adult guidance or in collaboration with a more capable peer" (p. 86). The ZPD was understood by Vygotsky to describe the learner's current or actual level of development and the next level attainable through mediating semiotic. Envir Roosevelt (2008) holds that the primary goal of education from a Vygotskian perspective is to keep learners in their ZPDs as often as possible by giving them exciting and culturally meaningful learning.

Moreover, problem-solving tasks that are slightly more difficult than what they do alone. They will need to work together either with another, more competent peer, or with a teacher or adult to finish the task.

2.13.1. Parental Involvement

In the situation that studies have shown the most advantages of parental involvement, Numerous variables support students (Hara & Burke, 1998). In general, researchers agree that parental involvement has a significant effect on student academic performance. Schools have the responsibility to do their best to persuade parents to participate in their children's educational activities and schoolwork (Griffith, 1996).

2.13.2. Epstein's Six of Parental Involvement: Researchers acknowledged that parental involvement is necessary for students' academic growth; however, definitions of parental involvement differ. A traditional description of parental involvement includes participating in activities at school and at home, such as volunteering at school; communicating with teachers; assisting with homework; and attending open houses, back-to-school nights, and parent-teacher conferences (Bower & Griffin, 2011; Epstein et al., 2009; Hill & Taylor, 2004). Lopez, Scribner, and Mahitivanichcha (2001) defined parental involvement as "supporting student academic achievement or participating in school-initiated functions" (p. 78). Epstein et al. 's (2009) framework consists of six types of parental involvement. The primary obligation of parents (Type 1) refers to a family's responsibility to ensure the child's health and safety (e.g., parenting, child-rearing, continual supervision, discipline, and guidance at each age level) to providing favorable home conditions that support learning and behavior. The primary obligation of schools (Type 2) refers to communication with the school about academic progress (e.g., memos, notices, report cards, conferences). The schools' fundamental obligation (Type 3) pertains to parental participation in the school setting (e.g., events, workshops, or programs for educational growth). The primary obligation of schools (Type 4) is to communicate with parents initiating, monitoring, and assisting in their children's homework or learning activities. The essential requirement of schools (Type 5) refers to parents accepting decision-making roles in committees that monitor school improvement (e.g., Parent Teacher Association [PTA], advisory councils, or other committees or groups at school). The primary obligation of schools (Type 6) involves collaborating with the community, which pertains to integrating various community agencies and resources that support school programs (e.g., Title 1, after-school programs, parent institute committee) (Epstein, Coates, Salinas, Sanders, & Simon, 1997). Studies show that parents are, in fact, a strong independent variable in motivating their children to learn (Gonzalez-DeHass, 2005; Williams, & Holbein, 2005). Parental involvement corresponds to many school constructs, such as engagement, which includes attending parent-teacher conferences, contributing to extracurricular activities, monitoring student grades, imparting parental values, helping with homework, and providing intrinsic and extrinsic motivation. Gonzalez-DeHass et al. (2005) argued that when parents are involved in their children's schools, academic motivation and achievement increase. Students' interest in learning, competence, and understanding of a subject area, improves and promotes student achievement.

Overall, students whose parents were involved improved in reading more than their counterparts whose parents were not included. Hara and Burke (1998) also found increased student participation in school activities, improved attendance, and enhanced self-esteem.

3. METHODOLOGY

In this study, a mixed-methods design has been used. According to Dorniye (2005), Mixed methods research involves different combinations of qualitative and quantitative research either at the data collection or at the analysis levels. A mixed-methods design is characterized by the combination of at least one qualitative and one quantitative research component. Because the primary purpose of this study is to evaluate whether the ESLE app effectively teaches English vocabulary to exceptional students with difficulty with English vocabulary learning, mixed methods are appropriate for this purpose

3.1. Sampling procedure

3.1.1. The target groups

This study's target group consisted of 40 exceptional students with intellectual and physical disabilities (20 in each group), grade 7th to 9th junior high school, 30 special needs education teachers, and 30 parents of exceptional students. The students were male and female, and their first standard language was Persian. To obtain adequate information and answer the research questions, different English special needs teachers were selected, with two teachers representing each school. The parents were selected by the head of a unit for children with special education needs from each junior high school.

The researcher was the instructor of two groups of game-based applications and a control group. To select exceptional students, the researcher initially asked the teachers to determine appropriate students for the study.

Table 1

Profile of exceptional students

Name	Gender	Grade	Location	English proficiency
Exceptional student 1	Girl	7th	Isfahan	Low-level
Exceptional student 2	Girl	7th	Isfahan	Low-level
Exceptional student 3	Girl	7th	Isfahan	Low-level
Exceptional student 4	Girl	7th	Isfahan	Low-level
Exceptional student 5	Girl	7th	Isfahan	Low-level
Exceptional student 6	Girl	7th	Isfahan	Low-level
Exceptional student 7	Girl	7th	Isfahan	Low-level
Exceptional student 8	Girl	7th	Isfahan	Low-level
Exceptional student 9	Girl	7th	Isfahan	Low-level
Exceptional student 10	Girl	7th	Isfahan	Low-level
Exceptional student 11	Girl	7th	Isfahan	Low-level
Exceptional student 12	Girl	7th	Isfahan	Low-level
Exceptional student 13	Girl	8th	Isfahan	Low-level
Exceptional student 14	Girl	8th	Isfahan	Low-level
Exceptional student 15	Girl	8th	Isfahan	Low-level
Exceptional student 16	Girl	8th	Isfahan	Low-level
Exceptional student 17	Girl	8th	Isfahan	Low-level
Exceptional student 18	Girl	8th	Isfahan	Low-level
Exceptional student 19	Girl	8th	Isfahan	Low-level
Exceptional student 20	Girl	9th	Isfahan	Low-level
Exceptional student 21	Girl	9th	Isfahan	Low-level
Exceptional student 22	Girl	9th	Isfahan	Low-level
Exceptional student 23	Girl	9th	Isfahan	Low-level
Exceptional student 24	Girl	9th	Isfahan	Low-level
Exceptional student 25	Girl	9th	Isfahan	Low-level
Exceptional student 26	Girl	9th	Isfahan	Low-level
Exceptional student 27	Boy	7th	Isfahan	Low-level
Exceptional student 28	Boy	7th	Isfahan	Low-level
Exceptional student 29	Boy	7th	Isfahan	Low-level
Exceptional student 30	Boy	7th	Isfahan	Low-level

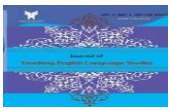
Exceptional student 31	Boy	7th	Isfahan	Low-level
Exceptional student 32	Boy	7th	Isfahan	Low-level
Exceptional student 33	Boy	8th	Isfahan	Low-level
Exceptional student 34	Boy	8th	Isfahan	Low-level
Exceptional student 35	Boy	8th	Isfahan	Low-level
Exceptional student 36	Boy	8th	Isfahan	Low-level
Exceptional student 37	Boy	8th	Isfahan	Low-level
Exceptional student 38	Boy	9th	Isfahan	Low-level
Exceptional student 39	Boy	9th	Isfahan	Low-level
Exceptional student 40	Boy	9th	Isfahan	Low-level

Table 2

Profile of parents

Name	Age	Gender	Occupation	Location	English proficiency
Parent A	40	Female	Teacher	Isfahan	Intermediate
Parent B	35	Female	Housewife	Isfahan	Beginner
Parent C	55	Female	Employer	Isfahan	Intermediate
Parent D	50	Female	Teacher	Isfahan	Intermediate
Parent E	65	Female	Housewife	Isfahan	Intermediate
Parent F	40	Female	Housewife	Isfahan	Beginner
Parent G	50	Female	Teacher	Isfahan	Advanced
Parent H	32	Female	Housewife	Isfahan	Intermediate
Parent I	48	Female	Doctor	Isfahan	Advanced
Parent J	45	Female	Housewife	Isfahan	Beginner
Parent K	62	Female	Teacher	Isfahan	Advanced
Parent L	30	Female	Housewife	Isfahan	Beginner
Parent M	28	Female	Nurse	Isfahan	Intermediate
Parent N	26	Female	Housewife	Isfahan	Beginner
Parent O	35	Female	Housewife	Isfahan	Beginner
Parent P	50	Female	Employer	Isfahan	Intermediate
Parent Q	56	Female	Teacher	Isfahan	Advanced
Parent R	63	Female	Doctor	Isfahan	Advanced
Parent S	71	Male	Employer	Isfahan	Beginner
Parent T	54	Male	Shopkeeper	Isfahan	Beginner
Parent U	42	Male	Teacher	Isfahan	Intermediate
Parent V	63	Male	Shopkeeper	Isfahan	Intermediate
Parent W	57	Male	Employer	Isfahan	Intermediate
Parent X	38	Male	Business	Isfahan	Advanced
Parent Y	45	Male	Accountant	Isfahan	Intermediate
Parent Z	67	Male	Employer	Isfahan	Intermediate
Parent Ch	66	Male	Business	Isfahan	Intermediate
Parent Sh	46	Male	Engineer	Isfahan	Advanced
Parent Kh	35	Male	Teacher	Isfahan	Intermediate
Parent Zh	63	Male	Dentist	Isfahan	Advanced

All the teachers' names, exceptional students' names and parents' names and are anonymous.



The following instruments were employed in the present study:

3.2. Interview

3.2.1. Semi-structured interview

With a semi-structured interview, it is possible to ask follow-up questions to get more valuable information. The first part of the semi-structured interview used in this study was related to ESLE app. The second part of the interview was related to their perceptions about collaboration with families. The research questions were translated from English to Persian, the national language of Iran, and the medium of instruction in all primary schools. For this reason, all participants were interviewed in Persian for better communication between the interviewer and the interviewees.

The 4 exceptional students' teacher who worked in special education schools were interviewed to elicit the needed information for the purposes of the study. All of the participants were also interviewed via telephone to discuss their perception of using ESLE English vocabulary learning app as a supplementary tool or substitution for exceptional students' book. Their feedback was noted down during the mobile interview and reviewed immediately afterwards. The time allotted to the interview was approximately 15 minutes for every teacher. The questions of each interview were formulated based on the main research questions and sub-questions. Through interviewing the teachers, more knowledge about the objectives of special education for teacher preparation programs and their perspectives on how family collaboration is integrated was gained.

3.3. Vocabulary test

In this study, 40 English vocabularies were used during the data collection process. Questions were collected from exceptional student's English book. Since vocabularies are seen in different forms, such as pictures, spelling, and counting numbers, the researcher wanted to have a variety of questions representing different word concepts. Questions consist of multiple choices. Questions were scored 0 (incorrect) and 1 (correct). And then, the researcher equally distributed the questions to 3 kinds of questions, consisting of 20 questions in terms of picture words, finding correct spelling and counting numbers. For the next step, the researcher sent questions to English professors. These teachers were chosen because of their expertise in English teaching and research area. They checked the quality, clarity, and structure of questions. They gave students some suggestions. The next step was to meet a faculty in the English department, considering the reliability of the questions. As a means for determining content validity (Johnson & Turner, 2003) of the question items, the researcher asked the English teachers, who check the clarity, and quality of the questions, to review the test items to determine whether these represent the targeted content, clarity of the items, appropriateness for participants, and whether the items align with the content in the app.

3.3.1. Open-ended and close-ended questionnaire

In the open-ended questionnaires, teachers were asked to summarize their specific patterns of ESLE apps for learning English vocabularies. In fact, Parents and teachers were asked to summarize their personal patterns of ESLE apps for learning English vocabularies and write down three things they liked and three things they disliked about the apps they used. Also, teachers were encouraged to note down the extent to which students had improved in English vocabularies through using the apps. They were welcomed to give any suggestions for further development of ESLE app.

3.4. ESLE Game-based App

ESLSE (Exceptional Students Learning English) app was developed at the Islamic Azad University of Shahreza by Ghobadi (2020) to improve exceptional students' understanding of vocabulary, alphabet, and spelling of words, and using the words in a game context. This game-based ESLE app is available for

multiplatform. In this game, a word is spelled and some pictures are shown, and the goal for players is to match the word with the related picture. They can only do this by placing the word on the correct picture. When students do not place a word at the correct point, the app provides several scaffolded clues to determine the correct placement of words. If the exceptional student is still unable to place the word to the correct point, the next picture will appear and is spelled. Similar words are also used as hints to help students to compare different pictures and words. ESLE offers different levels of difficulty to its audience: beginner to intermediate. The app also provides additional challenges within each level. The constant feedback while physically interacting with the game is an essential feature of ESLE. It provides reinforcement, such as verbal reinforcement, "clap or cry," and happy and sad stickers, which encourages exceptional students to play more. The app can also support core instruction by providing students with practice opportunities during the school day and after. ESLE is appropriate for exceptional students from grades 7^{th} to 9^{th}, considering addressed skills and grade levels. When we think about teachers' statements about time concerns in inclusive educational settings, the importance of this type of app might be realized. It provides exceptional students with opportunities to practice in and out of school, thereby making it possible for students to engage in more response opportunities, increasing their opportunities to develop proficiency and maintaining their proficiency. In this research, the "ESLE" app is the independent variable, and it was systematically manipulated during the intervention period. Furthermore, each individual has different points to differentiate in each phase, and even from person to person to demonstrate an effect in each phase.

In this study, because of the following features the ESLE was chosen: it

- was downloadable to different mobile devices including iPad, iPhone, smartphones, and tablets with an Android operating system;
- had online functionality;
- was quickly accessible;
- It contained features of a language learning app designed for exceptional students with different languages, including English and Persian;
- was designed for English vocabulary learning;
- was free;
- had app description; The app developers wrote the app description of every app in the app store with the following purposes:
- to present the intended goals and motives of the app;
- to introduce the app features from the developer's perspective;
- to provide some app development information.

3.5. Procedures

Two weeks before the study's commencement, the Key English Test (KET) as a general English proficiency test administered to examine whether the learners were homogenous in their general English abilities. The first instrument was a sample of the KET Test. The English language proficiency test used in this study was a sample of the Key English Test (KET) adopted from KET practice tests by Capel and Ireland (2008). KET is Cambridge ESOL's exam, which recognizes the ability to deal with everyday written and spoken English at a basic level. It has two pamphlets, and in the present study, due to administrational issues, the first pamphlet comprising vocabulary and reading comprehension tests was used. This section consisted of 20 questions, and the allotted time for completing the exam was about 40 minutes. The criterion for selecting homogeneous students was plus and minus 1SD or one standard deviation above and below the mean. In the subsequent session, the vocabulary pre-test was administered to the groups. A vocabulary test from the content of textbooks of 7th to 9th grades was designed to examine the participants' knowledge of vocabulary items. The test included 20 items multiple choice format. Considering the validity, the test had been expert-judged by three experts. The panel of experts reported the test with acceptable validity. The reliability of the test was reported based on the results of Cronbach Alfa. After the pre-test, students were divided into

two groups of game-based application groups and conventional group. The scores obtained from the vocabulary pre-test showed that the students were homogenized in vocabulary knowledge, and their levels in vocabulary were the same and without significant differences. Then, the researcher requested consent from families with students in the after-school program. For this study, the researcher used stratified and simple random sampling to choose participants. The purpose of sampling is to obtain a group of subjects representing the larger population (McMillan, 1992).

3.6. Data analysis procedures

An independent sample *t*-test was run to explore the effectiveness of the game-based application and conventional method of teaching vocabulary across two groups.

An inductive approach was used to analyze data, including the app description, user reviews, and app content that did not directly fit the data analysis matrix's categorization frame. First, the data of the app description, app content, and user review of each app in detail were reviewed. Every app description was divided into several new paragraphs according to each paragraph's inner meaning. Similarly, the app content was divided into different paragraphs based on the topic of each paragraph. A word or phrase was assigned to be a heading for each paragraph in this process. All user reviews were read and labeled each review with a heading that described the main idea of each review.

4. Addressing the first Research Question

RQ1: ***Is there a significant difference in vocabulary achievement between exceptional Iranian EFL students who learn vocabulary through the game-based app and exceptional Iranian EFL students who learn vocabulary in the conventional method?***

The second research question was an attempt to investigate the existence of any significant difference in vocabulary achievement between exceptional Iranian EFL students who learn vocabulary through game-based app and exceptional Iranian EFL students who learn vocabulary in the conventional method. To this end, a pretest and a posttest in vocabulary were run to the learners in both groups.

However, the differences among groups needed to be tested statistically, thus, the assumption of parametric test needed to be tested. One of the assumptions is that the data should be normally distributed. Table 3 shows the test of normality of pre-test in vocabulary between the groups.

Table 3

Kolmogrov-Smirov Tests of Normality in Pretest

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest Control	.138	30	.200*	.939	30	.229
Pretest Experimental	.128	30	.200*	.962	30	.475

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The Sig in the control group with df = 30 is .229, and the Sig of experimental group with df=30 is .475. As both of the significance levels are higher than 0.05; thus, the data is normally distributed. Again, the above tables are not enough for final conclusion to ensure the homogeneity of the groups under study before the treatment. So, there is a need for running an independent sample t-test to investigate the difference between two groups in the pre-test of vocabulary. The result of t-test of homogeneity at pretest is illustrated in Table 4.

Table 4

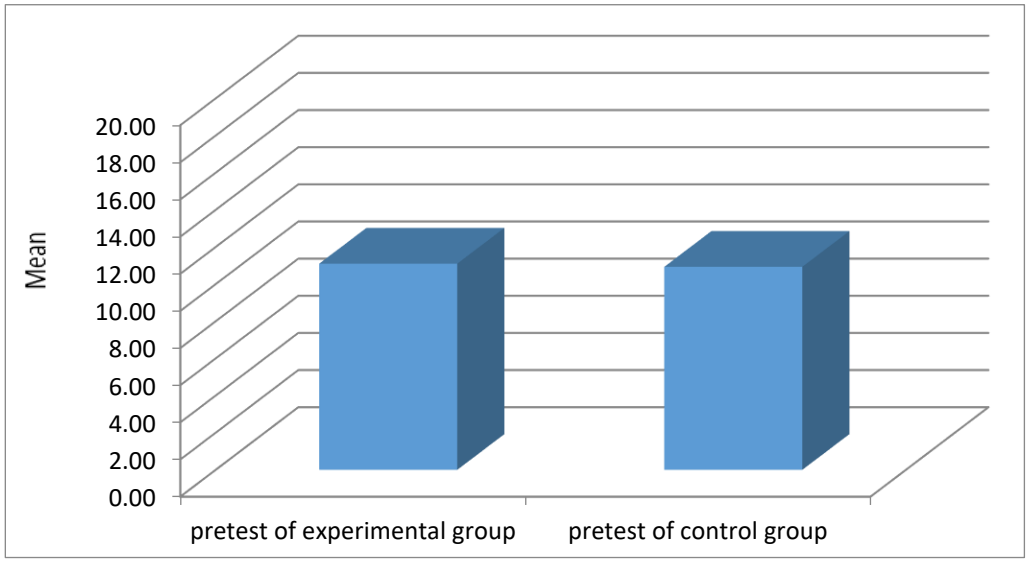
Independent Samples Test of Pretest

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	22.444	.740	.151	58	.881	.16667	1.10618	-2.04760	2.3809
Equal variances not assumed			.151	41.585	.881	.16667	1.10618	-2.06636	2.3996

According to the above table, Levene's test of the equality of variances is F=22.44 with a significant level of .740. As for the equal variances, the results show that the significant level of .740 is higher than 0.05. Since the p values in pretest of vocabulary of both groups are higher than the significance level (.05), it can be concluded that the data is normally distributed. Figure 4.3 show the bar graph of exception students at experimental and control groups at pretest.

Figure 1.

Pretest of Vocabulary



After treatment, a posttest on vocabulary was conducted between the groups under study. Table 5 presents the results of descriptive statistics of posttest.

Table 5

Group Statistics

	Groups	N	Mean	Std. Deviation	Std. Error Mean
	Experimental group	30	18.8667	1.33218	.24322
	Control group	30	14.7000	1.93248	.35282

Table 5 reveals that the mean scores of the exception students in treatment group or game-based app group is 18.8 with SD of 1.33. In addition, the mean of control group with the SD of 1.93 is 14.7. Similar to the procedure conducted to the pretest, there is a need to run a homogeneity test for posttest of vocabulary. Table 6 shows test of normality of posttest in vocabulary between the groups.

Table 6

Tests of Normality of Posttest

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Posttest Control	.128	30	.200*	.962	30	.575
Posttest Experimental	.128	30	.200*	.962	30	.489
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

The Sig of control group with df =30 is .575. The Sig of experimental group with df =30 is .489. Again, the above Tables are not enough for final conclusion to ensure the heterogeneity or difference of the groups under study after the treatment. So, there is a need for running t-test from pretest to posttest in vocabulary learning. Based on the research question, the null hypothesis claimed that there is no significant difference in vocabulary achievement between exceptional Iranian EFL students who learn vocabulary through game-based app and exceptional Iranian EFL students who learn vocabulary in the conventional method. As stated before, an independent t-test was run to investigate the difference among two groups from pretest to posttest in order to explore the effectiveness of game-based app on vocabulary learning of exceptional Iranian EFL students. The result is illustrated in Table 7.

Table 7

Results of T-Test in Vocabulary Learning

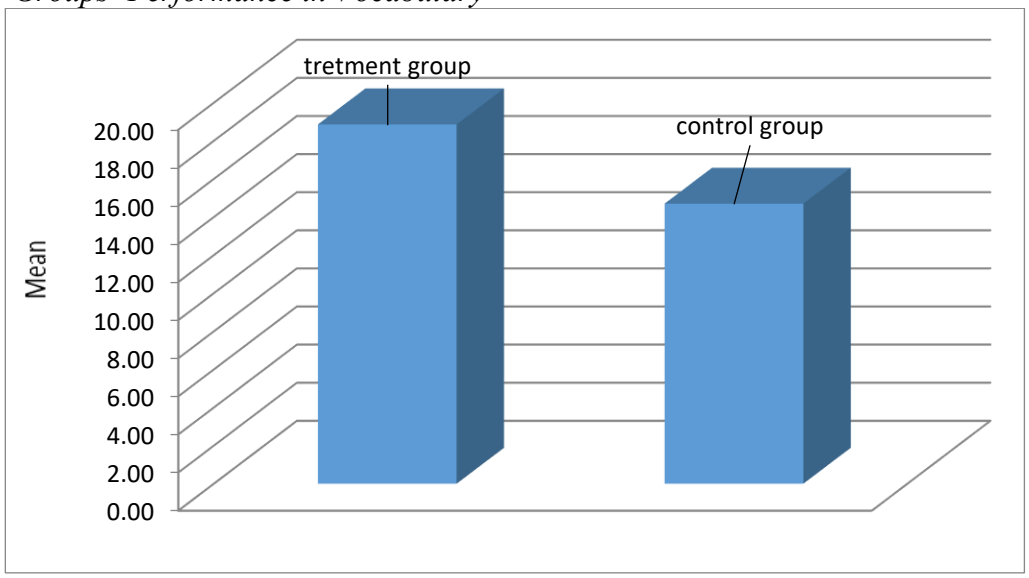
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Posttest Control	.128	30	.200*	.962	30	.575
Posttest Experimental	.128	30	.200*	.962	30	.489
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

According to the above table, Levene's test of the equality of variances is F=1.405 with a significant level of .003. The results also represent the t-test value of 9.72 to manifest the equality of means with a

significant level of .000. As for the equal variances, the results show that the significant level of 0.003 is less than 0.05. Therefore, the null hypothesis stating that there is no significant difference in vocabulary achievement between exceptional Iranian EFL students who learn vocabulary through game-based app and exceptional Iranian EFL students who learn vocabulary in the conventional method is rejected. It can indicate that there is a significant difference between the two groups in vocabulary learning. Hence, it is concluded that the exceptional Iranian EFL students who received game-based app instruction outperformed the group who received traditional vocabulary instruction. Figure 2 visualizes the results.

Figure 2

Groups' Performance in Vocabulary



5. Addressing the second Research Question

The last research question aimed to investigate the attitudes of exceptional students' parents towards game-based app via an open-ended questionnaire to evaluate the app for English vocabulary learning.

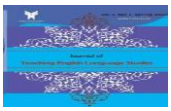
RQ2: ***What do parents perceive to be the pros and cons of using ESLE game-based app to Iranian EFL exceptional students?***

The questions and the answers of 30 parents that their children experienced working with game-based application listed below:

Please list three things you like and three things you dislike about the ESLE app.

►*Positive aspects:* Clear expression of words by spelling the part where a wrong word is selected, the feedback is obvious, attractive coloring, the audio of the app is very good, the pictures are interesting and attractive, high motivation, attractive learning environment, the program is fun and motivates the kids, convenient and full of content in accordance with the curriculum objectives, good training words, exceptional children also become familiar with letters, and the ability to repeat words.

►*Negative aspects:* Pronunciations were not clear, it entertains children on the phone, but it prevents them from doing other important things, hard application installation, monotony, it is not basically isolated for children, lack of meaning of words, lack of educational words. sound was not clear, and it is not designed and leveled for children on a basic basis.

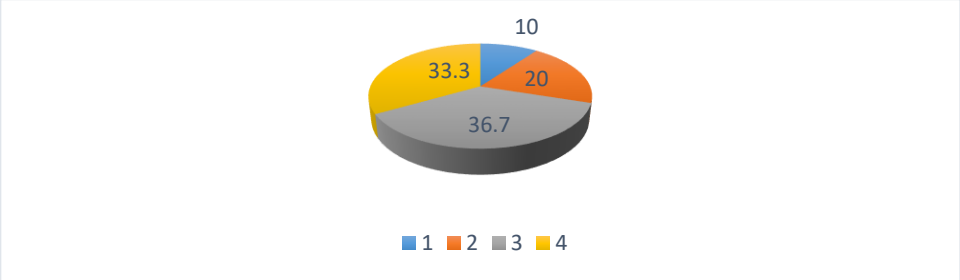


What aspects of English vocabulary of your child do you think have improved by using the app?
Writing letters, correct pronunciation, learning the letters, recognition of letters, learning the names and shapes of letters, spelling words, and learning English alphabet were the answers that all of the parents reported their children have improved by using the app.

Do you have any suggestions for further development of this app?
From the total 30 parents, 2 of them had no suggestion, but the rest had different point of views. Following are some extracts obtained from data gathering procedure.
►*The result of the test is determined by pressing the key.*
►*The initial and final test result can be determined by pronouncing the correct answer*
►*It was not uniform and it was difficult to install.*
►*It is better to separate this application for the seventh to ninth grades*
►*Use sentences;*
►*More Images;*
►*Use short films as well;*
►*I have no suggestion*
►*The app was great, I used it with no change*
►*Add sentences;*
►*I tried to add one part for instructing the names of public places.*

Please rate the app (from 1 to 5).
Figure 3 clarifies the results that the parents reported to the above question.

Figure 3
Praents' rating to the app



As it is clear from the above figure, 36.7% of the parents rated the app with the score of 3, and 33.3% rated it to be 4 as the highest score. Morever, a small number (10%) rated it with the lowest score of 1. Finally, 20% of the parents rated the game-based application as 2. In general more than half of the parents believed that the used application improved their exceptional children ability in English learning in general and vocabulary learning in particular and they rated it with high scores of 3 and 4.

As already stated, the main objective of the second research question was to explore the role of ESLE, a game-based mobile English vocabulary learning app, on vocabulary performance of exceptional English students. The results showed evidences of the effectiveness of application on improving disabled children who were learning English as foreign language. Using game-based English vocabulary for learning is very popular nowadays because it is portable with high mobility. With growing interest in the game-based app, these programs now are being used for education. Based on the results of the current stud, the game-based app can be used for motivating exceptional students to learn English vocabulary and facilitate learning English both inside and outside the school.

Based on the research question, the null hypothesis claimed that there is no significant difference in vocabulary achievement between exceptional Iranian EFL students who learn vocabulary through game-based app and exceptional Iranian EFL students who learn vocabulary in the conventional method. In order to test the null hypothesis, an independent samples t-test was used that its results showed that the t-test value of 9.72 to manifest the equality of means with a significant level of .000. As for the equal variances, the results show that the significant level of 0.003 is less than 0.05, hence the null hypothesis was rejected.

The results of the current study are in harmony with Gass and Selinker (as cited in Turgut & Irgin, 2009) that maintained the natural repetition in games allows a language learner to be continuously exposed to the target language, creating more opportunities for acquisition to occur. Furthermore, the results are in congruent with DeHaan, Reed and Kuwada's study (2010) that tried to explore the effects of music video game on second language vocabulary recall of Japanese EFL learners. Their justification for the effectiveness of games on language learning was the interactive nature of the games or "the extent to which users can participate in modifying the form and control of a mediated environment in real time" (p. 75).

They believed that the games incorporate various pedagogical elements to both entertain and train the player, and when a degree of interactivity between players and these elements takes place, learning happens.

The results of the current study are in line with Donmus's study (2010) who researched to achieve information about using educational games with the support of social networks in foreign language education. The result of his study showed that students who continuously interacted with Facebook benefited from educational games. In addition, the results are in congruent with Sudarmilah, et.al. (2020) who tried to make it easier for children to understand and foster vocabulary acquisition as well as to develop children's motivation in the learning process as this learning media is designed with an attractive and interactive interface. Edugame application which emphasized an android-based visual form was established as a support to the development of children's speech and reading skills. The development method used in designing this application is the prototyping model which consists of the needs analysis, prototype design, prototype evaluation, program writing/coding, program testing, program evaluation, and implementation. Edugame as vocabulary learning media for deaf children promotes an interesting and interactive learning process to improve children's understanding of words in learning vocabulary. The results of the black box testing, pre-test and post-test, paired sample t-test, SUS, and Aiken V revealed that all the results were valid, so it could be concluded that there were significant differences (real) before and after the use of the application in the learning process. Their reasons for the real effectiveness of the application under the study was its attractiveness and fun nature (very similar to the claim of the present research). This fantasy is enhanced through audio and graphics, attractive photos of English alphabet, and so on. Several studies suggest that the game show elements, graphics, points and, audio contribute to a more positive learning environment (Abidin & Zaman, 2017; Lee et al., 2019; Moutinho & Sá, 2018;). Several studies mentioned positive effects from the use of graphics, audio and music in games or training applications (Baydas & Cicek, 2019; Bicen & Kocakoyun, 2018). The aim when creating the current game-based application was to create a learning platform that was so engaging, fun, and motivating that it would positively affect the learning outcome, classroom dynamics, and reduce exceptional students' anxiety. The results of this study may suggest that there is a relationship between engagement, motivation, and having fun and learning outcomes and classroom dynamics, especially with exceptional students.

One justification for the effectiveness of the designed game-based English vocabulary app was the fact that the application made exceptional students more motivated and active in learning English vocabulary as the attitudes of their parents and their teachers approved this fact. The teacher controls the exceptional students learning progress and reviews what they have learned, and this corresponds to the benefits of using technology in English language learning. With this game-based English vocabulary app, exceptional students can choose when and where to learn. The whole process is student-centered learning.

The third research question tried to explore Iranian ELT teachers' perceptions about the pros and cons of using game-based app in the vocabulary learning classroom for teaching Iranian EFL exceptional students.

Based on the findings, EFL teachers believed that even though this application uses some content in English that is not at the level of students and parents and this causes discouragement, but compared to other language learning programs, it has a higher quality of learning, it is very fun and motivating and students enjoy learning the language due to its convenient nature.

The last research question was an attempt to involve the disabled children's parents in the process of the research and to investigate their attitudes to the pros and cons of using ESLE game-based app to Iranian EFL exceptional students. The 30 parents that their children experienced working with game-based application believed that the app has several positive aspects such as clear expression of words by spelling the part where a wrong word is selected, the feedback is obvious, attractive coloring, the audio of the app is very good, the pictures are interesting and attractive, high motivation, attractive learning environment, the program is fun and motivates the kids, convenient and full of content in accordance with the curriculum objectives, good training words, exceptional children also become familiar with letters, and the ability to repeat words.

The parents believed that the negative aspects of the application were the pronunciations that were not clear, it entertains children on the phone, but it prevents them from doing other important things, hard application installation, monotony, it is not basically isolated for children, lack of meaning of words, lack of educational words. sound was not clear, and it is not designed and leveled for children on a basic basis. In general, 36.7% of the parents rated the app with the score of 3, and 33.3% rated it to be 4 as the highest score. Moreover, a small number (10%) rated it with the lowest score of 1. Finally, 20% of the parents rated the game-based application as 2. In general, more than half of the parents believed that the used application improved their exceptional children ability in English learning in general and vocabulary learning in particular and they rated it with high scores of 3 and 4. The main conclusion of the present study is that game-based application has a positive effect on learning, but there are challenges and room for improvement. The study shows that there have been conducted several experiments on the learning effect of using games and application for disabled children and individuals, but there is still room for empirical studies, especially on classroom dynamics, student anxiety, and perceptions of exceptional students.

6. CONCLUSION

The main aim of the current study was to explore the impact of ESLE, a game-based English app, on vocabulary learning of exceptional students. The hypothesis under study was null ones and in order to confirm or reject them, t-test was run. Based on the results, the null hypothesis was rejected at P value less than 0.05 and the findings indicated that the role of ESLE game-based English vocabulary app was more significant in vocabulary learning of exceptional students. In addition, the attitudes of teachers and parents were the other focus of the study that the results of interviews and researcher-made questionnaire revealed the applicability and attractiveness of the application. Also, the pros and cons of the application were investigated for further study.

ESLE, a game-based English vocabulary app, was designed, developed, and tested in this study. The units and topics in the English book curriculum served as the basis for the game units and content. The game preferences served as the basis for the game types utilized within the in the game-based mobile application. This combined learning tool and game allows exceptional students to either learn or retain words they choose or words the app decides for them. This fun vocabulary app gives exceptional students definitions and tiles with combinations of several letters on them that you have to arrange into the new words. Based on the results, it was revealed that this app helped the exceptional student learn English words accurately and naturally. This app also assisted the exceptional students to check their learning outcomes and progress using an additional test. This app provided a comprehensive, in-depth word database, multiple words, realistic analysis, and audio pronunciations for unfamiliar words. In fact, games are motivating for EFL learners and as Uberman (1998) pointed out, games are a way to help students not only enjoy and entertain

with the language they learn, but also to practice it incidentally. Based on the results, it can be concluded that some techniques are effective in comprehension and production and the learners should be aware of the nature of different instructional strategies to trigger their own learners' interest in language learning and production.

As a final remark, it is sometimes proposed that games are just for fun and they have very little effect in teaching and learning. However, this research revealed that games, especially ESLE application, contribute to vocabulary performance of exceptional students if they give students a chance to learn and practice the language. To conclude, learning vocabularies through ESLE application was observed to be a significant and interesting way that can be applied for exceptional or disabled language learners. In the light of the findings, it is evident that using games may promote motivation and language acquisition. Then, it can be concluded that different instructional techniques can give different results, for this reason, it is suggested that EFL teachers as well as EFL learners should choose the best technique for learning a second language skill or sub-skill.

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