A COMPARISON OF UNDERGRADUATE STUDENTS' ENGLISH VOCABULARY LEARNING: USING MOBILE PHONES AND FLASH CARDS

Emrah Baki BAŞOĞLU
Zonguldak Karaelmas University, Turkey
emrahbaki@hotmail.com

Ömür AKDEMİR
Zonguldak Karaelmas University, Turkey
omurakdemir@gmail.com

ABSTRACT
Knowing a foreign language has become crucial to reach information. Learning vocabulary is the fundamental step to learn a foreign language. New devices are invented everyday to fulfill the needs of citizens of the twenty-first century. Increased use of mobile phones has made them popular for not only communication, but also entertainment and learning purposes. Mobile phones have provided remarkable advantages in learning process. They provide opportunity for learning to occur outside the classroom walls in anytime and anyplace. The effects of using vocabulary learning programs in mobile phones on students' English vocabulary learning are investigated using the mixed-method research design with sixty students studying in the Undergraduate Compulsory Preparatory Program of a public university located in the Black Sea region of Turkey. Results indicated that using mobile phones as a vocabulary learning tool is more effective than one of the traditional vocabulary learning tools.

Keywords: mobile learning; language learning; vocabulary learning; instructional technology; higher education

INTRODUCTION

As technology is developing at a great speed today, the importance of knowing a foreign language turned out to be important in an environment where information is so crucial. Learning vocabulary is the fundamental step to learn a foreign language. Hence, many studies are carried out in order to increase efficiency in vocabulary learning (Akın & Seferoğlu, 2004; Bruton, 2007; Erten & Tekin, 2008; Genç, 2004; McCarten, 2007; Moras, 2001; Newton, 2001; Tang & Nesi, 2003). In spite of various studies in vocabulary learning, learners show very little effort to deal with their problems about newly learned words (Meara, 1982). During the lesson, teachers often tend to have an attitude to make the students deal with this problem outside the class on their own (Baykal & Daventry, 2000). However, learners do not have enough knowledge about the vocabulary learning techniques and they have difficulty in dealing with this problem themselves (Akın & Seferoğlu, 2004). One of the most widely used techniques in language learning is flashcards, which is available for the students both in the class and outside in their extracurricular time.

With the importance given to foreign language, the development of Information and Communication Technologies (ICTs) has evoked innovations in educational activities. Additionally, mobile technology is getting more and more popular and mobile tools; such as Personal Digital Assistants (PDAs), tablet computers, and mobile phones have begun to gain more importance. These tools have provided great advantages in e/m-learning process and have taken away the problems about learning time and place, two of the factors preventing learning process (Chen-Chung, 2007). In a review of European Union about mobile learning, it is stated that mobile phones are the most frequently used devices in the projects, followed by PDAs (Pecherzewska & Knot, 2007). Recently, mobile phones are less expensive, lighter and more powerful and they have become more important part of language learning. As mobile phones become increasingly popular, new examples of language learning experiences in everyday surroundings are expected to be seen more often. Learning via mobile phones can create different learning opportunities for students. Even though studies about the use of mobile phones in language learning are recent and limited, results show that they have positive effects on the learning process.

In Saran, Çağıltay and Seferoğlu's (2008) study, results showed that students specified positive feedback to the use of mobile phones in language learning. Students stated that they were delighted to use the instructional materials in their mobile phones. In another study about mobile learning, Thornton and Houser (2005) used e-mails to send English vocabulary lessons to the mobile phones at specific times. The researchers wanted to find out whether mobile learning promoted learning for Japanese university students. They found that students using mobile phones in learning became more successful in compared to the students who used identical materials on paper or web and they concluded that using mobile phones was a valuable teaching method. In a similar study, Cavus and İbrahim (2009) used a mobile learning tool to investigate the use of wireless technologies in learning English vocabulary using Short Message Service (SMS) text messaging. The results showed that students

expressed positive attitudes while learning new words via mobile phones. In another study, McConotha, Praul and Lynch (2008) conducted a research giving the students the opportunity to use an m-learning product for the purpose of assisting them in preparation of two scheduled exams. Practice and review questions were made available on m-learning devices. The results showed that by using mobile devices in the learning process, students made better scores while they were reviewing and practicing for the exams.

Investigating the effectiveness of using a mobile phone while browsing WAP sites to learn listening skills and students' attitudes towards using a mobile phone, Nah, White and Sussex (2008) found that while using mobile phones for this purpose, the students expressed positive attitudes to the activities and they found the activities convenient and interactive. The students could study at anytime and anywhere spontaneously so it was a student-centered learning process. As seen from the findings of the studies, mobile phones offer many opportunities in language learning and learning in other domains since they are widely used and have various features; such as personalization, localization and mobility.

Similar to mobile phones, when students' needs are taken into consideration, PDAs which also offer features such as personalization, localization and mobility can be used in more flexible and extended ways for language learning. Song and Fox (2008) investigated undergraduate students' dictionary use of PDAs to boost their vocabulary learning in English. The study signified that the students produced positive attitudes towards the use of mobile devices in learning. Additionally, they accepted uses of the tools on both the PDAs and the computers for vocabulary learning. The study also pointed out that using PDAs and computers in an integrated way formed the vocabulary learning activities. Mobile learning creates a flexible, novel and extended atmosphere for English as a Foreign Language (EFL) vocabulary teaching and learning in higher education. In another study, Chen and Chun (2007) presented a study about personalized mobile English vocabulary learning system in PDAs providing appropriate English vocabulary for learning. The research findings showed that the vocabulary learning system promoted the performance and the interest of the students because of the effective and flexible vocabulary learning process. Moreover, most learners believed that the proposed system was very helpful in English vocabulary learning and it promoted their learning interests and English vocabulary abilities without time or place constraint.

It is understood that using mobile phones and PDA's as learning tools has many potential benefits to the language learning and takes learning out of the classroom walls, often beyond the reach of the teacher (Kukulska-Hulme, 2009). On the other hand, in Stockwell's (2007) study investigating mobile-based intelligent vocabulary learning system, learners completed vocabulary activities through either their mobile phones or personal computers. Results of the study revealed that mobile phones were less preferred than computers in vocabulary learning and students achieved better scores on computers. Similarly, in a year-long pilot study conducted by Okunbor and Retta (2008) to investigate the use of mobile phones to enhance student learning, students were able to manage their academic and social lives using customized packages of applications developed by the wireless company for university students and made available to students on the national mobile phone network. The results of the study revealed that most of the students using the mobile-based applications found them insignificant.

Results of limited number of studies are conflicted. It is still not clear whether using a mobile phone as a language learning tool is effective on undergraduate students' vocabulary learning. Moreover, although many studies related to mobile phone use in language learning are carried out in the world, the number of studies in Turkey is not satisfactory. Therefore, more studies should be carried out to understand the effectiveness of using mobiles phones in language learning. In this respect, this study was designed to determine the effectiveness of mobile phone use in vocabulary learning. Four research questions investigated are:

- Is there a difference between the vocabulary learning level of the students using vocabulary learning program in mobile phones before and after the study?
- Is there a difference between the vocabulary learning level of the students using flashcards before and after the study?
- Is there a difference between the gain scores of the students who used the vocabulary learning program in mobile phones and the gain scores of the students who used the flashcards?
- What are the experiences of the students using English vocabulary program on mobile phones as a vocabulary learning tool?

METHOD

Context

The study was conducted at a public university located in the Black Sea region of Turkey with undergraduate students enrolled in the Undergraduate Compulsory Preparatory Program. A multifunctional language learning program was applied to make students acquire the lessons in the language structure throughout their university education. Students were required to attend speaking, writing, video and grammar lessons and acquire the skills necessary for learning English as a second language. At the end of the academic year students were aimed to reach B1 level in European Language Portfolio "Global Scale" and attend English courses covering 30 percent of the total education period in their departments.

Participants

The participants were 60 students studying in the Undergraduate Compulsory Preparatory Program of a public university in the Black Sea region of Turkey. The students were selected to the university according to their scores and preferences in the university entrance exam. Within the student group having the same characteristics, students whose mobiles phones were compatible and incompatible with the vocabulary learning program were determined. Among the student groups, 30 students whose mobile phones were compatible with the vocabulary learning program were assigned to the experimental group and the other 30 students who would use the traditional vocabulary acquisition techniques to learn vocabulary were assigned to the control group.

Research Design

In order to conduct the study, the effects of using vocabulary learning programs in mobile phones on students' vocabulary learning were investigated using the mixed method research design. Mixed-method research design was used to collect quantitative and qualitative data. Therefore, weak points of quantitative and qualitative methods were minimized.

Quantitative data were collected using the pre-test post-test with control group experimental research design. New words were taught to the experimental and control groups in the six-week period. Before the experimental process was started, a vocabulary acquisition program to be operated on students' mobile phones was selected. The program, ECTACO Flash Cards, is especially made to run on mobile phones. After the content was scanned, vocabulary lists suitable for the students' level were selected from the ECTACO Flash Cards application and made available for student use. Among various topics; such as business, general, law and medicine, the most suitable one for the students' level, General 2 level (see Figure-1) available in the program was chosen. The application helped the users memorize approximately 1000 words under this topic.

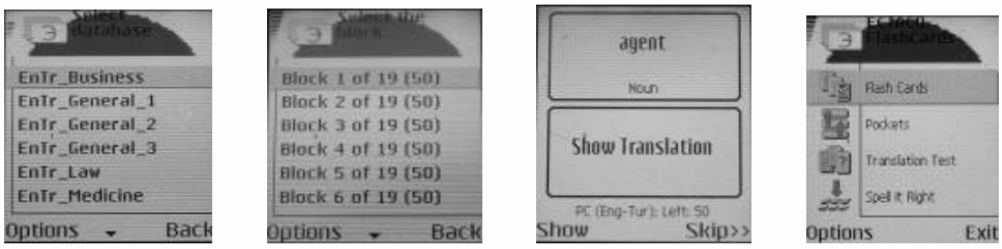

Figure 1: Screen Views of Vocabulary Learning Program Executing on Mobile Phones

Before the application, the purpose of the study and expectations from the students during the experiment process were explained to the students. During the six-week period, students were expected to use the vocabulary program on their mobile phones in their extracurricular times. Students in the control group were given the vocabulary flashcards including words available in the mobile phones and they were expected to use the traditional vocabulary learning techniques. Using these vocabulary flashcards, students in the control group studied the new words on paper for six weeks. Students in the control group were not able to interact with the vocabulary acquisition program in mobile phones. A multiple-choice test to assess experimental and control groups' English vocabulary acquisition was administered before and after the study. After the quantitative part of the study, qualitative data were collected using semi-structured interview questions. Eight interviews were conducted with randomly selected students from the experimental group and they were recorded using the digital voice recorder.

Data Collection Instrument

Students' English vocabulary learning was measured through a multiple-choice test. Initially an 80-item multiple-choice test containing frequently used vocabularies in the mobile phone program was constructed. The test was administered to 50 students taking the same course to find the measure of internal consistency. Point

Biserial values of items falling below 0.3 were removed and the measure of internal consistency of the multiple choice test was found as 0.783. The final version of the test had 25 items, with four choices for each item. This 25-item multiple-choice test was administered to the experimental and control groups before and after the study.

Data Analysis

Students in the study received four points for each of their correct answer in the pre-test and post-test. Scores of the students ranged from 0 to 100 in the multiple-choice test. In order to answer research questions, descriptive statistics, independent and dependent t-tests were used for the analysis of quantitative data. One participant from each of the experimental and control groups was excluded from the data analysis since they did not take the post-test. After transcribing the semi-structured interviews involving eight students, a descriptive qualitative analysis was carried out in order to identify the use of mobile phones for English vocabulary learning. Using the questions of the semi-structured interviews as a framework, three categories were generated. These categories are the time devoted for using mobile phone for learning, the place preferences for the use of mobile phones for learning, and perceived effectiveness of using mobile phones for English vocabulary learning.

RESULTS

The descriptive analyses of pre-test and post-test results of participants are presented in the Table-1.

Table-1: The Descriptive Analysis of Pre and Post-test Results of Participants

		N	Mean	Std. Deviation	Std. Error Mean
Pre-test	Experimental Group	29	24.82	16.33	3.03
	Control Group	29	26.27	18.07	3.35
Post-test	Experimental Group	29	38.62	22.07	4.09
	Control Group	29	34.89	21.08	3.91

The first research question investigated whether there was a difference between the vocabulary learning level of the students using vocabulary learning program in mobile phones before and after the study. The result of the paired-samples t-test has shown that post-test score of the experimental group (M= 38.62) is statistically higher than the pre-test score of the experimental group (M=24.82) ($t_{(28)}$= -7.6; $p<0.05$) (See Table-2). Students in the experimental group used the vocabulary learning program in their mobile phones outside the school and students' active participation was expected to complete the levels in the vocabulary learning program. This finding shows that the use of vocabulary learning program in the mobile phone improves students' vocabulary learning.

Table-2: Pre-Post Test Comparison of the Experiment Group

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-Post Test	-13.29	9.77	1.81	-17.51	-10.07	-7.6	28	0.000

The second research question investigated whether there was a difference between the vocabulary learning level of the students using flashcards on papers before and after the study. The result of the paired-samples t-test has shown that post-test score of the control group (M= 34.89) is statistically higher than the pre-test score of the control group (M=26.27) ($t_{(28)}$= -5.7; $p<0.05$) (See Table-3). Students in the control group achieved better scores on the vocabulary acquisition test at the end of the study in compared to their pre-test scores. The control group was given the vocabulary lists on paper and they memorized them through self-study. This finding shows that the extracurricular activity used for the control group also enabled students to improve their vocabulary learning.

Table-3: Pre-Post Test Comparison of the Control Group

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-Post Test	-8.62	8.12	1.5	-11.71	-5.5	-5.7	28	0.000

The third research question investigated whether there was a difference between the gain scores of the students who used the vocabulary learning program in mobile phones and the gain scores of the students who used the flashcards on papers. The gain score was calculated for the control and the experimental groups and compared. There is a statistically significant difference between the mean score of the experimental group (M= 13.79) and the mean score of the control group (M= 8.62) ($t_{(56)}$= 2.191, $p<0.05$) (See Table-4). This finding indicates that using vocabulary learning programs in mobile phones improves students' achievement more than the use of vocabulary flashcards to learn vocabulary.

Table-4: The Comparison of the Mean Gain Scores

Groups	N	Mean	Std. Deviation	df	t	p
Experimental group	29	13.79	9.77	56	2.191	0.033
Control group	29	8.62	8.12			

The last research question investigated the experiences of the students using English vocabulary program on mobile phones as a vocabulary learning tool. The descriptive qualitative analysis resulted in three categories namely the time devoted for using mobile phone for learning, the place preferences for the use of mobile phones for learning, and perceived effectiveness of using mobile phones for English vocabulary learning.

Interviewed participants for the time devoted for using mobile phone indicated that their use of the program on the mobile phone increased in compared to the beginning. One participant said;

"Initially I used for one hour but afterwards, I spent up to two hours in the dormitory everyday to use vocabulary program on the mobile phone."

However, some participants also said that their use of program dropped lately. One participant indicated;

"Initially I used 5 to 10 minutes, but then, it increased up to one or two hours, but lately it dropped."

It was understood that participants used the program increasingly, but when the end of the semester was reached, their use diminished.

Interviewed participants for the place preferences to use the mobile phones indicated that the program on the mobile phone was mostly used in their leisure time. One participant said;

"I used the mobile phone with friends during the daytime when we got bored and also I used it before sleeping" Another participant indicated that

"I used the mobile phone when travelling on the bus."

Interviewed participants for the perceived effectiveness of using mobile phones for English vocabulary learning indicated;

"I preferred to use mobile phones for vocabulary learning rather than as a dictionary. I really believe that mobile phone is beneficial for vocabulary learning."

Another participant said;

"Studying vocabulary on paper is boring for me. On the other hand, studying with mobile phone is more effective and fun for me since it is available all the time."

It is seen that effectiveness, availability and entertaining use of mobile phones have made them a preferred mean for English vocabulary learning in compared to the hardcopy counterparts.

DISCUSSION

This study has four findings. The first result indicated that the use of vocabulary learning program in the mobile phone improved the acquisition of students' vocabulary learning and students' attitudes towards the use of mobile phones for English vocabulary learning. The second finding indicated that students' vocabulary learning was also improved when flashcards on paper were used. The third finding of the study indicated that using vocabulary learning programs on mobile phones is more effective to improve students' vocabulary learning than using flashcards on paper. The last finding indicated that participants found learning English vocabulary on mobile phones effective and entertaining. These findings are discussed with the results of the studies found in literature.

Result indicated that not only did mobile phones improve students' vocabulary learning, but students also showed positive attitudes towards the use of mobile phones for English vocabulary learning. Similarly, using mobile devices to investigate the value of dictionary use on mobile devices for incidental vocabulary learning in

higher education, Song and Fox (2008) found out that students produced positive attitudes towards the use of mobile devices in learning. Additionally, they accepted uses of the tools on both mobile devices and computers for vocabulary learning. The study also pointed out that using mobile devices and computers in an integrated way formed the vocabulary learning activities. Besides accessing vocabulary programs in mobile phones whenever and wherever they preferred, students could have developed a positive attitude in using mobile phones for language learning (Saran, Cagiltay and Seferoglu, 2008). Cavus and Ibrahim (2009) also found out that as a mobile learning tool to learn English vocabulary using Short Message Service text messaging, students expressed positive attitudes to their learning. The combination of these factors might have contributed to achieve such results with increased vocabulary learning in this study when mobile phones are used.

In addition to the findings showing that using mobile devices in language learning is an effective learning tool, results also manifest that students' English vocabulary learning has improved after the use of flash cards. Findings in the literature also support the benefits of flashcards use. In a study conducted by Tan and Nicholson (1997), results showed that flashcard training groups were significantly better than the control group in speed of reading words and reading comprehension. Students said that they enjoyed their lessons and flashcards could be fun. Results of Stutz's (1992) study also support that flashcards are fast and fun to use and they are effective since they have multi-sensory appeal and occupy only a short time within the lesson. The article concludes that there are various ways to use flashcards; such as writing, speaking, testing and having fun. Fun and ease of use of flashcards could be the reason for effectiveness of flashcards in improving students' English vocabulary learning.

This study also demonstrated that utilizing vocabulary learning programs running on mobile phones improved students' acquisition of English vocabulary more than traditional vocabulary learning tool, flash cards. Thornton and Houser (2005) also found similar results when comparing students' scores studying vocabulary materials on mobile phones with paper. Mobile phone users received better scores than students using identical materials on paper. Therefore, it was concluded that mobile phone use for language learning is more effective than its paper counterparts. Increased use of mobile phones has made them a popular device for not only communication, but also for entertainment and learning purposes. Accessibility and portability of mobile phones promoted students to use them as an English vocabulary learning tool in their leisure time. Therefore, vocabulary learning gain of students using mobile phones might be found higher than flashcard users.

CONCLUSIONS

Nowadays, mobile phones have already become a routine part of our lives. Increased features and decreased cost of mobile phones have made them popular devices not only for communication, but also for educational purposes. Similar to the popularity of mobile phones, the need for knowing a foreign language is increasing. Learning vocabulary is the fundamental step to learn a foreign language. As the mobile phone use becomes more common and vocabulary programs running on phones become more appealing, students seem to use mobile phones more often as an instructional tool for language learning. However, it should be remembered that the data were collected from undergraduate students who have to pass the final exam at the end of the academic year. Therefore, high motivation of participating students learning vocabulary to pass the exam might have influenced the effect of interventions used by students in the control and experimental group. This limitation of the study should be remembered before attempting to generalize the result of the study for other groups. Although a simple and primitive form of English vocabulary learning program executing on mobile phones was used as an intervention, this study has demonstrated that using such a program on mobile phones is more effective in English vocabulary learning than a traditional vocabulary learning technique. Therefore, it is concluded that a vocabulary learning program executing on mobile phones can be used to learn English vocabulary as an effective mean. This study demonstrates that mobile language learning is an effective tool for Turkish undergraduate students to learn English vocabulary.

IMPLICATIONS AND RECOMMENDATIONS

The results of this investigation could have important implications for English vocabulary learning and mobile learning. English vocabulary programs executing on mobile phones can be employed as an extracurricular activity for undergraduate students in teaching English vocabulary. Students can have opportunity to practice anytime and anywhere since they carry their mobile phones almost all the time. This enjoyable experience can make learning fun even for undergraduate students who are 17 to 24 years old. Results also suggest that mobile devices provide tremendous opportunities for learning, especially outside the class since they are available all the time.

Another implication of this study is that in the absence of English vocabulary programs running on mobile phones, flashcards can also be used to teach English vocabulary since they also improved the vocabulary gain of

students. However, it should be noted that using a mobile phone is more effective than using flashcards in English vocabulary learning. Therefore, flashcards should be considered as a second alternative in the absence of a mobile learning option.

It is recommended that further studies should investigate the effects of using vocabulary learning programs which have visually appealing screens and multimedia features; such as pictures and sound since only the text-based vocabulary learning program executing on mobile phones was used in this study. Also non-random sampling of the study group is one of the constraints of the study. Further works with randomly chosen samples should be conducted to make findings more generalizable.

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