

The effect of mobile game apps on second language learners' motivation and vocabulary learning

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Abstract:

Technology has recently permeated every aspect of life. Technology, if integrated effectively, has the potential to facilitate the process of language education. Technology has already been widely employed in education. Furthermore, in recent decades, technology has plagued the field of language education. However, the use of cutting-edge technologies in language education has only recently come to fruition: literacy and augmented reality (Park & Khoshnevisan, 2019); augmented reality and teacher education (Khoshnevisan, 2019); animated pedagogical agents (Khoshnevisan, 2018); augmented reality (Khoshnevisan & Le, 2018). Researchers have employed an array of technologies in the language learning process (Cheng & Tsai, 2014; Wu, Lee, Chang, & Liang, 2013). To deepen our understanding of the role of technology in language education, multiple researchers have explored the perceptions of language educators and learners: Wojciechowski & Cellary, 2013; Di Serio, Ibáñez & Kloos, 2013; Wu, Chang, & Liang, 2013; Reinders & Lakarichua, 2014; Kuçuk, Yılmaz, & Göktaş, 2014; Cheng & Tsai, 2016. Mobile game apps have been recently recognized as useful technological

tools to motivate language learners and increase their vocabulary levels in different contexts (EFL & ESL). To gain insight into the studies conducted concerning mobile game apps and their use in language education, the author intends to conduct a systematic literature review to analyze the related studies. This analysis will amount to discovering the impact of these apps on language learners' motivation and learning gains. Beginning with the advantages and limitations of these apps, this article will present helpful pedagogical implications and future research ideas for emerging researchers.

Keywords: phone applications, second language teaching, education teachers, motivation

تأثير تطبيقات ألعاب الهاتف المحمول على تحفيز متعلمي اللغة الثانية وتعلم

مفردات اللغة

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دكتوراه في تكنولوجيا التعليم - الهيئة العامة للتعليم
التطبيقي والتدريب - الكويت

مستخلص:

أصبحت التكنولوجيا مؤخرًا في كل جانب من جوانب الحياة. إذا تم دمج تلك التكنولوجيا بشكل فعال، فإنه سيكون لديها القدرة على تسهيل عملية تعليم اللغة. تم بالفعل استخدام التكنولوجيا على نطاق واسع في التعليم. علاوة على ذلك، في العقود الأخيرة، ارتبطت وتوثقت التكنولوجيا بمجال تعليم اللغة كما اثبت بعض الباحثين (Khoshnevisan & Le, 2018).

ومع ذلك، فإن استخدام التقنيات المتطورة في تعليم اللغة لم يؤت ثماره إلا مؤخرًا، استخدم عدد من الباحثين تصورات الواقع المعزز وأثره على تعليم اللغة وتعليم المعلمين. لكي يتم تعميق فهمنا لدور التكنولوجيا في العملية التعليمية وتطلعات معلمي اللغة في استخدام التقنيات والتكنولوجيا في العملية التعليمية. أجرى مجموعة من الباحثين والتربويين دراسات عديدة بخصوص هذا الشأن (Cheng & Tsai, 2014; Wu, Lee, Chang, & Liang, 2013).

وللحصول على نظرة ثاقبة للدراسات التي أجريت بشأن تطبيقات ألعاب الهاتف المحمول واستخدامها في تعليم اللغة، يعتزم المؤلفين إجراء مراجعة منهجية للأدبيات لتحليل الدراسات ذات الصلة. سيصل هذا التحليل إلى اكتشاف تأثير هذه التطبيقات على تحفيز متعلمي اللغة ومكاسب التعلم.

الكلمات المفتاحية: تطبيقات الهاتف، تعليم اللغة الثانية، معلمين التربية، التحفيز

Introduction

It is evident that traditional eLearning methods are on the verge of extinction, and in the years to come, a more significant share of the learning programs, as a whole, will be made up of game-based learning. Game-based learning has emerged as a dominant educational force (Squire, 2005).

Games have become more potent because some provide situated experiences that immerse players in much more complicated, problem-solving tasks (Squire, 2005). Good games not only teach players facts, but they also provide them with ways of viewing and understanding problems and critically offering solutions to them. Studies also indicate that the correct balance of different dimensions used in creating games makes them practical for learning (Guillén-Nieto & Alison-Carbonell, 2012). These dimensions include the game's dimensions, instructional content, the cycle of the game, perceived educational value, and intrinsic motivation. More specifically, in the foreseeable future, game-based learning will be instrumental in reducing the gap between failing students and great ones (Van Eck, 2015). Research findings imply that integrating digital games into learning is crucial in enhancing educational skills in specific domains such as physics, mathematics, and medicine (Van Eck, 2015). Video games also improve learners' cognitive abilities; for instance, they eliminate divided attention and improve spatial visualization. It is more motivational for the students to learn English vocabulary through games (Lin, Young, & Hung, 2008).

According to Van Eck (2015), the time is coming when college students will be expecting video games as part of their curriculum. Additionally, he states that since serious games are being massively adopted in K–12 schools, higher education is likely to face many students with gameplay as part of their formal education (Van Eck, 2015). Currently, various serious games developed and have proven to be effective learning tools. Even those who do not play them now will be forced to play them in the future for educational purposes.

The learning activities involved in the system transform vocabulary learning from tedious memorization to game–based learning, enhancing learners’ vocabulary memory and familiarity with curriculum–related vocabulary through various multimedia (Yueh–Min Huang, 2017). Conversely, a two–digit value addition game is an example of a bad game that educators can use in the learning process. Through the use of two–digit value addition games, learners may be addicted

to them and thus making the games lose their intended meaning. Lastly, not all computer and video games are effective; some may not have educational value as intended by the educator. Games often portray a feel–good factor since they are usually associated with something fun and easy to undertake. The educational world has taken full advantage of combining gaming and education to instill different teachings that would be boring if conducted via the traditional classroom setup (Kurshan, 2016). This has led to develop more educational games to meet this need.

With the diversification and advancement in the education sector, learning methodologies have also changed. For instance, with the advance in technology, teachers are using it as teaching and learning aids. Through this advancement and diversity, progress in learning has been observed and experienced to a large extent. Besides technology, educators are also employing other strategies in the learning process such as games. However, this was a traditional method of learning, but with time, new games have been put in place and thus enhancing learning. Through the use of different learning and teaching methodologies, much is assimilated by learners, and there is excitement in the learning process (Chao et al., 2021).

Language learning and, more particularly, foreign language learning is not about the specifics of the grammar of a particular language, nor is it about learning the lexicon of a particular language. Language learning is broad and encompasses several other factors such as how knowledge is shared and how the process of language learning is affected by various interactions and communications that place within the periphery of language learning. Learning recognizes and appreciates the communication and interaction nuances that facilitate the learning process within the learning context. This inquiry will improve the input on foreign language learning as a process that connects with culture.

The researchers intend to investigate the impact of mobile apps on English language learners' cognitive attainment and motivation, so the gap is discovered. Accordingly, the present systematic literature review intends to (1) analyze recent studies related to the use of mobile game

apps in language education, (2) explore the constraints and affordances of the game apps through an in-depth analysis of the related articles, and (3) propose novel ideas for the practical implications of mobile game apps in language education as well as future research. To achieve that, the following research questions were crafted to usher the research path:

Questions

1. What is the effect of mobile vocabulary game apps on second language academic vocabulary learning?
2. What is the effect of mobile vocabulary game apps on second language learners' motivation level?

Method

Inclusion and exclusion criteria

Consistent with this backdrop explained in the literature review of this article, mobile game app-related articles will shape the crux of this literature review. Drawing on the prominent goals of this literature review, the researchers will include well-grounded articles in the technology and language education field. To that end, the researchers will search major journals that lie at the intersection of educational technology and language education, such as CALICO, Computer & Education, and Research & Practice in Technology Enhanced Learning to locate and retrieve the pertinent articles. The researchers will set out to include pertinent studies with all age ranges and different language proficiency levels. Our quest will investigate the relevant articles in language education to encompass all the relevant studies. Similarly, the following criteria will be developed to guide our article selection process:

- The articles can be empirical/concept studies including conference papers and published ones; The articles had to be peer-reviewed to guarantee quality.
- The articles have to focus on mobile game apps and the pertinent topics in language education, that is, language teaching and learning, not other subject matters.
- The articles have to have been published between 1999 and 2019 so that it can portray a complete picture of up-to-date studies. Further, the window of time is limited to the last 20 years since the use of mobile game apps has gained popularity.

Search Strategy

There were two main phases in the selection process of articles. In the first phase, a large number of articles were searched through education-related databases such as ProQuest and ERIC (Education Resources Information Center) using the search terms “mobile game apps and language education”, “mobile game apps”, “mobile game apps in language classrooms”, and “Mobile game apps in language skills”. Additionally, due to the fact that the topic is too specific,

The researchers will extend the search through significant journals within the fields that were indexed in the databases. For the second phase, important journals are selected as follows:

- British Journal of Educational Technology
- CALICO journal
- Computers & Education

- Computer Assisted Language Learning
- Journal of Educators Online
- Language Learning & Technology
- Literacy Practice & Research
- Modern English Teacher
- Research & Practice in Technology Enhanced Learning

After selecting and retrieving the articles, the relevant conceptual papers and empirical studies that meet the literature review inclusion criteria will be selected for further in-depth analyses.

The researchers employed different research approaches to conduct the game-based apps studies. The mixed methods approach with 12 articles took the lead in the last 20 years in the literature. Quantitative and qualitative methods followed the mixed methods studies with 6 and 2 articles respectively.

Table 1
Number of Studies by Design

<i>Study Type</i>	<i>Number</i>
<i>Mixed Method</i>	<i>12</i>
<i>Quantitative Study</i>	<i>6</i>
<i>Qualitative Study</i>	<i>2</i>

Description of the Included Studies

1. Study features and Analysis

All studies were coded with respective research methodology, the title of the study, author, research questions, the findings in terms of mean (M) and standard deviation (SD), and study limitations, among other features. Each of the experiments was categorized into subgroups (pretest and post-test) to enhance an easy understanding of the impacts of mobile game apps. The research methodology was made up of quantitative, qualitative, and mixed methods (both quantitative and qualitative studies). The main focus was to examine various ways in which game apps have been used to enhance second language learning and vocabulary acquisition by looking at how they have been successful in learning motivation. The researchers decided to include and identify the studies if they were moving towards the same conclusion. This was done by comparing the topic of the study, research questions, and the final results. We compared the outcome of the pre-test and post-test in both studies to identify the similarity. In the last section, we reviewed limitations and checked the gaps in the studies. Identifying the gaps would help in concluding the implications for future studies.

In this systematic literature review, each study is analyzed independently by looking at the type of research methodology (either qualitative, quantitative, or mixed methods) and the final results. To ensure reliability and validity, the researchers rigorously observed the findings

from all coded studies. This was to confirm the findings before making a summary and conclusion. The findings were presented in charts and tables to promote easy understanding.

2. Systematic review of the Findings

The researchers gathered several peer-reviewed articles on mobile game-based language and vocabulary learning and other related topics. In a total of 20 articles, 12 used mixed methods, 6 applied the knowledge of quantitative study, and 2 used qualitative study. We were interested in examining what is discussed in the peer-reviewed articles. Based on the outcome measures, studies in 13 articles had pre-test and post-test measures, one used mathematical concept of addition and subtraction, one had a writing task, and five studies had an unknown – type of measures. The studies mainly targeted the outcome in control and experimental groups. The results from each group were categorized as pre-test and post-test. Technological devices were used in all groups. Some technological devices used included smartphones, laptops, iPad, and computers. These devices were suitable for the studies because they used software applications.

Research Questions or Key Features

To answer the first research question

Table 2: One Group studies

Article	Measurement	N	Pre-test-M	Post-test M
Huang, (2014)		40	108.24	109.74
Masoumeh, (2014)		20	4.95	8.60

Shelley Shwu-Ching Young and YiHsuan Wang (2013)		52	51.36	60.63
Letchumanan & Hoon (2012)		40	12.7	13.5
Wafa Muhanna (2012)		160	68.93	70.45

Table 2 shows an improvement in performance by comparing the pre-test (108.24) and the post-test ($M = 109.74$). This implies that mobile game apps have a positive impact on vocabulary learning.

Huang (2014) conducted a Mixed-Method Study on Learning Vocabulary. The following are two research questions for the study. How do new technologies and vocabulary-technology integration strategies support students' vocabulary development? How effective are vocabulary technology strategies in helping these second-grade students to develop vocabulary? The research was categorized as experimental group and control group. The experimental group was more engaged in class activities and significantly improved in post-test (Huang, 2014). Conversely, the control group showed no difference in both pre-test and post-test, as presented in table 2. The study was composed of 40 learners (21 males and 19 females) who were chosen randomly for the study.

Masoumeh (2014) researched "Game-Based Tasks for Foreign Language Instruction." The study examined the effect of language games on vocabulary learning among Iranian learners. Also, he investigated the likeness of the differences between male and female engagement

concerning vocabulary learning in game-based tasks (Masoumeh, 2014). Forty language students were selected randomly for the study, where 20 were named in the comparison group, and the remaining 20 were in the experimental group. In the experiment, there were four types of games (flashcard memory game, hangman, odd man out, and bingo). After completion of the experiments, data analysis was done. The findings showed a significant difference between the comparison and experimental groups. The comparison group had no change, while the experimental group showed a shift in pre-test and post-test, as shown in Table 2.

Shelley Shwu-Ching Young and Yi-Hsuan Wang (2013) recorded a study on “The Game Embedded CALL System to Facilitate English Vocabulary Acquisition and Pronunciation.” The research questions are as follow, “Were there different learning interactions or behaviors between the learners in the two learning scenarios?” Based on Table 2, there was a significant effect of the game embedded call system.

This is visible from the changes observed after the pre- test and post-test. There was a noticeable difference in learning interaction in the comparison and experimental groups. The comparison group did not exhibit any change, while the experimental group showed improved performance as seen in the post-test.

In another article, Letchumanan and Hoon (2012) recorded a study on “Using Computer Games to Improve Secondary School Students’ Vocabulary Acquisition in English.” The research question is “Does the integration of computer games expand ESL learners’ vocabulary?” Initially, the subjects took a

vocabulary pre-test to identify and evaluate their vocabulary knowledge. Then, they were exposed to traditional vocabulary strategies using a dictionary, semantic mapping, and contextual clues. These three strategies were the most preferred vocabulary learning strategies chosen by learners in a research study involving (Four students). This method of acquiring vocabulary was carried out for seven weeks. After the seventh week, a vocabulary post-test was conducted, and their scores were recorded. It is apparent from Table 2 that the integration of computer games expands ESL learners' vocabulary. This is confirmed by a positive change observed in the pre-test (M= 12.7) and Post-test (M=13.5).

Is using online games for vocabulary learning more effective than traditional instruction as measured by the learners' post-test results?

Wafa Muhanna (2012) conducted a study on "Using online games for teaching English vocabulary for Jordanian students learning English as a foreign language." The experimental group participants were exposed to websites focused on English vocabulary for eight weeks in different contexts for each experimental group.

However, the control group subjects didn't use any websites for the same period. A pretest was given before the training to all groups to make sure they were equivalent. The same test was administered as a post-test after applying the instrument of the study to see whether using online games for teaching vocabulary had any influence on the groups and whether this technique would have more impact on the subjects than

the traditional way. Results from the experiments confirmed that using online games for vocabulary learning is more effective than traditional instruction as measured by the learners' post-test results.

In one of the two groups' studies, Francoise (2015) researched the question, "What is the Effect of Computer Game-Based Learning on FL vocabulary Transferability?". The first study involved a quasi-experiment to compare the use of targeted words in writing tasks among several students who engaged in computer game-based lessons. The findings show that the use of computer game-based learning strategies in foreign language teaching can promote the transferability of learned vocabulary. Game-based lessons recorded a mean of 5, and the Writing task had 4.9. Below is a summary of the outcome.

Table 3: Two groups' studies

Effects of Computer game-based lessons

	N	M	SD
Game-based lesson	114	5.0	2.0
Writing Task	114	4.9	2.8

Based on the findings, Game-based lessons (M=5.0) motivate vocabulary learning more than Writing tasks (M= 4.9).

To answer the second research question, we focused on studies that discussed the impact of mobile games on learners' motivation. Specifically, research questions were our guide. Table 4 summarizes the results of our search.

Table 4: Studies on motivation

Title	RQ
<p>A scaffolding strategy to develop handheld sensor-based vocabulary games for improving students' learning motivation and performance</p>	<p>Q1: Can the handheld sensor-based vocabulary game improve the student's performance in vocabulary learning? Q2: Can the handheld sensor-based vocabulary game help the students retain learned vocabulary? Q3: Can the handheld sensor-based vocabulary game enhance the students' motivation in learning vocabulary?</p>
<p>The Impact of Mobile Game-Based Language Learning Apps on EFL Learners' Motivation</p>	<p>Q1: What are the types and levels of motivation among Saudi EFL students? Q2: How do EFL learners perceive the impact of mobile Game-based apps on their motivation to learn English?</p>
<p>Development of a Mobile Game Application to Boost Students' Motivation in Learning English Vocabulary</p>	<p>Q1: Do EFL students using the mobile game application show higher learning motivation than those students who learn with the traditional learning approach? Q2: Do EFL students using the mobile game application show better learning achievement than those students who learn with the traditional learning approach? Q3: Is there any</p>

relationship between the pre–test scores and the post–test scores on motivation to learn between these two groups (experimental group vs. traditional group) undergoing two types of intervention?

Researchers found that a high instrumental motivation in English is needed to graduate from tertiary education. Similarly, other authors (Dwaik & Shehadeh, 2010) found that college students lack integrative motivation. Most of them respond negatively when asked about the desire to learn about a foreign culture. However, it is found that instrumental motivation is not effective enough to promote second language learning proficiency. Only a few students studying English were interested in knowing the culture of the English language; hence, they had less interest in integrative motivation (Cam & Tran, 2017). Taiwanese schools portray a greater level of the use of learning techniques and a strong desire to record a high score in English learning. Studies conducted in Saudi Arabia and the United Arab Emirates showed that instrumental motivation is more valued than integrative motivation, as shown in Table 5 below. The student’s awareness of the benefits of learning English as a foreign language contributes to this. They know that learning English would make them get good jobs and succeed in their careers.

Table 5**Motivation test, t-test**

	N	M	SD	T	P
Instrumental Motivation	50	5.73	0.50	14.35	0.005
Integrative Motivation	50	4.56	0.54	8.57	0.005
Pre-apps integration	50	4.93	0.48	13.90	0.005

Huang (2014) conducted a Mixed-Method Study on Learning Vocabulary. The following are two research questions for the study. How do new technologies and vocabulary-technology integration strategies support students' vocabulary development? How effective are vocabulary technology strategies in helping these second-grade students to develop vocabulary? The research was categorized as experimental group and control group. The experimental group was more engaged in in-class activities, thus showing a high improvement in post-test (Huang, 2014).

Conversely, the control group showed no difference in both pre-test and post-test, as presented in Table 6 below. The study was composed of 40 learners (21 males and 19 females) who were chosen randomly for the study.

Table 6: Learning Vocabulary

Experimental group	N	M	Standard Deviation (SD)
Pre-test	40	108.24	16.27
Post-test	40	109.74	9.25

Table 6 shows an improvement in performance by comparing the pre-test (108.24) and post-test (M= 109.74). This implies that mobile game apps have a positive impact on vocabulary learning. In another study, instructors are advised to integrate mobile game into language learning applications to promote learners' motivation and to help them develop long-term studies. The research question was, "How do digital games used in language learning motivate vocabulary learning?" The study involved an experiment evaluating the impact of using digital games to learn vocabulary to establish learners' enjoyment and motivation (Hitosugi et al., 2019). The findings show that students enjoy learning vocabulary through the use of digital video games, as shown in Figure 1 below. They are always motivated when they play games in the process of learning.

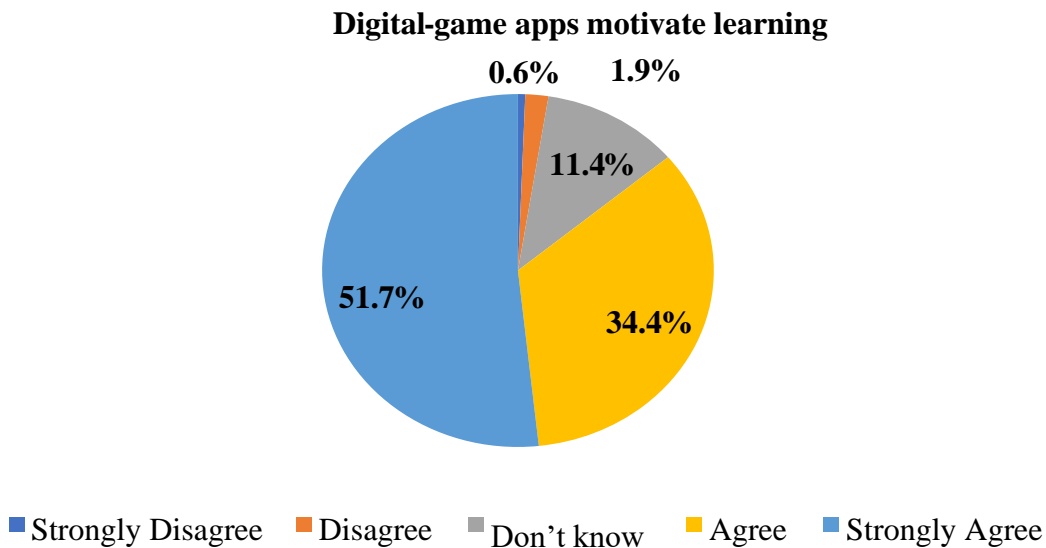


Figure 1: Mobile-game apps motivate learning

According to figure 1 above, 51.7% of the participants strongly agree with mobile game apps as motivating factors for language learning, 34.4%

agree, 11.4% Neither agree nor disagree, and very strongly disagree (0.6%).

Masoumeh (2014) researched “Game-Based Tasks for Foreign Language Instruction.” The study examined the effect of language games on vocabulary learning among Iranian learners. Also, he investigated the likeness of the differences between male and female engagement concerning vocabulary learning in game-based tasks (Masoumeh, 2014). Forty language students were selected randomly for the study, where 20 were named in the comparison group, and the remaining 20 were in the experimental group. In the experiment, there were four types of games (flashcard memory game, hangman, odd man out, and bingo). After completion of the experiments, data analysis was done. The findings showed a significant difference between the comparison and experimental groups. The comparison group had no change, while the experimental group showed a shift in pre-test and post-test, as shown in Table 7 below.

Table 7: Game-Based Tasks for Foreign Language Instruction

Experimental group	N	M	Standard Deviation (SD)
Pre-test	20	4.95	1.93
Post-test	20	8.60	2.20

Chen et al. (2019) researched the effects of mobile game-based learning on English vocabulary learning. They applied both quantitative and qualitative approaches to examine the impact of mobile apps on English vocabulary learning with game-based related functions (MEVLA-

GF) and compare it to the effects of mobile apps on English vocabulary learning with no game-based related functions (MEVLA-NGF). Twenty students were picked randomly to participate in the experiment (Chen et al., 2019). The findings showed high performance in the acquisition and retention of vocabulary in the control group. The study's outcome confirmed that MEVLA-GF is more effective and satisfying in vocabulary learning than MEVLA-NGF. The researchers used Spearman rank correction; the results showed a positive correlation between gamified functions and vocabulary learning performance, as shown in Figure 2 below.

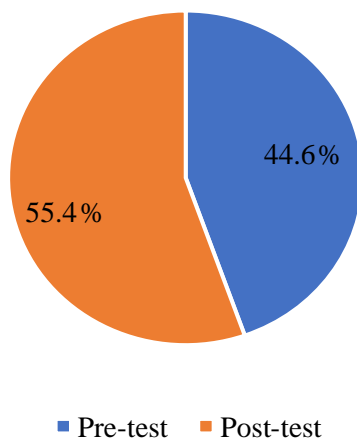


Figure 2: Effects of a mobile game-based learning

Based on the finding, there is an increase in the level of performance in English Vocabulary learning after the introduction of mobile game-based learning, as compared to the pre-test (44.6%) and post-test (55.4%).

Researchers found that a high level of instrumental motivation in English is needed to graduate from tertiary education. Similarly, other

authors (Dwaik & Shehadeh, 2010) found that college students lack integrative motivation. Most of them respond negatively when asked about the desire to learn about a different culture. However, it is found that instrumental motivation is not effective enough to promote second language learning proficiency. Only a few students studying English were interested in learning the English language culture; hence, they had less interest in integrative motivation (Cam & Tran, 2017). Taiwanese schools portray a greater level of the use of learning techniques and a strong desire to record a high score in English learning. Studies conducted in Saudi Arabia and the United Arab Emirates show that instrumental motivation is more valued than integrative motivation, as shown in Table 8 below. The student's awareness of the benefits of learning English as a foreign language contributes to these results. They know that learning English would make them get good jobs and succeed in their careers.

Table 8: Motivation test, t-test

	N	M	SD	T	P
Instrumental Motivation	50	5.73	0.50	14.35	0.005
Integrative Motivation	50	4.56	0.54	8.57	0.005
Pre-apps integration	50	4.93	0.48	13.90	0.005

Table 8 describes students' motivation in English learning and shows a high intensity in instrumental motivation (M= 5.73), which is higher than integrative motivation (M= 4:93).

Language educators have been working tirelessly to implement proper and effective teaching techniques that would promote learning among students (Hwang et al., 2016). A study conducted in Malaysia

recorded that over 95 percent of English language teachers preferred videos, pictures, and projectors for teaching and illustration because they make lessons more interesting. They facilitate keenness and participation among students (Yunus et al., 2013). Based on these results, mobile-game apps can be the best option for learning in classroom activities and even outside class.

According to a pilot study on mobile learning conducted by Kétyi (2013). He suggests that if instructors could use mobile devices in language learning, the learner could highly obtain extra learning time even without having to go to class or school. This will raise their language learning proficiency. Therefore, second language learning institutions across the world should make use of mobile learning efficiently to promote students' learning. These devices, especially mobile-game apps, create enjoyable and engaging learning environments, thus motivating learners. Teachers are challenged to use the fact that learners like using mobile phones for playing games and communication. Hence, students can also use them for learning if they are encouraged to do so.

Additionally, this is another opportunity to help them learn vocabulary in the second language. Language learning and vocabulary acquisition can be achieved through activities that are made up of visual and audio aids (Lin & Lan, 2015). The visual and audio aids can be acquired from mobile-game applications. Comparing this type of learning with traditional learning techniques, digital video games are also essential in giving students an interactive learning experience, thus boosting

learners' independent learning (Yükseltürk, 2018). Also, digital video games help learners link learning content to daily activities.

Furthermore, other authors have researched the impacts of mobile-game apps on teaching and learning based on the perspective of learners' motivation (Beserra et al., 2017). The authors designed a game-based application (experimental group) that elevated learning and motivation outcomes. The finding implies that game applications positively impact second language learners' motivation and vocabulary learning. Most of the learners praised game applications as helpful and user-friendly. Consequently, it is arguable that utilizing mobile-game apps could promote second language learning and vocabulary learning. In another study done at the University in Vietnam, there was an evaluation of the use of the game application in Grammar teaching (Cam & Tran, 2017). The findings from the study confirmed that integrating games motivated students to participate in learning without anxiety. The only challenge observed is that some students had difficulties due to lack in the required vocabulary to communicate with their classmates while gaming (Cam & Tran, 2017). Some could not understand instructions, while others could not communicate easily using new grammatical structures.

According to the Horizon report, mobile learning is the fastest-growing learning sector because of its benefits to users, especially students. The devices are designed in different languages, making it possible for anybody who wants to learn to access them. For instance, some may wish to study Chinese as their second language. Having the

Chinese language set as the operating language in the devices would help them learn more about the Chinese vocabulary. The same applies to game apps; you can select any language you desire.

Traditional ways of learning have been restricted to a classroom environment where the professor lectures while students remain attentive, listening to the teachings. During the classroom lecture, most of them struggle to take notes (Keiler, 2018). In traditional means of learning, the interaction between the lecturer and learners is helpful because it provides first-hand information (Javid et al., 2012). Some studies consider the traditional way of study advantageous because it allows students to seek clarifications and involve their professors in further discussions (Yükseltürk, 2018). According to these studies, in a classroom setting with a smaller teacher-student ratio, learners enjoy the one-on-one contact with their professors or instructors through face-to-face interaction. In this environment, students and an instructor can participate in the discussion, with fewer possibilities of taking notes. Besides, those researchers claim that discussions create a ground where many topics can be covered within a short period. The only challenge with the traditional way of study is that the time students discuss with their tutor may be the same time they are supposed to attend another class. In addition, the discussion may involve a slower pace because some students are slow learners and spend most of their time seeking clarification.

Shelley Shwu-Ching Young and Yi-Hsuan Wang (2013) record a study on “The Game Embedded CALL System to Facilitate English

Vocabulary Acquisition and Pronunciation.” The research questions are as follows, “Were there different learning interactions or behaviors between the learners in the two learning scenarios?” Based on Table 9 below, there is a significant effect of the game–embedded call system. This is visible from the changes observed after the pre–test and post–test. There was a big difference in learning interaction between the control and the experimental groups. The control group did not exhibit any change, while the experimental group showed improved performance as seen in the post–test.

Table 9: Game Embedded CALL System

Experimental group	N	M	Standard Deviation (SD)
Pre–test	52	51.36	12.4
Post–test	52	60.63	27.99

In another article, Letchumanan and Hoon (2012) record a study on “Using Computer Games to Improve Secondary School Students’ Vocabulary Acquisition in English.” The research question is, “Does the integration of computer games expand ESL learners’ vocabulary?” At first, the subjects took a vocabulary pre–test to identify and evaluate their vocabulary knowledge. Then, they were exposed to traditional vocabulary strategies using a dictionary, semantic mapping, and contextual clues. These three strategies were the most preferred vocabulary learning strategies chosen by learners in a research study involving Form Four students). This method of acquiring vocabulary was carried out for seven weeks. After the seventh week, a vocabulary post–test was conducted, and their

scores were recorded. It is apparent from Table 10 that the integration of computer games expands ESL learners' vocabulary. This is confirmed by a positive change observed in the pre-test (M= 12.7) and Posttest (M=13.5).

Table 10: Use of Computer games

Experimental group	N	M	Standard Deviation (SD)
Pre-test	40	12.7	1.56
Post-test	40	13.5	0.97

Is using online games for vocabulary learning more effective than traditional instructions as measured by the learners' post-test results?

Wafa Muhanna (2012) answered this question in her research "Using Online Games for

Teaching English Vocabulary for Jordanian Students Learning English as A Foreign Language." The participants of the experimental groups were exposed to websites with a focus on English vocabulary for eight weeks in different contexts for each experimental group. However, the subjects of the control group didn't use any websites for the same period. A pre-test was given before the training to all groups to make sure they were equivalent. The same test was administered as a post-test after applying the instrument of the study to see whether using online games for teaching vocabulary had any influence on the groups and whether this technique would have more impact on the subjects than the traditional way.

Results from the experiments confirmed that using online games for vocabulary learning is more effective than traditional instruction as

measured by the learners' post-test results. There is an improvement in performance as observed in pre-test and post-test results in Table 11 below.

Table 11: Using Online Games for Teaching English Vocabulary

Experimental group	N	M	Standard Deviation (SD)
Pre-test	40	68.93	10.976
Post-test	40	70.45	11.277

Summary of the findings

Second language and vocabulary learning have undergone several changes in the past few years (Mohammed, 2015). As long as learners have mobile devices (smartphones), they can easily download the application, which will help them in learning purposes. The devices are designed with features that motivate learners to continue using them. The previous studies considered mobile learning apps advantageous to learners. There is a positive relationship between using game-based tasks in foreign language learning. Therefore, mobile-game apps should be implemented in learning because they motivate learners. This is an appropriate action to be taken to enhance second language learning and acquisition of vocabulary. Several studies have been done on the impacts of mobiles on language learning confirming the importance of game-based learning (the use of mobile game apps). Control groups showed no change, while an improvement was observed in the experimental group. There was a change in the results obtained in pre-test and post-

test, where post-test in all studies recorded high Means and reduced Standard Deviation.

Conclusion and discussion

Today the interest in learning vocabulary is increasing at a higher rate. So, several aids are being implemented to help learners and students, some of which are mobile game apps. They are the best and most famous devices for promoting vocabulary acquisition. Over the past few years, research in teaching and learning English as a second language has been underestimating vocabulary sources in language studies (Saha & Singh, 2016). But even though the effectiveness of mobile applications in learning vocabulary is still at an early stage, the concepts and tools provided are essential. Learners can easily acquire evolving issues in vocabulary. The benefit of these studies results from the feedback on mobile games apps and their effectiveness to the point where the app developers quickly know that mobile applications are helpful in learning. The influence of the new learning strategies entails assigning mobile apps with specific codes to aid in teaching. Mobile game apps are vital in different aspects of learning (Vasileiadou & Makrina, 2017). They are beneficial for students who have difficulties learning what is being taught in classrooms. Most of them struggle with shyness or lack of confidence. Therefore, mobile game apps are beneficial because they motivate and encourage students by providing a fun platform where learning information is delivered and entertaining.

The author noticed various limitations in the studies that need resolution. Some of the vocabulary used are too easy to measure the learning performance of high and medium-achieving students. The game helped students only in spelling and did not consider hearing and writing abilities. Also, the game can only help students store vocabulary knowledge in their short-term memory. The problems faced by many learners are that despite having learned all the basic structures in English, they still have limited receptive and productive vocabulary.

This is generally true with ESL learners as they are inclined to use their mother tongue rather than the second language even in the English classroom. The small range of productive vocabulary limits learners in expressing themselves clearly and appropriately, especially in their essay writing.

The following recommendations should be considered:

- 1) The game-based lesson must be treated as a single factor encompassing the enabling task (Quizlet), the game itself, and the debriefing reports in future studies.
- 2) Even as we intend to use mobile game apps, learners should be encouraged to practice often speaking a second language on their own every time. They have a trend of speaking their mother tongue the most.
- 3) The game apps should be designed to help students with spelling, hearing, and writing skills Problems.
- 4) For long-term memory of vocabularies, tutors should encourage learners to use gaming devices consistently.

- 5) There is a need to create user-friendly game-apps that can work offline.
- 6) There is a need for a wide range of productive vocabulary to help learners express themselves clearly and appropriately, especially in their essay writing. Effective vocabulary should be included in the apps.

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