

The Effect of Mobile Applications on English Vocabulary Acquisition

Azadeh Rezaei*, Neo Mai, Ahmad Pesaranghader

Multimedia University (MMU), Jalan Multimedia, 63100 Cyberjaya, Malaysia

*Corresponding author: azadeh.rezaei@sfmtm.edu.my

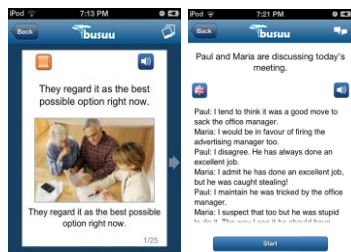
Article history

Received :1 December 2013

Received in revised form :
10 January 2014

Accepted :31 January 2014

Graphical abstract



Abstract

The study reported here investigates the use and effectiveness of mobile applications in English vocabulary learning. Vocabulary acquisition is an important part of language learning. The advancement in technology has greatly improved the existing setting in education world in recent years. The wide use of mobile wireless technologies also has created more opportunities to shift the traditional academic environment to mobile learning. Interactive multimedia is a great avenue for the communication and education. This research studies intermediate-level English learners' performance before and after using mobile applications that were introduced to the study group as an intervention. It examines whether multimedia courseware affects the vocabulary learning in the second language acquisition. The quantitative data revealed positive change in learners' performance and the questionnaire analysis indicated that using the applications helped enhance learning of vocabulary, confidence, class participation and that, students had a positive tendency toward the use of multimedia in education.

Keywords: Mobile technologies; e-learning; mobile learning; mobile applications; english language learning

Abstrak

Kajian yang dilaporkan di sini menyiasat penggunaan dan keberkesanan aplikasi mudah alih dalam pembelajaran perbendaharaan kata Bahasa Inggeris. Pengambilalihan Perbendaharaan kata adalah satu bahagian penting dalam pembelajaran bahasa. Kemajuan dalam teknologi telah bertambah baik persekitaran yang sedia ada dalam dunia pendidikan pada tahun-tahun kebelakangan ini. Penggunaan meluas tanpa wayar mudah alih teknologi serta mewujudkan lebih banyak peluang untuk beralih persekitaran akademik tradisional untuk pembelajaran mudah alih. Multimedia interaktif adalah ruang yang besar bagi komunikasi dan pendidikan. Kajian ini mengkaji peringkat pertengahan prestasi pelajar Bahasa Inggeris sebelum dan selepas menggunakan aplikasi mudah alih yang telah diperkenalkan kepada kumpulan kajian sebagai campur tangan. Ia mengkaji sama ada perisian multimedia menjejaskan perbendaharaan kata belajar dalam pemerolehan bahasa kedua. Data kuantitatif mendedahkan perubahan positif dalam prestasi pelajar dan soal selidik yang menunjukkan bahawa menggunakan aplikasi membantu meningkatkan pembelajaran perbendaharaan kata, keyakinan, penyertaan kelas dan bahawa, pelajar mempunyai kecenderungan positif terhadap penggunaan multimedia dalam pendidikan.

Kata kunci: Teknologi mudah alih; e-pembelajaran; pembelajaran mudah alih, aplikasi mudah alih; pembelajaran bahasa inggeris

© 2014 Penerbit UTM Press. All rights reserved.

1.0 INTRODUCTION

With rapid development of communication technology, this technology was later applied in e-learning. Communication technology is mainly categorized as asynchronous or synchronous. Blog, wiki and dissection boards are part of asynchronous activities, in asynchronous main idea is that learners might participate in the exchange of idea or information without depending on other learners' interference at the same time, synchronous activities consist the exchange of idea and information with one or more participants during the same time.

Virtual classroom and online chat sessions and the use of this technology as a mode of self-studying are examples of synchronous communication technology.

Learning a foreign language effectively means using needed learning strategies (Meschyan and Hernandez, 2002). These language-learning strategies are used as a mean to earn competence in English especially between English-as-second (foreign)-language (EFL) learners. Many studies claim that language learning strategies and English proficiency are related (Liu, 2004) and this pattern of strategy use has been significantly related to English proficiency (Magno, 2010). According to these

studies the more strategies used, the more likely the desired English proficiency increases. English language teaching or in a wider range, the second language acquisition has moved away from its former phase where finding the perfect teaching method was the main aim, to focusing on how to help learners as well as teachers to achieve theory goal in better comprehension. In the case of teachers, the quest has led to more classroom-centered or students-centered studies on the linguistic, discourse and interactional teaching activities. In the case of learners, both in and out of classroom research come up, along which various kinds of strategies and cognitive processing activities are being used in second language acquisition (Magogwe and Oliver, 2007).

As the interest in vocabulary acquisition is growing, today various kinds of aids are available to the learners and students, among which mobile applications are one of the most effective and popular. Still research in English language teaching and learning has often underestimated the vocabulary resources of the language. The effectiveness of mobile learning in education is still in its first stages of implementation and concepts and instructional issues surrounding mobile learning are still evolving and require further research (Kukulska-Hulme, 2007). The significance of these studies comes from the feedback it provides on mobile applications and their effectiveness, where app developers can see how the selected applications are making difference on students' learning performance in real life and through the detailed questionnaire strength and weakness points are revealed. Not to mention how the proved influence of an application's effectiveness can help instructors to come up with new teaching methods that involve assigning applications as a homework and only do post-testing to make an evaluation. Multimedia aids are beneficial in different aspects of education, especially language acquisition. They lower student's stress and anxiety, especially students who cannot involve in classroom activities due to shyness or lack of confidence, what's more they motivate and encourage students by providing a fun platform through which the content is delivered as well as increasing communicative competence.

■ 2.0 BACKGROUND OF PROBLEM

English language acquisition and teaching had undergone a lot of changes in the past few decades. Mobile learning (M-Learning) is mainly described as a new learning method in which users use mobile platforms to learn. It syncretises all qualities of modern education, computer network technology, mobile communications technology, and multimedia technology. Nevertheless, the main advantage of mobile learning is its mobility and accessibility that gets over all the boundaries of common distance learning. Mobile learning (M-Learning) is mainly described as a new learning way in which learners use their mobile devices to learn. It syncretises all qualities of modern learning. Nevertheless, the main advantage of mobile learning is its easy access at all times and being portable. Since mobile e-learning is still in its infancy and is immature, there are presently more possibilities regarding what can be done and what are the true potentials of this technology. Still, the increasing number of cell phone users surpassing the number of computer users for browsing the web in near future mobile e-learning can certainly become an important learning platform (CSATA, 2004). Based on a recent study from Ericson mobile manufacturer, by 2015, 80% of people will be browsing the web with their smart phone or devices and more importantly in education; internet accessing devices will outnumber computer users in following years (Johnson *et al.*, 2005). Mobile learning is considered the

fastest growing area in education field also mentioned in 2011 Horizon Report. For the same reason the sources through which mobile education evaluation can be done are new compared to the traditional way. The traditional delivery system has always been a classroom setting with a professor giving a lecture and students listening and at times taking notes, where interaction between the lecturer and students has always been considered as an essential learning element within this arrangement (O'Malley and McCraw, 1999). As in classrooms with smaller teacher-to-students ratio, students can even enjoy more direct assistance from the lecturer or instructor due to the real time interaction where there might be less note-taking and more direct discussion between the lecturer and learners and so more ground can be covered in less time. At the same time, students are required to attend the class at a specific time, and also the pace of the lessons can be slower because of different students' learning ability. On the other hand, with the advance of information technology, millions of students are doing their higher education online. Online learning, e-learning or distance learning is the idea of being in touch with the teacher even when the students are in remote locations, while they could not have access to the teacher nor could take part in a course and get education. One of the best reasons to choose online education is its unique feature, which is convenience and availability. It is the factor that can make online learning, the feature college for getting degrees. It means eliminating the factor of time and place from education restrictions, since learners can access the information and take part in their desired courses at anytime and anywhere. As discussed in this paper the focus is one of the forms multimedia assists learners to learn without the restrictions of time and place. However, drills, rote memorization, and related techniques can still be seen as useful. Groot compared teaching vocabulary using bilingual lists with teaching vocabulary in appropriate context by the help of a multimedia program called CAVOCA (Groot, 2000). This program is designed based on first language vocabulary acquisition theories according to which, several stages might be involved in learning: 1) Observation; 2) Storage of linkage; 3) Consolidation.

Learning will be more effective if learners go through these three stages in the process of learning. For example, in Groot's study, when a student is encountered by a new word, he can click on it and then its meaning is presented in the form of motion or motionless pictures and also its pronunciation is given, (observation stage), then some relevant English equivalents are given in order for the student to relate the knowledge he is learning to his background knowledge. (storage of linkage), and at the end by doing some exercises and three games, the student can consolidate the new information (consolidation stage). The results of Groot's research supported the theory of vocabulary acquisition on three stages through multimedia aids. Nevertheless, Groot also suggested that students who are learning a foreign language could also use the concepts of words in their own language when learning the vocabulary of a foreign language. He also said, "A simple bilingual presentation followed by some rehearsal practice may be more efficient".

Obviously, the idea of using multimedia aids in foreign language teaching and learning was introduced when technology and computers started to affect all aspects of human life. In the past, only specialists could use computers and technology but today it's accessible to everyone, and it is used in language instructions more than any time before. With the use of multimedia, students are in control of their learning environment, they can choose when to access their learning materials, and review the context as often as they want and need to. Therefore, many teachers around the world had to change their methods of teaching into the new ways of foreign language instruction with

the help of multimedia aids and computer because they seem to be more effective than the ordinary textbooks in learning. According to Nelson (1976), “The unique property of computer as a medium for education is its ability to interact with the student. Books can tell the students what the rules are and what the right solutions are, but they cannot analyze the specific mistakes the student has made and react in a manner which leads not only to correct his mistake but also to understand the principles behind the correct solution” (Kenning and Kenning, 1984). “Today, education is immersed in a technological revolution.” (Moeller *et al.*, 1998)

■3.0 LEARNING WITH MULTIMEDIA

Mayer (2002) explains how comprehension happens through verbal and visual inputs with offering a Cognitive Theory of Multimedia. This theory contains Dual Coding Theory, which is based on three important suppositions. The first, the Dual Channels Assumption, explains how the visual and verbal inputs are processed separately, although a transfer in one type of input is probable. Next is the Limited Capacity Assumption which points out the limited capacity in the channels. And the third is the Active Processing Assumption that explains how humans involve in the active knowledge construction. However a multimedia presentation can provide both verbal and visual inputs and the user can then decide on the words and illustrations and manages them individually in verbal or pictorial channels where essential and logical connections between channels are provided. However the two structures are supposed to complete one another they are different since pictures create nonlinear holistic information while words create discrete linear output. Learning happens when the learner creates the essential bond between these two channels and the required connection happens between the pictorial and the verbal portion and combining the two in the working memory. Mayer offers an experimental support for his theory and concludes that the use of multimedia can be helpful when the information is presented in a way that doesn't overload the active working memory for example illustrating words with pictures, or presenting the information through images, or putting words and images close to one another so that the learner creates the link between the two, or like presenting them together instead of one at a time to help create the link between the two. While the conclusions made by Mayer are based on the studies done on native speakers there exist other studies that support the same results on second language learners (Mayer, 2002). Mobile applications or multimedia aids are teaching aids based on computer technologies using sight or sound to present information. Such as, films, videos, motion pictures, slide projectors, language tapes, multimedia games, etc. He also believes, believes that the effectiveness of an instructional message depends not on the medium but the method used within it. Based on this theory, multimedia learning happens when a learner builds a representation from words and pictures that have been presented (Mayer, 1997).

Mayer and Anderson (1992) have proposed that the instructional design principle called the contiguity principle, which states the effectiveness of multimedia instruction's increase when words and pictures are presented together in the same time or space (Mayer and Anderson, 1992). Based on this saying, there is no doubt in the effectiveness of learning mobile applications since they provide multiple activities to state the content.

One of the best reasons to choose online education is its unique feature, which is convenience and availability. It is the factor that can make online learning, the feature college for

getting degrees. It means eliminating the factor of time and place from education restrictions, since learners can access the information and take part in their desired courses at anytime and anywhere. Multimedia refers to computer-based systems that use various types of content, such as text, audio, graphics, animation, and interactivity. Therefore, the most important concepts on multimedia are ‘computer-based’ and ‘interactive’. Some researchers have assessed the value of ESL/EFL software programs for improving (AlKahtani, 1999). Also recent studies have assessed the effect of extended use of computers on reading achievement, the effect of computer instruction rate and reading comprehension, the effect of multimedia software on reading comprehension and vocabulary acquisition, and the relationship between vocabulary development and reading comprehension (Singhal, 1998). Most research projects conducted on vocabulary acquisition and multimedia-assisted language learning, focus on the effects of multimedia glosses.

“Perhaps the greatest influence over EFL curriculum change in the past fifteen years is the rate and extent to which technology has affected and has been integrated into coursework and the curricula throughout the English teaching world” (Dickinson and Neuman, 2007). When video was introduced as a phenomenon, language teachers and curriculum designers quickly found out its benefits in teaching, which also resulted in the change in the manners of instructions. Almost every language program in the United States use computer based technology and multimedia aids.

The importance of multimedia aids in language learning and teaching became more obvious in 1983 after the annual TESOL (Teachers of English to Speakers of Other Languages) conference in Toronto because more than ten per cent of presentations in this conference were about multimedia aids and some learning software were introduced during the conference. Carrell and Eisterhold (1983): “with the use of multimedia, students are in control of their learning environment, they can choose when to access their learning materials, and review the context as often as they want and need to”.

According to Nelson (1976), “The unique property of computer as a medium for education is its ability to interact with the student (Kenning and Kenning, 1984). Books can tell the students what the rules are and what the right solutions are, but they cannot analyze the specific mistakes the student has made and react in a manner which leads not only to correct his mistake but also to understand the principles behind the correct solution”. “Today, education is immersed in a technological revolution.” (Moeller *et al.*, 1998)

■4.0 VOCABULARY ACQUISITION

Vocabulary acquisition happens in one the ways mentioned below:

A. *Incidental:*

Delliberate or indeliberate acquisition of vocabulary while doing independent listening or reading activities.

B. *Direct:*

Through direct conscious study.

Incidental vocabulary acquisition is atypical way of vocabulary acquisition, especially for proficient readers. Incidental vocabulary learning refers to the process of learning without specific focus of attention. It's the way through which learners focus on understanding the meaning of a text or listening to contexts, instead of intentional learning (Hong, 2010). Students who possess reading skills who read different texts may find out that their vocabulary has improved without direct study.

Encouraging learners to read more listen to English songs, or even playing games can lead to incidental vocabulary learning as well. According to Richards' study (1976) students can learn vocabulary through reading which supports the fact that pleasure reading in a foreign language is an incidental vocabulary acquisition (Richards, 1976).

However, the educational system should not ignore or depend only on incidental acquisition. The system should try to enhance its effectiveness through using vocabulary logs, word walls, and other techniques (Hong, 2010).

Multimedia can be used as a great asset to help vocabulary development. As it provides features which are not accessible by any other conventional instructional tools, such as offering variety of example, i.e. videos, sound, pictures, animation, and accessibility what's more, researchers have studied the effectiveness of these features that can enhance incidental vocabulary learning through the use of multimedia (Al-Seghayer, 2005).

■5.0 MULTIMEDIA AIDS

Some researchers have studied the effectiveness of ESL/EFL software programs in vocabulary learning (AlKahtani, 1999). Also recent studies have reviewed the changes using computers and multimedia software bring in reading comprehension and vocabulary acquisition, and the relationship between vocabulary development and reading comprehension (Singhal, 1998). Most research projects conducted on vocabulary acquisition and multimedia-assisted language learning, focus on the effects of multimedia glosses.

According to Baker *et al.* (1995) studies on computer-assisted methods of teaching proved them to be more attractive to learners for three important reasons. First, these kinds of interventions need teacher to be less involved than teacher-led instructions. Next, the possibility to change the instructions accordingly and easy the techniques and vocabulary goals; and last, the potential to change important instructional design features within the change framework which includes instructional scaffolding, and integration throughout academic areas.

■6.0 RESEARCH QUESTION

Because of students' lack of vocabulary knowledge and their focus on other skills such as grammar, dictation, and reading comprehension, and because of researcher's personal interest, the researcher looked for better ways of teaching and learning vocabulary. To achieve the objectives of this study, the researcher stated the following research question:

- How effective are English vocabulary mobile applications in enhancing learners' vocabulary learning performance?

■7.0 RESEARCH APPROACH

Research began by exploring current studies on vocabulary learning and its importance in the process of language learning and mobile learning in education and academic level. Review of vocabulary learning importance focused on previous studies and different modes of vocabulary learning, incidental learning and direct study and categorizes mobile learning as an incidental acquisition. Later in the literature a review of multimedia assisted language teaching in vocabulary acquisition and its benefits and barriers are included.

A quantitative descriptive approach is used to examine the change in students' performance after using the multimedia courseware to learn new concepts and a comparative research design using the before-and-after study design is used to study this change in comparison to the usual traditional approach in vocabulary learning. A survey questionnaire is employed to explore the significance of the change in class participation, students' confidence, and the use of multimedia after the testing.

■8.0 METHODOLOGY

The main objective of the study was to find how effective a vocabulary mobile application can be on students' learning performance, confidence and class participation. This is to target new vocabulary topic that students are going to learn through the vocabulary application and to see if it's more effective than the traditional method of learning vocabulary. The applications and their content were chosen based on the classrooms' course syllabus. To gather the required data, researcher chose the before-and-after experimental design where pre-testing is used prior to the use of applications and the post-testing afterwards to study the effectiveness of the applications' use on the vocabulary acquisition. Since the project is carried out in relatively short time span, extraneous factors such as age are minimized and do not affect the outcome. The class syllabus is divided in a way that learning one group of vocabulary is not going to affect the way students would learn the next groups since the chosen vocabulary family groups are cross-compatible and the learning contents do not overlap at anytime. This would eliminate the interference chance of daily exercise or the duration of using the application with the results.

8.1 Participants

Due to the limitations of the study a total of 42 Students studying English for Academic Purposes at an English Language Academy participated in this study. Students all participated in a class with the focus of "Vocabulary and Talk" focusing on the acquisition of vocabulary and their practical use in everyday conversation held by researcher herself. The class and Students came from different demographics and multi-cultural backgrounds including, Turkey, Uzbekistan, Iran, Syria, Saudi Arabia, Kuwait, Lebanon, Djibouti, and Libya, etc. participants aged from 16 to 40 and were all students at the pre-intermediate and intermediate level taking the same class. The sample was selected based on students' availability and presence during the whole course. Participants all had enough experience with mobile technology and the selected applications for the purpose of the study. The sample was divided into two groups referred as "Study 1" consisting 19 Students and "Study 2" 23Students to make the results more accurate.

8.2 Instruments

The data was collected through the before-and-after design on the effectiveness of the two chosen mobile applications. Both evaluation tests were through multiple-choice questions.

Pre-test: The questions in the pre-test are chosen from the courses syllabus taught by the researcher in both study groups during the course. The examination was based on the course book, English Vocabulary in Use, pre-intermediate & intermediate, by Stuart Redman, Cambridge University Press (Singhal, 1998). Selected subjects for the pretest were "Money and Finance" and everyday verbs. The pre-test consists of twenty multiple-choice questions. Students had twenty minutes to

answer the questions. There are 20 multiple choice questions with three choices per item. Figure 5, demonstrates an extract of the questions in the Pre-test examination.

8.3 Multimedia Courseware: BUSUU and INTERACTIVE ENGLISH

Due to the limitations of the study researcher had an obligation in choosing the learning applications between the free applications, the applications also needed to be available on most devices and the content needed to be based on the classroom syllabus. For this purpose and after thorough study on the existing free vocabulary learning applications, he search resulted in the following two applications both available on all iProducts (iPhone, iPod, iPod Touch, iPad, requiring iOS 4.3 or later) and in Android app Store. In order to use the applications as a mode of study in the classroom and also at home, researcher made sure students are able to use the application properly and are aware of all the features in both apps. For this purpose, many parts of the apps were covered and studied by students in advance and as an assignment, and for the final post-tests, a new part was assigned. This was done to reduce the effects and limitations the use of a new tool may cause in the process of the research.

• Busuu

Busuu is a mobile English learning app available on iPod, iPad, iPhone, iPod Touch, Android phones and recently even on BlackBerry devices. The application is a learning application for about twelve different languages. Busuu.com as well, is considered one of the largest online communities for language learning. The application is the only language learning application that provides direct interactions with native speakers. Like all the other applications, not all the sections in the application are free, but still unlike many, there is almost enough free sections for users to get benefit from. The application provides online registration through which users can log in on a lap top or a desk-top computer as well and use the website. There are four sections named as Beginner A1, Beginner A2m Intermediate B1, and Intermediate B2 in course selection (Figure 1). In each of the sections, there are five free sections, four vocabulary lessons with different subjects and one grammar lesson (Figure 2). There are 25 to 30 vocabulary and grammar lessons for learners to purchase. For the purpose of this project, the researcher chose testing on three subcategories in section B1 and B2. Each of the free sections is focusing on one group of words, as in section “Intermediate B1”, there are: Express yourself, Surfing the Internet, Are you Searching for a Job, and Horoscopes. Each of the groups provides 23 to 25 words, their pronunciations and an example of how the words are used in a sentence.

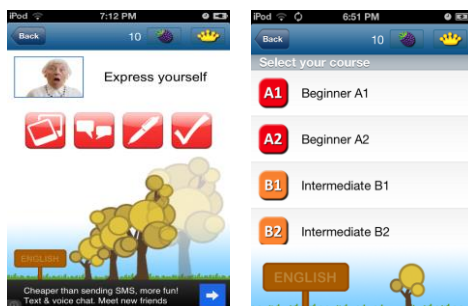


Figure 1 Busuu mobile application, log in, level selection, topics

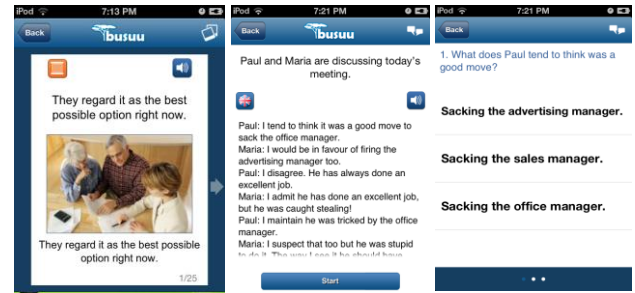


Figure 2 Busuu mobile application, word definition and pronunciation, article and testing

• Interactive English

Interactive English is a completely free monthly application to practice and improve users English. Each month's edition contains interactive exercises, a news story and a news story discussion in three levels of basic, intermediate and advanced (Figure 3). This application is compatible with iPhone, iPod Touch and iPad and requires iOS 4.3 or later as well as android phones.

For the purpose of this paper, the intermediate section was introduced to students and like the other application, Busuu, the subject of both expressions taught in this section and the news story are work and job search. The application uses multiple choice questions in the study part and later in the News Story section, provides a recent article with its reference in which the same vocabulary taught in the previous section are used. Learners can tab on the underlined words in red to see the part of speech and the definition of the word if they cannot remember it. For the purpose of this study “April 2013” issue “Man sacked for wrestling shark” is used.

The news story article is chosen from different references based on the subject of the month. Learners can also read the full article if they were interested through the link that is usually mentioned by the end of the article (Figure 4).

Post-test: A test of 20 multiple-choice questions was used in the post-test examination based on the chosen content in chosen applications. Students were asked to study the selected content for the post-test examination, using the applications.

Questionnaire: after the post-test the Participants of the study were then given a closed twenty-question questionnaires that measured based on the Likert's five-point scale.

The questionnaire sought students' opinion on the change using English Vocabulary Learning mobile applications make on students' learning performance, confidence, students' class participation and their opinion on the use of multimedia in general in education and as a mode of learning. The survey was designed to assess students' perception on the effectiveness of vocabulary mobile application on students' learning performance, confidence, and Class participation and in general their perspective on the use on multimedia assisted learning.

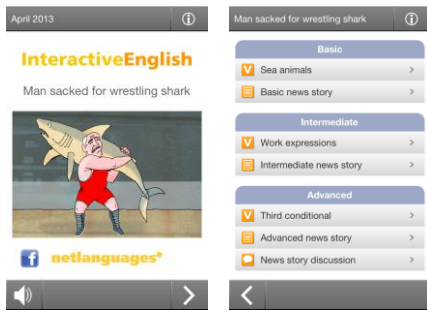


Figure 3 Interactive English application, April 2013 issue, level selection and monthly subject

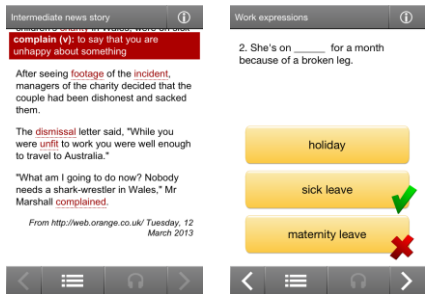


Figure 4 Interactive English application, monthly news story and test

9.0 DATA COLLECTION

The data collection was done in three phases. The first phase, administering a pre-test vocabulary test based on the traditional teaching, took place in the second week of the study, based on the traditional system and the content taught during the sessions through the pre-test and lasted for 30 minutes (Figure 5). Next the applications were introduced to the class and essential explanation was given by the instructor to make the interaction easier. The second phase of data collection involved the post-tests in both study groups in the sixth week of the study (Figure 6), an examination based on the use of mobile English learning applications. The third and the last phase was carried out by the end of the experiment through a set of questionnaire on students' experience of using the applications (Figure 7). The two classes were chosen based on their availability and non-random sampling and the same applies for the students who participated through the course and tests. Since the course was about vocabulary learning, students were not interviewed or chosen from one specific level, but their language proficiency level was mostly at pre-intermediate level.

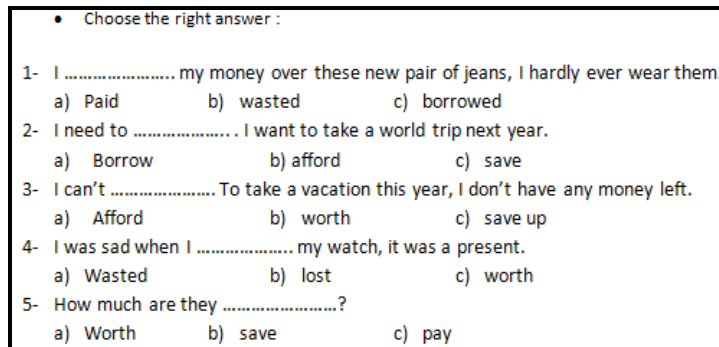


Figure 5 Pre-test exam

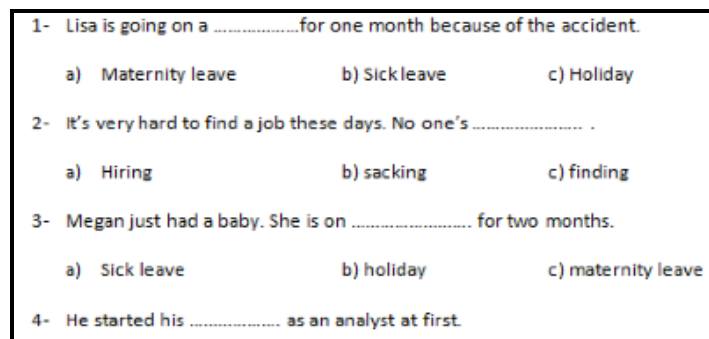


Figure 6 Post-test exam

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1- I was able to learn vocabulary better when it was presented in multiple ways. (Pictures, Sound, Definition, Examples, etc.)	1	2	3	4	5
2- I was able to have a wider range of vocabulary activities using an English mobile app.	1	2	3	4	5
3- Using a mobile app to test my vocabulary knowledge was more fun & less stressful.	1	2	3	4	5
4- Using apps helped me access additional info, outside of using my textbooks.	1	2	3	4	5
5- I enjoyed using a mobile app to learn.	1	2	3	4	5

Figure 7 Questionnaire, vocabulary learning performance

10.0 DATA ANALYSIS

The study focus was mainly on students' vocabulary learning and its use in their daily conversations. For the purpose of the study and to observe the change, the study was done on the same group of students who attended a vocabulary learning class in the months of March and April 2013. Students of both study groups attended twelve two-hour classes each month (three times a week, two hours per session). In "Study 1", the class consisted of 19 students, of which 57.9% of the students were male and 42.1% female from various ethnicity and backgrounds. The most number of students were 36.84% from Iran, and then 21.05% from Syria, and 42.10% from other ethnicities including Uzbekistan Libya, Turkey, Saudi Arabia, Kuwait, Lebanon and Djibouti. 42.85% of Iranians were male and 57.14% were female, 75% of participants from Syria were male and 25% were female, and 62.5% of other ethnicities were male and 37.5% female. Study 2 consists of 23 students, of which 47.8% were female and 52.8% were male. 21.73% of the total students came from Libya from which 40% were female and 60% were male. After Libya, students from Syria had the highest percentage of 17.4% from which, 4.34% were female and 13.4% were male. 60.87% percent of the total students came from different ethnicities from which, 34.78% were female and 26.08% were male.

11.0 RESULTS

Data gathered from the pre-tests and post-tests was analyzed using the Statistical Package for the Social Sciences (SPSS) software as well as the data derived from the questionnaires. In both study groups the whole experiment took place in a period of two months.

Since the sample sizes in both studies were small, a normality test was done to see if the data set is normally distributed and to ensure that the results driven from the study can be generalized. The normality test on pre-tests and post-tests in both study groups were done using Shapiro-Wilk and Kolmogorov-Smirnov tests, however for dataset smaller than 2000 elements, only the Shapiro-Wilk test is considered. In both classes, Study 1 and Study 2, due to the small number of participants, 19 in Study 1 and 23 in Study 2, the Shapiro-Wilk test the results were insignificant with the p-value greater than .05 which indicates the data is normally distributed. What's more in both studies, students showed positive performance after the intervention.

Based on the statistics done on the pretest and post-test result with SPSS, in Shapiro-Wilk Normality tests, Study 1, pre-test p-value is .43 and post-test .48 both greater than .05 which is insignificant and proves the data is normally distributed. In Study 2, p-value in pretest is .128 and in post-test .202, both greater than .05 which again proves it's insignificant and proves the data in Study 2 is normally distributed although the number of participants are small. In Study 1, the pre-test scores mean is 12.89, and the post-test scores mean is 16.21 which shows 3.32 points improvement.

In Study 2, the pre-test scores mean are 13.6, and the post-test scores mean is 15.43, which shows 1.83.

As a conclusion, the mean for all pretest scores in Study 1 and in Study 2 is 13.24 and the mean for all post-test scores in Study 1 and Study 2 is 15.82 which shows 2.58 scores improvement in general in both Studies and proves using vocabulary mobile applications has had a positive effect in students' learning performance.

Questionnaires aimed in studying students' perception regarding four main points, Vocabulary learning performance, Confidence, Class participation, and the use of multimedia in Education Since the sample sizes in both studies were small, a normality test was done to see if the data set is normally distributed and to ensure that the results driven from the study can be generalized in order to assess students' perception on these points. In general, items in the questionnaire were designed based on the reviewed literature to observe and seek students' feedback on how their experience in learning through an application differed from the usual traditional learning. To observe the reliability of the data gathered from the questionnaires, a reliability test was done in both studies. In "Study 1" the test resulted in Cronbach Alpha of 0.63 which according to Devellis (1991) is above 0.60, and is therefore reliable. The reliability test on "study 2" resulted in, the Cronbach's Alpha is 0.978, which is again greater than 0.60 and shows the data is reliable.

After the reliability tests, a descriptive statistic was done on the data derived from the questionnaires. According to the statistics derived from questionnaires in both studies, the testing concludes that:

- 37.2% of all students Strongly Agree and 46.12% Agree that using applications had been effective on their learning performance.

- 42.03% of all students in both studies Strongly Agree and 43.49% Agree that they felt more confident after using the applications.

- 25.7% of all students Strongly Agree, and 52.7% Agree that applications had positive effect on their class participation.

- 49% of all students Strongly Agree and 40% Agree that using multimedia in education has a positive effect.

Table 1 Descriptive statistics of questionnaire, study 1

	Survey Questions	SD f(%)	D f(%)	U f(%)	A f(%)	SA f(%)	Mean (M)	Std. Dev
1	I was able to learn vocabulary better when it was presented in multiple ways. (Pictures, Sound, Definition, Examples, etc.)	0 (0.00)	1 (5.26)	3 (15.74)	10 (52.63)	5 (26.31)	4.00	.81
2	I was able to have a wider range of vocabulary activities using an English mobile app.	0 (0.00)	0 (0.00)	3 (15.74)	5 (26.31)	11 (57.89)	4.42	.76
3	Using a mobile app to test my vocabulary knowledge was more fun & less stressful.	0 (0.00)	0 (0.00)	2 (10.52)	14 (73.68)	3 (15.78)	4.05	.52
4	Using apps helped me access additional info, outside of using my textbooks.	0 (0.00)	0 (0.00)	3 (15.74)	9 (47.36)	6 (37.5)	4.21	.71
5	I enjoyed using a mobile app to learn.	0 (0.00)	0 (0.00)	3 (15.74)	10 (52.63)	6 (37.5)	4.15	.68
6	Using the English mobile apps helped me become more confident in my learning.	0 (0.00)	1 (5.26)	3 (15.74)	5 (26.31)	10 (52.63)	3.26	.93
7	I can use the vocabulary learnt by apps better, since they provide me with more visual examples.	1 (5.26)	1 (5.26)	3 (15.74)	8 (42.10)	2 (10.52)	3.52	1.02
8	I was more confident in classroom evaluation tests after using the mobile apps.	1 (5.26)	0 (0.00)	3 (15.74)	9 (47.36)	6 (37.5)	4.00	1.00
9	The English-game/tests in the mobile apps helps me build confidence and overcome stress in class evaluation tests.	1 (5.26)	2 (10.52)	0 (0.00)	8 (42.10)	8 (42.10)	4.05	1.17
10	Mobile apps give me confidence knowing I have my resources at hand and can access it at any time.	0 (0.00)	1 (5.26)	1 (5.26)	13 (68.42)	4 (21.04)	4.05	.705
11	Using mobile apps allowed me to interact better in the class.	0 (0.00)	1 (5.26)	2 (10.52)	12 (63.15)	4 (21.04)	4.00	.745
12	Picking up activities and doing them on my own time and preferred environment, helps me be more confident during my English class.	0 (0.00)	1 (5.26)	2 (10.52)	11 (47.82)	5 (26.31)	4.05	.779
13	Using the English mobile apps enhanced my communication performance.	0 (0.00)	1 (5.26)	2 (10.52)	9 (47.36)	7 (36.85)	4.15	.834
14	By participating in frequent non-threatening situations/ testing (with apps), I am now able to face more challenging ones in real life.	0 (0.00)	1 (5.26)	1 (5.26)	13 (68.42)	4 (21.04)	4.05	.705
15	Using the mobile apps allowed me to communicate with my classmates outside of the classroom	1 (5.26)	1 (5.26)	3 (15.74)	10 (52.63)	4 (21.04)	3.78	1.03
16	Using mobile apps was more practical than reading textbooks.	0 (0.00)	1 (5.26)	3 (15.74)	10 (52.63)	5 (26.31)	4.00	.816

	Survey Questions	SD f(%)	D f(%)	U f(%)	A f(%)	SA f(%)	Mean (M)	Std. Dev
17	Using the mobile apps was easier than browsing the web.	0 (0.00)	0 (0.00)	1 (5.26)	5 (26.31)	13 (68.42)	4.63	.597
18	Mobile apps are more accessible than books when I am moving around.	0 (0.00)	0 (0.00)	2 (10.52)	5 (26.31)	12 (63.15)	4.52	.696
19	Interacting with the mobile apps helped me remember my English vocabulary better.	0 (0.00)	2 (10.52)	2 (10.52)	6 (37.5)	9 (47.36)	4.26	.871
20	I am able to quickly access my study materials and notes with the mobile apps.	0 (0.00)	0 (0.00)	1 (5.26)	6 (37.5)	12 (63.15)	4.57	.606

Table 2 Descriptive statistics of questionnaire, study 2

	Survey Questions	SD f(%)	D f(%)	U f(%)	A f(%)	SA f(%)	Mean (M)	Std. Dev.
1	I was able to learn vocabulary better when it was presented in multiple ways. (Pictures, Sound, Definition, Examples, etc.)	0 (0.00)	2 (8.69)	4 (17.39)	10 (43.47)	7 (30.43)	3.95	.92
2	I was able to have a wider range of vocabulary activities using an English mobile app.	0 (0.00)	1 (4.34)	4 (17.39)	8 (34.78)	10 (43.47)	4.17	.88
3	Using a mobile app to test my vocabulary knowledge was more fun & less stressful.	0 (0.00)	1 (4.34)	3 (13.04)	14 (60.84)	5 (21.73)	4.00	.73
4	Using apps helped me access additional info, outside of using my textbooks.	0 (0.00)	0 (0.00)	2 (8.69)	8 (34.78)	13 (56.52)	4.47	.66
5	I enjoyed using a mobile app to learn.	0 (0.00)	2 (8.69)	2 (8.69)	8 (34.78)	11 (47.82)	4.21	.95
6	Using the English mobile apps helped me become more confident in my learning.	3 (13.04)	3 (13.04)	4 (17.39)	8 (34.78)	5 (21.73)	3.56	1.19
7	I can use the vocabulary learnt by apps better, since they provide me with more visual examples.	2 (8.69)	2 (8.69)	5 (21.73)	8 (34.78)	6 (26.08)	3.60	1.23
8	I was more confident in classroom evaluation tests after using the mobile apps.	2 (8.69)	1 (4.34)	3 (13.04)	8 (34.78)	9 (39.13)	3.91	1.23
9	The English-game/tests in the mobile apps helps me build confidence and overcome stress in class evaluation tests.	0 (0.00)	2 (8.69)	2 (8.69)	12 (52.17)	7 (30.43)	3.95	.82
10	Mobile apps give me confidence knowing I have my resources at hand and can access it at any time.	0 (0.00)	1 (4.34)	3 (13.04)	12 (52.17)	7 (30.43)	4.08	.79
11	Using mobile apps allowed me to interact better in the class.	0 (0.00)	1 (4.34)	4 (17.39)	10 (43.47)	8 (34.78)	4.08	.84
12	Picking up activities and doing them on my own time and preferred environment, helps me be more confident during my English class.	0 (0.00)	1 (4.34)	3 (13.04)	13 (56.52)	6 (26.08)	4.04	.76

	Survey Questions	SD f(%)	D f(%)	U f(%)	A f(%)	SA f(%)	Mean (M)	Std. Dev.
14	By participating in frequent non-threatening situations/ testing (with apps), I am now able to face more challenging ones in real life.	1 (4.34)	2 (8.69)	2 (8.69)	12 (52.17)	6 (26.08)	3.86	1.05
15	Using the mobile apps allowed me to communicate with my classmates outside of the classroom	1 (4.34)	3 (13.04)	3 (13.04)	10 (43.47)	4 (17.39)	3.65	1.07
16	Using mobile apps was more practical than reading textbooks.	0 (0.00)	2 (8.69)	3 (13.04)	12 (52.17)	6 (26.08)	3.95	.87
17	Using the mobile apps was easier than browsing the web.	0 (0.00)	0 (0.00)	1 (4.34)	10 (43.47)	12 (52.17)	4.47	.59
18	Mobile apps are more accessible than books when I am moving around.	0 (0.00)	0 (0.00)	3 (13.04)	7 (30.43)	13 (56.52)	4.43	.72
19	Interacting with the mobile apps helped me remember my English vocabulary better.	0 (0.00)	0 (0.00)	4 (17.39)	8 (34.78)	11 (47.82)	5.69	1.86
20	I am able to quickly access my study materials and notes with the mobile apps.	0 (0.00)	0 (0.00)	2 (8.69)	12 (52.17)	9 (39.13)	4.30	.63

12.0 DISCUSSION

Vocabulary acquisition has proved to be crucial to academic development. Not only language learners need a strong body of knowledge including the grammatical points to succeed in basic skills, but they also need vocabulary help to learn content area materials. According to Baker (1995) direct teaching of the word meanings does not adequately reduce the gap between students with poor versus rich vocabulary knowledge, since the gap is greater. It is therefore important, that students learn other techniques and ways for independent vocabulary acquisition. (Baker *et al.*, 1995)

As the examination of the selected applications used by the learners revealed that learners consistently preferred visual information such as graphics or video.

The before-and-after study design provided the chance to closely observe the change introducing a multimedia aid would bring along when it is introduced as an intervention to the vocabulary learning process. Based on the collected data and the analysis in both classes, Study 1 and 2, students showed positive performance after the intervention. Both study groups had insignificant p-values greater than .05 which showed the results are normally distributed. The mean average for both study groups in pretest is 13.24 and for all post-tests is 15.82 which shows 2.58 scores improvement in overall in both studies and proves the significance of the intervention in vocabulary acquisition through mobile applications.

What's more is other research studies conducted by other researchers have evaluated the effectiveness of ESL/EFL software programs in vocabulary acquisition (Meschyan and Hernandez, 2002). Also recent studies have assessed the effectiveness of using computers on reading achievement, and reading comprehension, the effect of multimedia software on reading comprehension and vocabulary acquisition, and the relationship between vocabulary development and reading comprehension (Singhal, 1998). Most research projects conducted on vocabulary acquisition and multimedia-assisted

language learning, focus on the effects of multimedia glosses. According to Baker (1995) Studies on computer-assisted methods of teaching prove them to be more attractive to learners for three main reasons. First, these kinds of interventions need less direct teacher participation than teacher-led instructions. Next is the ability to customize the instructions and make the techniques and vocabulary goals easy, and last, the potential to systematically repair essential instructional design features within the change framework which includes instructional scaffolding and integration across academic areas (Magogwe and Oliver, 2007). What's more in an article about the relationship between multimedia annotations and vocabulary acquisition, Chun and Plass (1996) talk about the positive results of three studies on students in second year of German who used Cyber bunch, a multimedia application which provides many annotations (pictures, texts, videos). The results driven from this study as well supported the driven conclusion from the past studies on the effects of various types of annotation, that found out that visual imagery helps learning and remembering new foreign words Chanier and Selva (1998) as well emphasized on the benefits of multimedia in learning L2/FL vocabulary and they introduced Alexia, a French vocabulary learning environment in vocabulary acquisition process.

Motivation is an important factor in education. With the rapid pace of technological development, mobile applications can motivate students to learn more. Students and teachers are tired of the routine ways of teaching words such as repetition and memorization this is while using different platforms not only helps the learning process but also creates excitement and variety.

13.0 CONCLUSION

In a typical traditional learning system, the learning environment consisted of teaching aids, whiteboards and books, students participating in such an environment, the teacher is in the center and it's through the teacher the learning acquisition takes place.

As in this research, in both Study 1 and 2, students were reminded of the importance of traditional system in the first phase of the study.

Although the results cannot be generalized at this point and more studies and observation of the effects of such applications on learners' performance need to be done, we can still conclude that instructors can enhance students' knowledge of vocabulary through using multimedia aids. This study was an investigation of the use of English Vocabulary applications to enhance students' vocabulary learning. The findings of the study support the idea that using mobile applications helps vocabulary acquisition to reach more general conclusions. Particularly it can be concluded from the results of this study that an effective way to improve the learning of English vocabulary based on Mayer (1997)'s principle in the selected focus group is to present the contents through graphics to show the meaning of words and help students remember. When mobile applications were presented, the subjects showed more motivation to learn vocabulary since it helped visualize the definitions in a meaningful manner.

References

- [1] Al-Seghayer, K. 2005. The Effect of Multimedia Annotation Modes on L2 Vocabulary Acquisition. *Research in Technology and Second Language Education: Developments and Directions*. 3: 133.
- [2] AlKahtani, S. 1999. Teaching ESL Reading Using Computers. *The Internet TESL Journal*. 5(11).
- [3] Baker, S. K., Simmons, D. C., and Kameenui, E. J. 1995. Vocabulary Acquisition: Synthesis of the Research: National Center to Improve the Tools of Educators, College of Education, University of Oregon.
- [4] CSATA, T. 2004. Evaluating Non-Functional Requirements in Mobile Learning Contents and Multimedia Educational Software. *Learning with Mobile Devices*. 13.
- [5] Carrell, P. L. and Eisterhold, J. C. 1983. Schema Theory and ESL Reading Pedagogy. *TESOL Quarterly*. 17(4): 553–573.
- [6] Chanier, T., and Selva, T. 1998. The ALEXIA System: The Use of Visual Representations to Enhance Vocabulary Learning. *Computer Assisted Language Learning*. 11(5): 489–521.
- [7] Chun, D. M. and Plass, J. L. 1996. Effects of Multimedia Annotations on Vocabulary Acquisition. *The Modern Language Journal*. 80(2): 183–198.
- [8] Devellis, R. 1991. *Scale Development: Theory and Applications*. Newbury Park, CA: Sage.
- [9] Dickinson, D. K. and Neuman, S. B. 2007. *Handbook of Early Literacy Research*. Vol. 2. Guilford Press.
- [10] Groot, P. J. 2000. Computer Assisted Second Language Vocabulary Acquisition. *Language Learning & Technology*. 4(1): 60–81.
- [11] Hong, X. 2010. Review of Effects of Glosses on Incidental Vocabulary Learning and Reading Comprehension. *Chinese Journal of Applied Linguistics*. 33 (1): 56–73.
- [12] Johnson, L., Smith, R., Willis, H., Levine, A., and Haywood, K. 2005. The 2011 Horizon Report. The New Media Consortium, Austin, Texas.
- [13] Kenning, M. J. and Kenning, M. M. 1984. *Introduction To Computer Assisted Language Teaching*. Oxford University Press.
- [14] Kukulska-Hulme, A. 2007. Mobile Usability in Educational Contexts: What Have We Learnt? *The International Review of Research in Open and Distance Learning*. 8(2).
- [15] Liu, D. 2004. EFL Proficiency, Gender And Language Learning Strategy Use Among A Group of Chinese Technological Institute English Majors. *ARECLS e-Journal*. 1.
- [16] Magno, C. 2010. Korean Students' Language Learning Strategies and Years of Studying English as Predictors of Proficiency in English. *TESOL Journal*. 2: 39–61.
- [17] Magogwe, J. M., and Oliver, R. 2007. The Relationship Between Language Learning Strategies, Proficiency, Age And Self-Efficacy Beliefs: A Study Of Language Learners In Botswana. *System*. 35(3): 338–352.
- [18] Mayer, R. E. 1997. Multimedia Learning: Are We Asking The Right Questions? *Educational Psychologist*. 32(1): 1–19.
- [19] Mayer, R. E. 2002. Multimedia Learning. *Psychology of Learning and Motivation*. 41: 85–139.
- [20] Mayer, R. E., and Anderson, R. B. 1992. The Instructive Animation: Helping Students Build Connections Between Words and Pictures in Multimedia Learning. *Journal of Educational Psychology*. 84(4): 444.
- [21] Meschyan, G., and Hernandez, A. 2002. Is Native-Language Decoding Skill Related To Second-Language Learning? *Journal of Educational Psychology*. 94(1): 14.
- [22] Moeller, A. K., Corl, K. A., Ricaurte, R., and Abrate, J. 1998. Celebrating Diversity in the Language Classroom. Selected Papers from the 1998 Central States Conference, N(National Textbook Company).
- [23] O'Malley, J., and McCraw, H. 1999. Students Perceptions of Distance Learning, Online Learning and the Traditional Classroom. *Online Journal Of Distance Learning Administration*. 2(4).
- [24] Richards, J. C. 1976. The Role of Vocabulary Teaching. *TESOL Quarterly*. 77–89.
- [25] Singhal, M. 1998. A Comparison of L1 and L2 Reading: Cultural Differences and Schema. *The Internet TESL Journal*. 4(10).