Tablet, Flashcard and SMS and their Effects on EFL Learners' Attitudes and Vocabulary Knowledge

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ABSTRACT

The purposes of this study were to compare the effects of using SMS, tablet and flashcard on the EFL learners' attitudes and vocabulary learning. The participants of the study were 45 Iranian advanced EFL learners, who were divided into three groups, each with 15 participants. The first group learned the vocabulary items via tablet, the second group learned them via SMS, and the third one learned the vocabulary items via flashcard. Three instruments were used in this study: a pretest of vocabulary, a posttest of vocabulary, and an attitude questionnaire. The results revealed that vocabulary instruction via SMS, flashcard, and tablet was effective in improving the participants' performance on the vocabulary test; however, the highest mean on the posttest was obtained by students who received vocabulary instruction through tablet. The results also showed that the majority of the learners in the SMS group found reading texts on mobile phone's tiny screen troublesome and preferred to receive English words via email rather than SMS. Majority of the learners in the flashcard group considered flashcard effective for learning English words arguing that flashcards could be used on the move and provide flexible learning anywhere, anytime. Learners in the tablet group reported that tablet learning increased their motivation and was effective for learning English words. This study recommends that instructors consider language learners' attitudes towards various methods of vocabulary learning.

1. Introduction

Vocabulary learning has an important role in learning foreign languages, as students can improve their language skills by learning new words. There are also different strategies for teachers to teach vocabulary (Al-Jarf, 2007). The growth of mobile technologies has changed the way teaching and learning processes are being conducted (Cavus, 2011). Bulun, Gülnar, and Güran (2004) suggest that with the help of mobile learning, lifelong, peripheral, and adaptive, as well as contextual learning is possible. Mobile technologies including mobile phones, pocket electronic dictionaries, Personal Digital Assistant (PDAs), MP3 players, and tablets are being used for educational purposes.

Mobile Assisted Language Learning (MALL) is a language learning that is enhanced through the use of a mobile and handheld devices including PDA, multimedia cell phones, tablets, MP3 players, and DVD players (Chinnery, 2006). Language learners, according to Joseph and Uther (2009), have more authentic real world learning experiences through the use of mobile devices and their multimedia capabilities. SMS can be applied for various educational practices (Kizito, 2012). Short message is one of the features of mobile phones that have the capacity to contribute to enhancing language learners' vocabulary knowledge (Lu, 2008).

People are also using tablet in their daily lives, as it is now becoming more common than before, although the use of tablet as an instructional technology tool in the different areas of education is almost at its primary stage (Savas, 2014). Tablet is useful due to its mobility as it can be easily used in any place and in free time (Bulun et al., 2004). A number of studies (e.g., Chapelle, 2001; Ellis, 2002; Fotos, 2001; Kitade, 2008; O'Brien & Levy, 2008; Salaberry, 2001; Zhao, 2003; Xiang et al., 2009) have investigated the impact of tablet on language instruction, indicating that tablets are beneficial in providing an easier

way for presenting the learners with the options of editing and immediate revision.

A flashcard is a piece of cardboard consisting of a vocabulary, a sentence, or a simple picture on it (Komachali & Khodareza, 2012). Some researchers (e.g., Komachali & Khodareza, 2012; Schmitt & Schmitt, 1995; Thornbury, 2002) have discovered that teaching with flashcards helps learners to acquire vocabularies more effectively than word lists. In addition, it helps in freeing students from physical barriers in assessment (Siozos, Palaigeorgiou, Triantafyllakos, & Despotakis, 2009), and facilitating collectively discourse capabilities (Alvarez, Brown, & Nussbaum, 2011).

Attitude towards usage refers to "the degree to which an individual evaluates and associates the target system with his or her job" (Davis, 1993, p. 476). Some studies (e.g., Hayati, Jalilifar, & Mashhadi, 2013; Suwantarathip & Orawiwatnakul, 2015; Tabatabaei & Goojani, 2012) have investigated the attitudes towards MALL application for vocabulary learning of the students, and the results showed positive attitudes towards the application of MALL.

In order to identify the benefits of tablet, SMS and flashcards in vocabulary learning, there is a need to do more research on the effectiveness of these tools, particularly in the various aspects of language learning. Moreover, there is a lack of research on the issue of mobile applications in the Iranian language teaching and learning context (Dashtestani, 2013). A number of researchers (e.g., Lu, 2008; Thornton & Houser, 2005; Zhang et al., 2011) have investigated the effectiveness of vocabulary learning by using SMS. Other researchers (e.g., Akın & Seferoğlu, 2004; Erten & Tekin, 2008; Genç, 2004; McCarten, 2007; Moras, 2001; Newton, 2001; Sinaei & Asadi, 2014) have found that flashcards are effective for vocabulary learning. In addition, some studies (e.g., Chapelle, 2001; Ellis, 2002; Fotos, 2001; Kitade, 2008; O'Brien & Levy, 2008; Salaberry, 2001; Zhao, 2003) have reported that tablets were more helpful for the instruction preparation, lesson delivery, and student assessment than book-based classes. Findings of the above studies showed that tablet, SMS, and flashcards were effective for vocabulary learning; however, none of these studies compared the three methods at the same time.

Thus this study aimed (a) to compare the impact of using tablet, SMS, and flashcards on the vocabulary learning of EFL learners and (b) to compare the learners' attitudes towards using SMS, tablets, and flashcards. The research questions formulated in this study were:
Is there any statistically significant difference in the EFL learners' vocabulary learning via tablets, SMS, and flashcards?
Is there any statistically significant difference in the EFL learners' attitudes towards using tablets, SMS, and flashcards?

2. Review of the Related Literature
2.1. Computer Assisted Vocabulary Instruction (CAVI)

Vocabulary learning and teaching has been a highly popular subject matter in CALL applications since the early history of CALL, and one of the most common applications of CALL is considered as CAVI. CAVI is one of the subfields of CALL (Ghorbani & Jahandar, 2015) and mainly consists of the use and practices of computers for vocabulary learning and instruction purposes (Basoz & Cubukcu, 2014). It is a new tool of vocabulary instruction in which more language instructors and researchers are interested. Some Iranian researchers (e.g., Ghanbari, Shamsoddini, & Radmehr, 2015; Ghorbani & Jahandar, 2015; Sharifi, Azizifar, Jamalinesarib & Gowharya, 2014; Tabar & Khodareza, 2012) have reported the positive effects of CAVI on vocabulary learning. In the foreign language learning context, CAVI treatments have been made to simplify the complex process of vocabulary learning (Tabar & Khodareza, 2012).

Researchers focus on the CAVI to find useful ways for language learners to help them learn and practice language vocabulary by employing technological aids (Ghorbani & Jahandar, 2015). Goodfellow and Laurillard (1994) states that CAVI software needs to do several things for effective computer assisted vocabulary instruction. Vocabulary acquisition software should help learners acquire a large vocabulary by promoting the deep processing of words and allow learners both to study and use the target vocabulary. Furthermore, vocabulary acquisition software should maximize the interaction between learners and the CAVI program.

Constantinescu (2007) suggested four teaching principles related to the use of CALL in vocabulary and reading development: (a) instructors should pay

more attention to the existence of various teaching tools, (b) instructors should introduce multimedia-glossed texts into their vocabulary/reading classes, (c) instructors should be acquainted with the criteria for software and courseware evaluation, and (d) instructors should keep up with current methodology and make best use of visuals and multimedia. CAVI tools such as electronic dictionaries, concordances, hypertext, glosses, computerized exercises, and the Internet provide students with exciting and innovative vocabulary learning experiences (Ghorbani & Jahandar, 2015).

2.2. Mobile Assisted Language Learning (MALL)

Mobile learning can be defined as the acquisition of any knowledge and skill through using mobile device, anywhere and anytime (Geddes, 2004). According to O'Malley, Sharples, and Lefrer (2003), MALL is any kind of learning that happens when the learner is not at a fixed state and takes advantage of the learning opportunities offered by mobile technologies. Klopfer (2002) suggested the following properties for mobile devices: (a) portability: such devices can be taken to different places due to small size and weight; (b) social interactivity: exchanging data and collaboration with other learners is possible through mobile devices; (c) context sensitivity: the data on the mobile devices can be gathered and responded uniquely to the current location and time; (d) connectivity: mobile devices can be connected to other devices, data collection devices, or a common network by creating a shared network, and (e) individuality: activities platform can be customized for individual learner.

MALL offers numerous merits which can facilitate the process of learning and improve the quality of instruction significantly. Specifically, the educational benefits of mobile learning comprise adaptation of learning to students' learning styles and preferences, interactive learning, multimedia capabilities, ubiquitous Internet connectivity, increased understanding of learning materials, increase in students' motivation, cost-effectiveness, enhanced communication between teachers and students, easy access, student-friendliness, and effective feedback (Kukulska-Hulme & Shield, 2008; Milrad & Jackson, 2008; Stockwell, 2010; Walker, 2013). According to Joseph and Uther (2009), language learners have more authentic learning experiences through the use of mobile devices and their multimedia capabilities.

One of the ways that can help teachers in teaching vocabulary is using different technologies available to students. A number of researchers (Chen & Chung, 2008; Godwin-Jones, 2011; Levy & Kennedy, 2005; Lu, 2008) have done research on the application of MALL in vocabulary learning. Godwin-Jones (2010) argues that the noticeable developments of mobile software are vocabulary learning programs and flashcard software. For example, one of the powerful spaced repetition software (SRS) for vocabulary learning is Supermemo (Godwin-Jones, 2010), which has recently been equipped with sound recognition system, and expanded its usability in multiple platforms including PC, smartphones, and e-learning via website (Yang & Park, 2012).

One of the most used features of mobiles in language learning is Short Message Service (SMS), as it can provide some of the essential ways to give quick attention to words (Nation, 2001).Using SMS has recently become more common in language learning, and it is more suitable in communicative language practice (Chinnery, 2006). Levy and Kennedy (2005) note that the use of SMS in language learning is a successful technique.

2.3. Tablets

Although the mobile and small handheld devices (e.g., cell phones, PDAs, iPod, etc.) have the benefit of portability, the potential challenges of these mobile devices are likely to be their small screen (Carlson, 2002; Chae & Kim, 2004; Chinnery, 2006) and their memory and the data processing speed. To solve these problems, the use of tablets has recently been increased as an alternative to small devices such as cell phones, PDAs, iPod, etc (Godwin-Jones, 2011). Tablet computers, including other mobile technologies, serve as an effective means for fostering learner autonomy and ubiquitous learning in an informal setting. Tablet, with its high mobility, convenient network connectivity, and smart application extendibility is a part of a wave of the latest mobile inventions (Chen, 2013). As the number of people who use tablet rises, using these technological tools in the field of education is beneficial and vital (Savas, 2014). Chen and Denoyelles (2013) reported that tablets are the most frequent tools that students use and the majority of students own mobile devices. They argue that

teachers should provide more guidance for students in order to encourage them to use their mobile devices in the classroom.

There is a benefit of using tablet in testing, which is that the students can use it in free physical space and allows them to participate in assessment wherever learning is taking place (Siozos, 2009). Alvarez, Brown, and Nussbaum (2011) argue that tablets can increase learners' self-confidence in expressing their ideas, facilitate a richer and more natural body language, and strengthen collective discourse capabilities. Xiang et al. (2009) argue that tablet creates better views for learners and do not obstruct the students' views, especially when the instructor writes on the board. In addition, tablets provide instructors with dynamic and flexible presentation in lectures because the content can be revised and edited in the class. Moreover, with tablets learners can use multimedia better.

Using tablets may have some problems, which are technical (e.g., loss of network connectivity, battery power or display connectivity, or pc hardware or software malfunction). Moreover, if instructors become familiar with the use of tablets and they become part of their usual teaching routines, these issues can be solved. In this regard, to help instructors to get used to tablets, pre-service teacher trainer programs need to incorporate the training and use of tablets into their training programs (Savas, 2014). As Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, and Sendurur (2012) pointed out, "the most cited reason for lack of implementation of new technology is lack of professional development" (p. 425).

2.4. Flashcards

According to Cross (1991), flashcard is a simple picture on a piece of card or paper, which is probably the most widely used visual aids in language teaching. Flashcards are used for teaching prepositions, articles, sentence structures, tenses, and phrasal verbs (Palka, 1988). Thornbury (2002) states that flashcards can help teachers demonstrate a simple sequence of activities to the learners and is considered as a useful strategy for vocabulary learning. Moreover, teachers can also use flashcards for drilling and presenting new words. The best advantage of flashcards is that they can be taken almost anywhere and studied when one has a free moment (Brown, 2000).

Some researchers (e.g., Mondria & Mondria-de Vries, 1994; Schmitt & Schmitt, 1995) compared flashcards with word lists and found that working with flashcards is more effective for vocabulary learning than word lists. Flashcards are also found to be effective for vocabulary learning (Akın & Seferoğlu, 2004; Erten & Tekin, 2008; Genç, 2004; McCarten, 2007; Moras, 2001; Newton, 2001; Sinaei & Asadi, 2014). Nicholson (1998) also argues that flashcards can create joy and fun in the classrooms. On the other hand, McCullough (1995) criticized flashcard learning as it stresses memorization over comprehension.

2.5. Studies on MALL, Tablet, and Flashcard in Iran

Cavus and Ibrahim (2008) investigated the use of mobile phone SMS for technical English vocabulary. The participants were 45 Computer Science university students. A web-based application (MOLT) was used to send SMS word pairs every half-hour daily between 9am and 5pm. A total of 48 word pairs were sent three times for nine days. Responses to a student survey indicated very high approval of the system. All participants expressed enjoyment of learning out of class with the help of their mobile phones.

Derakhshan and Kaivanpanah (2011) investigated the effectiveness of SMS on university students' vocabulary learning. During the experiment, which lasted for seven weeks, the participants were taught fifteen to twenty words each session and were asked to work in groups to talk about the words. Then, the experimental groups were told to send a sentence for each word taught in class to the researchers and to three of their classmates. The participants of the control group were asked to write sentences on paper and bring it to the class. The result of the posttest showed that the experimental group had higher scores than the control group; that is, they outperformed the control group in vocabulary retention.

Motallebzadeh, Beh-Afarin, and Daliry Rad (2011) used short message service to help Iranian intermediate EFL learners to retain English collocations. During a five-week experiment one group of participants received seventy collocations along with their definitions and some example sentences via SMS and the other group received them on paper. In addition, both groups took two quizzes, one group via SMS and the other on paper. The result of the post-test showed that the participants in the experimental group outperformed those in the control group. Their scores were also significantly better in the posttest compared

to the pretest. Moreover, with regard to participants' attitudes, the experimental group had positive attitudes towards learning collocations via SMS.

Gutiérrez-Colon Plana, Gallardo Torrano, and Grova (2012) used SMS phone-based to improve the L2 English vocabulary of the students. The participants were 13 L2 English university students. The students were sent three exercises per week via SMS over a period of two semesters based on class content, to which they were expected to respond immediately without consulting any outside resources. The results of the attitude survey revealed that most of the students found the experience interesting and appealing.

In another research, Komachali and Khodareza (2012) studied the effect of using vocabulary flashcard on Iranian pre-university students' vocabulary knowledge. The participants of the study comprised 50 female learners. They were randomly assigned into two homogeneous groups, each consisting of 25 learners. The control group received the traditional treatment, while the experimental group received the treatment on flashcard. Before starting the treatment, two similar tests were administered as the pretest/posttest to find out students' vocabulary knowledge at the beginning and at the end of the study. The result showed that flashcards could lead the students to a higher level of vocabulary improvement.

Sitompul (2013) investigated the effect of using flashcards on fifty graders' vocabulary mastery. The participants were divided into experimental and control groups with a relatively similar vocabulary knowledge before treatment. The experimental group received flashcards treatment, while the control group received word list treatment. The results showed that students' vocabulary improved after they were taught using flashcards and wordlist. The students who used flashcard could memorize the words better and were more motivated to learn English. In addition, they could understand vocabulary easily. On the other hand, students in the control group perceived that word list was a tedious strategy.

Mojarradi (2014) conducted the study to test 40 pre-university students attending high school to find out if flashcards affected vocabulary learning. The participants were given a pretest to ensure that their vocabulary levels were at the same level and

were separated into two groups: experimental and control. Students were asked to answer pretest and posttest questions. Finally, the results showed that using flashcards could be effective in vocabulary learning.

Lin and Yu (2016) investigate the impact of three modes of presentation (i.e., text in isolation, a combination of text and sound, a combination of text and picture) on vocabulary learning of 32 language learners learning vocabulary items on their mobile phones. A vocabulary test at intermediate level as well as a cognitive load questionnaire were administered to them. The results showed that audio representation of the words reduced learners' cognitive load and enhanced the chances of their retaining of the words.

Ahmad, Armarego, and Sudweeks (2017) aimed to develop a framework for using MALL to assist non-native English women to learn vocabulary in a non-formal learning setting. The participants of the study were nine migrated women to Australia with varied backgrounds and low proficiency in English that six of them attended five non-MALL sessions, while three attended five MALL sessions. In this case study research, semi-structured interviews and observations were used. The results of the thematic analysis of data revealed that MALL could enrich the vocabulary acquisition and learning experience of those participants who received vocabulary instruction via MALL.

Conducting a meta-analysis research, Mahdi (2017) compared the outcomes from students learning vocabulary using mobile devices with those learning vocabulary using traditional ways of learning and analyzed how effect sizes varied with regard to learners' age, type of vocabulary learning (receptive or productive), and aspects of vocabulary (e.g., form, meaning, and use). This study reviewed 16 studies analyzing the impact of using mobile devices on vocabulary learning by 986 participants. The results of this analysis revealed that greater achievement can be made through using mobile devices for learning vocabulary compared to traditional ways. In addition, the findings of the analysis showed that (a) mobile devices were found to have the moderate effect sizes on both productive and receptive ways of vocabulary learning, (b) more benefits can be obtained by adult learners using mobile devices for vocabulary learning than young learners, and (c)

moderate effects on all aspects of vocabulary learning were reported by mobile devices.

Findings of the above studies showed that tablet, SMS, and flashcards were effective for improving learners' vocabulary learning; however, none of these studies compared the three methods at the same time. Thus, in this research the effects of the instruction of these three methods on the learners' attitude and vocabulary knowledge were investigated.

3. Methodology
3.1. Participants

The participants in this study were 45 Iranian advanced EFL learners consisting of 25 female and 20 male learners with various majors. We considered them as advanced learners because they had read so many English books such as the series of *New interchange 1, 2, 3, & 4, Passages 1 & 2,* and *FCE English* books in the Sefarat private English language institute in Tehran. The participants' age ranged from 22 to 38.

3.2. Instruments

In this study three instruments were administered: a pretest of vocabulary, a posttest of vocabulary, and an attitude questionnaire (Appendices A, B, C, & D). A pretest of vocabulary containing 50 multiple choice questions was administered before the treatment. The questions were chosen from *Test and puzzles for 504* (Nasrolahi & Sadeghi, 2010). The book consisted of two practical parts of classified tests and crossword puzzles. Five questions were chosen for each lesson of the book (i.e., 10 lessons, for each lesson five questions were chosen, totally 50 questions were administered). The vocabulary posttest was exactly similar to the pretest and was administered after the treatment.

To obtain information about students' perceptions about the application of SMS, tablets, and flashcards in learning English vocabulary, at the end of the experiment participants of all groups were asked to complete an attitude questionnaire, which measured their attitudes towards learning vocabulary through each method. The survey consisted of 20 questions that were divided into two sections. The first 15 items were made using a 5-point Likert scale ranging from 5 (*strongly agree*) to 1 (*strongly disagree*), evaluating the descriptive aspects of the vocabulary learning project. This was followed by five in-depth questions regarding students' preferences for receiving instruction via

SMS, tablets and flashcards, such as the frequency of reading English vocabularies, their time intervals and what the instruction and evaluation should be like during and after the project. Students were expected to choose the answers that best corresponded to their opinions from the given alternatives.

3.3. Procedure

First, the vocabulary pretest with 50 multiple choice vocabulary items was administered to ascertain the participants' knowledge of English vocabulary items (10 lessons, from each lesson five words were chosen). The posttest vocabulary questions were exactly the same as pretest. The attitude questionnaire was administered to obtain information about students' perceptions of mobile learning and the application of SMS, flashcards and tablet in teaching and learning English vocabulary. With regard to the use of SMS, flashcards and tablets in this study, some changes were made in each questionnaire. The attitude questionnaire was similar to the attitude questionnaire that Hayati, Jalilifar, and Mashhadi (2013) used in their study for the purpose of gathering information about students' perceptions of mobile learning and the application of SMS in learning English idioms.

To avoid any confusion all the questionnaires were translated into Persian. The participants of each group were asked to complete a written survey at the end of the experiment. The participants of this study were 45 advanced EFL learners. They were divided into three groups, each group with 15 participants. The first group learned vocabularies via tablet application, the second group learned vocabularies via SMS and the third group learned vocabularies via flashcard. In the tablet group at first, the pretest of vocabulary was administered. The learners were asked to bring their tablets to class where the *504 Absolutely Essential Words* application was installed. In each session the instructor taught the learners 15 new vocabularies via tablets by working on the Persian meanings, definitions, pronunciations, and three sample sentences for each word. The treatment continued for eight sessions, and each session was one hour long (two hours a week). Ten lessons were taught. At the end of the treatment, learners were given the attitude questionnaire and the posttest of vocabulary.

In the flashcard group, 120 flashcards were prepared based on *the 504 Absolutely Essential Words*. The flashcards were given

to 15 learners. Each flashcard contained Persian meanings, definitions, pronunciations, and three sample sentences for each word. At first, the pretest of vocabulary was administered. In each session the instructor taught the learners 15 new vocabularies via flashcards by working on the Persian meanings, definitions, pronunciations and three sample sentences for each word. The treatment was eight sessions, and each was one hour long (two hours a week). At the end of the treatment, learners were given the attitude questionnaire and the posttest of vocabulary.

In the SMS group initially all learners took the pretest of vocabulary. The instructor sent four words each day at different times (i.e., 8 a.m., 11 a.m., 2 pm., & 5 p.m.). A sample of messages sent to learners on the first day is presented in Table 1. The total number of the text messages was 120 words, which were sent to learners during 30 days. Each SMS for each word contained the Persian equivalents of the words, their definitions, pronunciations, and three sample sentences in which the words were used.

Table 1: Vocabulary Messages Sent to Students' on the First Day of the Treatment

Sample SMS	Persian Equivalent	Definition	Time	Sample Sentence
Abandon /əˈbændən/	رها کردن، ترک کردن	Leave without planning to come back, desert, quit	8 a.m.	a. When Roy **abandoned** his family, the police went looking for him. b. The soldier could not **abandon** his friends who were hurt in battle. c. Because Rose was poor, she had to **abandon** her idea of going to college.
Keen /kiːn/	باهوش، تیز	Sharp, eager, intense, sensitive	11 a.m.	a. The butcher's **keen** knife cut through the meat. b. My dog has a **keen** sense of smell. c. Bill's **keen** mind pleased all his teachers.
Jealous /ˈdʒeləs/	حسود، غیرتی	wanting what someone else has	2 p.m.	a. A detective was hired by the **jealous** widow to find the boyfriend who had abandoned her. b. Although my neighbor just bought a new car, I am not **jealous** of him. c. Being **jealous**, Mona would not let her boyfriend dance with any of the cheerleaders.
Tact /tækt/	درایت، مهارت، تدبیر	ability to say the right thing	5 p.m.	a. My aunt never hurts anyone's feelings because she always uses **tact**. b. By the use of **tact**, Janet was able to calm her jealous husband. c. Your friends will admire you if you use **tact** and thoughtfulness.

3.4. Research Design

This study was an experimental research as three types of treatment for vocabulary instruction (i.e., SMS, tablet, and flashcard) were offered to learners, and the impact of these three methods on the learners' vocabulary learning was investigated. The sampling was non-probability convenient sampling as the researchers had to do the research with the students attending each language class and had no control over the selection of the participants of the study.

3.5. Data Analysis

In order to compare the performance of learners on the pretest and posttest of vocabulary, paired samples t test was performed. In addition, in order to compare the vocabulary posttest scores of learners in all three groups of SMS, flashcard, and tablet, one way analysis of variance was performed. Additionally, descriptive statistics and chi-square analysis were performed for the items of the attitude questionnaire for all three groups of learners.

4. Results

4.1 Performance of SMS, Flashcard and Tablet Groups on Pretest and Posttest of Vocabulary

Before investigating whether instruction via tablet, SMS, and flashcard was effective for improving vocabulary knowledge of the learners, test of kolmogorov-smirnov was used to assess the normality of the distribution of the pretest and posttest scores for all three groups. The kolmogorov-smirnov statistic for all three groups was not significant ($p > .05$), indicating that the distribution of scores in the pretest and posttest was normal. Therefore, to compare learners' performance on the pre and posttests of vocabulary, parametric statistical techniques were used. To investigate whether there was any significant difference between the pretest and posttest of vocabulary in the SMS, flashcard, and tablet, paired samples t test was performed. Results of the t tests for the three groups are presented in Table 2.

Table 2: Performance of SMS, Flashcard, & Tablet Groups on Pre and Posttests of Vocabulary

Groups	Test of Vocabulary	N	Mean	SD	df	t	p
SMS	Pretest	15	13.47	5.276	14	-10.662	.000
	Posttest	15	21.27	7.216			
Flashcard	Pretest	15	13.53	8.070	14	-8.087	.000
	Posttest	15	33.13	10.084			
Tablet	Pretest	15	11.20	5.990	14	-18.209	.000
	Posttest	15	41.20	7.775			

As Table 2 indicates, the mean in the posttest of SMS group was greater than that of the pretest. It can be claimed that, $M_{pre} = 13.47$, $M_{post} = 21.27$. However, the scores were more heterogeneous in the posttest, $SD_{pre} = 5.276$, $SD_{post} = 7.216$. The results of t test showed a significant difference, $t_{(14)} = 10.662$, $p=.000$, in the learners' performance on the vocabulary test. Therefore, it can be concluded that vocabulary instruction via SMS was effective in improving the

participants' performance on the vocabulary test.

As shown in Table 2, the mean in the posttest of learners in the flashcard group was greater than that of the pretest. It can be claimed that there was an improvement in the vocabulary knowledge after learning vocabulary via flashcard from pretest to posttest, M_{pre} = 13.53, M_{post}= 33.13. However, the scores were more heterogeneous in the posttest, SD_{pre}= 8.070, SD_{post} = 10.084. The results of t test showed a significant difference, $t_{(14)}$ = 8.087, p=.000, in the learners' performance on the vocabulary test. Therefore, it can be concluded that vocabulary instruction via flashcard was effective in improving the participants' performance on the vocabulary test.

Table 2 also shows that the mean in the posttest was greater than that of the pretest of the tablet group. It can be claimed that there was an improvement in the vocabulary knowledge from pretest to posttest (M_{pre} = 11.20, M_{post}= 41.20) after receiving vocabulary instruction via tablet. However, the scores were more heterogeneous in the posttest, SD_{pre}= 5.990, SD_{post} = 7.775. The results of t test showed a significant difference, $t_{(14)}$ = 18.209, p=.000, in the learners' performance on the vocabulary test. Therefore, it can be concluded that vocabulary instruction via tablet was effective in improving the participants' performance on the vocabulary test.

4.2 Comparing the Performance of Tablet, SMS, and Flashcard Groups on the Posttest of Vocabulary

Table 3: Descriptive Statistics of the Performance of Three Groups on the Posttest of Vocabulary

	Mean	SD	Std. Error	95% Confidence Interval for Mean		Min	Max
				Lower Bound	Upper Bound		
SMS	21.27	7.216	1.863	17.27	25.26	9	31
Flashcard	33.13	10.084	2.604	27.55	38.72	12	45
Tablet	41.20	7.775	2.008	36.89	45.51	18	50
Total	31.87	11.692	1.743	28.35	35.38	9	50

As Table 3 shows, the highest mean (M= 41.20) on the posttest was obtained by students who received vocabulary instruction through tablet, while the lowest mean (M= 21.27) was received by the learners in the SMS group. In order to investigate whether there was statistically significant difference between the posttest scores, ANOVA test was conducted. Table 4 shows the results of the ANOVA test.

Table 4: Results of ANOVA Test

	Sum of Squares	Df	Mean Square	F	p
Between Groups	3016.133	2	1508.067	21.120	.000
Within Groups	2999.067	42	71.406		
Total	6015.200	44			

A one way ANOVA was conducted to explore the differences between the impact of SMS, flashcard, and tablet instruction on the learners' vocabulary learning. As Table 4 shows, there was a statistically significant difference among the mean scores of the three groups on the vocabulary. To exactly determine where the differences among groups occur, the post-hoc test was performed. The result is provided in Table 5.

Table 5: Multiple Comparisons Using Post Hoc Test

(I) group	(J) group	Mean Difference (I-J)	Std. Error	p	95% Confidence Interval	
					Lower Bound	Upper Bound
SMS	Flashcard	-11.867*	3.086	.001	-19.36	-4.37
	Tablet	-19.933*	3.086	.000	-27.43	-12.44
Flashcard	SMS	11.867*	3.086	.001	4.37	19.36
	Tablet	-8.067*	3.086	.032	-15.56	-.57
Tablet	SMS	19.933*	3.086	.000	12.44	27.43
	Flashcard	8.067*	3.086	.032	.57	15.56

Post-hoc comparisons using the Tukey HSD test indicated that the mean score for SMS group (M=21.27) was significantly higher than that for flashcard group (M= 33.13). The mean score for flashcard group was also significantly different from Tablet group (M= 41.20). Post-hoc comparisons using the Tukey HSD test indicated that the mean score for SMS group (M=21.27) was significantly different from flashcard group (M= 33.13). The mean score for flashcard group was also significantly different from Tablet group (M= 41.20).

4.3 Learners' Attitudes towards Learning Vocabulary via SMS, Tablet, and Flashcard

Percentage and chi-square analysis were calculated to investigate the learners' attitudes towards learning vocabulary through SMS. Most of the participants disagreed with item 15, '*I should pay for learning English via SMS*' (93.4%), item 13, '*I would follow predefined time intervals for reading SMS*' (80%), and item 14, '*I prefer to receive English words via email rather than SMS*' (80%), respectively. Most of the participants agreed with item 9, '*it is troublesome to read text on mobile phone's tiny screen*' (93.3%) and item 6, '*mobile phone can be used to learn English on the move*' (86.7%), respectively.

Considering learners' attitudes towards learning vocabulary via flashcard, the highest disagreements were obtained by

item 14, '*I prefer to receive English words via email rather than flashcard*' (80%), item 13, '*I would follow predefined time intervals for reading flashcard*' (64.7%), and item 11, '*I prefer to receive English words via SMS than via flashcard*' (60%). On the other hand, the highest agreement was reported for item 6, '*flashcard is used to learn English on the move*' (93.3%), item 4, '*flashcard learning provides flexible learning anywhere, anytime*' (80%), item 8, '*I think flashcard is effective for learning English words*' (66.7%) and item 9, '*it is troublesome to read text on flashcard's tiny paper*' (66.7%), respectively.

Considering learners' attitude towards learning vocabulary via tablet, the highest disagreements were obtained by item 14, '*I prefer to receive English words via email rather than tablet*' (80%), item 10, '*tablet is not cost effective for learning English*' (60%), and item 11, '*I prefer to receive English words via SMS than via tablet*' (60%). On the other hand, the highest agreements were reported for item 2, '*tablet learning increases students' motivation*' (100%), item 1, '*tablet is effective for learning English*' (93.3%), and item 8, '*I think tablet is effective for learning English words*' (93.3%), respectively.

Considering the learners' responses to the item 16 of the attitude questionnaire, "*how many words do you think you should study via SMS, flashcard, and tablet daily?*", most of the participants in the SMS group (60.0 %) preferred to receive two words daily. The majority of the participants (26.7 %) in the flashcard group, however, preferred to receive two, three, and more than four words daily. Most of the participants (60.0 %) in the tablet group preferred to receive more than four words daily.

Considering the learners' responses to the item 17 of the attitude questionnaire, '*at what time intervals do you prefer to study the words via SMS, flashcard, and tablet?*', most of the participants in the SMS group (46.7 %) preferred to receive the words in the other category rather than every one, two, or three hours daily. The majority of the participants in the flashcard group (46.7 %) preferred to receive the words every three hours or in the other category rather than every one or two hours daily. Most of the participants in the tablet group preferred to receive the words in the other category rather than every one, two, or three hours daily (53.3 %).

With regard to learners' opinions about how often they study each word via SMS, flashcard, and tablet, most of the participants in the SMS group (53.3 %) preferred to study the words twice a day. The majority of the participants in the flashcard group (46.7 %) preferred to study the words twice a day. While most of the participants in the tablet group (33.3 %) preferred to study the words three times a day. Regarding learners' opinions about how they would like the evaluation to be done at the end of the study, most of the participants in the SMS group (93.3 %), in the flashcard group (80.0 %), and in the tablet group (73.3 %) liked the evaluation to be done by paper.

Concerning learners' opinions about their preferences for learning other language components including grammar, pronunciation, etc. via SMS, flashcard, and tablet, most of the participants in the SMS group (86.7 %) and in the flashcard group (73.3 %) did not like to learn other language components via SMS and flashcard. However, most of the participants (80%) in the tablet group preferred to learn other language components via tablet.

Regarding learners' answers to the two open-ended questions about their attitudes towards the use of flashcard, SMS, and tablet, in the SMS group, a large number of students believed that SMS was a useful method for learning vocabulary, but it could not be the only method for this purpose. Some participants noted that learning vocabulary by SMS can be more useful when combined with the other methods and using only SMS for the vocabulary learning can take a long time. However, learning vocabulary via SMS was not a very effective method and using books and social networks could be the better methods for vocabulary learning.

In the flashcard group, most of the students believed that flashcard was a useful method for learning vocabulary. Some participants believed that using books and flashcards together with more examples for vocabulary items in the sentences can be more effective in learning vocabulary. However, some stated that flashcard can be lost easily, and it is not useful for all language levels. In the tablet group, a large number of students believed that it was an easy and useful method for learning vocabulary, as it could increase the students' motivation. On the other hand, some noted that tablets are expensive and not all students could afford to buy it, and when

they use it, the battery might die and causes unexpected problems.

5. Discussion

The result of the pretest and posttest showed that there was an improvement in the vocabulary knowledge after learning vocabulary via SMS, tablet, and flashcards. The results also showed that tablet was the most effective instrument for vocabulary learning, which can be related to the fact that tablet could increase the learners' motivation more than the other instruments. This finding was in line with Yang (2013) who carried out a research in which the students learnt the idioms by using tablet to find the meaning, pronunciation, definition, and visual illustration.

Additionally, comparing the pretest and posttest of vocabulary knowledge in the flashcard group, the result showed that the flashcard group had a positive effect on students' vocabulary learning. Flashcard was found to have a better effect than SMS for vocabulary learning. This finding is in line with that of some studies (e.g., Akın & Seferoğlu, 2004; Erten & Tekin, 2008; Genç, 2004; McCarten, 2007; Moras, 2001; Newton, 2001; Sinaei & Asadi, 2014), which reported the positive impact of flashcard for vocabulary learning.

Comparing the vocabulary pretest and posttest of learners, this study confirmed the effectiveness of the SMS on the students' vocabulary learning. This finding is similar to that of studies by Li and Erben (2007), Lu (2008), Thornton and Houser (2005), and Zhang et al. (2011). Results of the current study also showed that students had a positive attitude towards using tablets and SMS. This finding is in line with that of Stockwell (2008) who reported that the students in his study adopted positive attitudes towards mobile learning.

In addition, students gave some comments that provided further insights into their experience in using tablets, SMS, and flashcards for vocabulary learning. In the tablet group, some students noted that tablet motivated the students to learn the vocabulary and that learning with tablet was easier than the paper-based method. Most of the students believed that tablet had a positive effect on vocabulary learning. However, some had negative attitudes towards using tablets. It can be related to the fact that tablets could not replace the English classrooms and paper-based materials. It can also be due to the technical problems and the short battery life of the tablets, or the harms it can have for students' eyes.

In the flashcard group, one student mentioned that vocabulary learning with flashcards was effective, but it would not be sufficient on its own and should be used with the other methods. Most of the students believed that flashcards are effective in vocabulary learning. However, some students mentioned the negative aspects of using flashcards including the issue that they could be lost easily.

In the SMS group, some students noted that vocabulary learning with SMS was effective, but they preferred to use this method alongside the traditional classroom setting including paper-based materials. The majority of the students in this group believed that SMS was effective for vocabulary learning. However, some students mentioned that it was troublesome for them to read text on the tiny screens.

6. Conclusions

The purpose of this study was to investigate whether there was any significant difference among the effects of flashcard, SMS and tablet on EFL learners' vocabulary knowledge. In addition, this study aimed to examine the attitude of the learners towards receiving vocabulary instruction via these tools. The results of the study revealed that tablet, SMS, and flashcards were found to be useful for vocabulary learning and can be applied in the language classes as the valuable tools for vocabulary learning. Although these instruments could be regarded as a viable medium for teaching and learning English vocabulary, we should not ignore the inherent functional constraints of technological components along with the pedagogical considerations. In other words, despite the many benefits of MALL, in the end, a language class must not be entirely mobile centered because this may reduce the role of the teacher who should be the real provider of the input and the inspiration in the class. Therefore, we should not disregard the true value of the conventional classroom learning; on the other hand, the real potential of learning with mobile technologies should be received well (Hayati, 2009).

Materials developers and language teachers can use mobile apps and SMS as a supplement to language learning, as mobile apps provide different features and components that traditional textbooks and paper materials cannot. Teachers can use these instruments in English institutes, schools, or even in the university to improve

students' vocabulary learning. These instruments can add to the educational setting as effective supplemental tools for vocabulary learning. Finding out how the students feel about tablet, flashcard and SMS can encourage language teachers to explore the features of the tablet, flashcard, and SMS and to improve the effectiveness of language learning and teaching.

This study examined the impact of vocabulary learning via SMS, flashcard, and tablet on the attitude of EFL learners. Future researchers can investigate the impact of this kind of instruction on the autonomy, motivation, self-regulation and self-confidence of EFL learners. In addition, future researchers are suggested to investigate the impact of using online flashcards on the vocabulary learning of EFL learners. Moreover, future researchers can study the impact of using SMS, tablet, and flashcard on the grammar and collocation learning of EFL learners. Other techniques for data collection such as interview can also be used to determine the learners' attitudes towards vocabulary learning via SMS, tablet, and flashcard.

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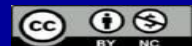
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Appendix A. Vocabulary Pretest and Posttest

Choose the best answer and mark it in on your answer sheet.

1- He's never had much……………… and people don't like his blunt.
a. data   b. fact   c. tact   d. oath

2- They were …………………… for their children to go to the best schools.
a. keen   b. numb   c. visible   d. talented

3- The witness placed his hand on the Bible and took the ……………… .
a. oath   b. wage   c. tempt   d. probe

4- It was a ……………………… for me to save part of my weekly allowance for six months.
a. defect   b. defraud   c. burden   d. hardship

5- Despite fierce competition she made a ……………… effort to win the first medal of the championships.
a. keen   b. vacant   c. frigid   d. gallant

6- He ……………his head on my shoulder.
a. devised   b. reclined   c. inhabited   d. concealed

7- They ……………him to join the company by offering him a large salary and a company car.
a. tempted   b. qualified   c. motivated   d. abandoned

8- The outlook is …………………………… No one thinks he's going to get better.
a. frigid   b. dumb   c. dismal   d. perilous

9- I had been lying awkwardly and my leg had gone ………………
a. dull   b. numb   c. frigid   d. humid

10- The journey through the mountains was fraught with …………..
a. care   b. peril   c. retail   d. talent

11- Companies publish……………reports to inform the public about the pervious activities.
a. dismal   b. annual   c. typical   d. essential

12- A careful ……………… of fine product will result in delicious food.
a. vapor   b. reform   c. probe   d. blend

13- A/An ……………………… day in Florida is full of sunshine and warm breezes.
a. visible   b. annual   c. typical   d. essential

14- The buffalo, which once roamed the plains, is quite ………… Today.
a. vacant   b. prolific   c. scarce   d. jealous

15- If you like I get that camera you want cheaper for you …………..
a. minimum   b. expensive   c. essential   d. wholesale

16- A move towards healthy eating could help ……………………… heart diseases.
a. eliminate   b. circulate   c. descend   d. predict

17- He's either a hero or a ………………………… depending on your point of view.
a. parole   b. multitude   c. morgue   d. villain

18- There will be ………………… fog in northern parts of the country tomorrow.
a. dismal   b. dense   c. numb   d. frigid

19- Sensible ……………………………… of the world's resources must be given priority.
a. elimination   b. utilization   c. prediction   d. circulation

20- It gives me ……………………… pleasure to welcome Professor Hall.
a. marvelous   b. enormous   c. vertical   d. potential

21- Switzerland has a long ……………………… of neutrality.
a. evasion   b. burden   c. tradition   d. exploration

22- The area is still very ………………… and undeveloped.
a. traditional   b. urban   c. typical   d. rural

23- Buying a house often places a big financial ………………………… on young couples.
a. burden   b. tradition   c. probe   d. debate

24- The ………………………………… of the employees have university degrees.
a. assembly   b. fantasy   c. majority   d. probability

25- Education is the current focus of public …………………….
a. probe   b. reform   c. debate   d. decay

26- The North African coast is increasingly …………………………… with British holiday makers.
a. deceptive   b. defective   c. popular   d. comprehension

27- They are both charged with conspiracy to ………………..an insurance company of $20 000.
a. evade   b. explore   c. probe   d. defraud

28- The number of ……………… in the company has increased tenfold over the past decades.
a. clients   b. employees   c. probes   d. traditions

29- They did a/an …………………………… search of the area but found nothing.
a. undoubted   b. popular   c. thorough   d. detective

30- Financial experts have……………signs that the economy is beginning to improve.
a. defrauded   b. detected   c. approached   d. neglected

31- We've had to …….. going to France because Adrian's got an interview for the job that week.
a. resist   b. conclude   c. postpone   d. ignore

32- My aunt never married because her father wouldn't …………. to her marriage to her cousin.
a. consent   b. conclude   c. postpone   d. ignore

33- If the drought continues death will occur on a/an …………. scale.
a. obvious   b. reluctant   c. massive   d. valid

34- We want to …………………………… the character of the town while improving the facilities.
a. consent   b. conclude   c. preserve   d. ignore

35- We must ……………………………… injustice and oppression.
a. resist   b. conclude   c. postpone   d. denounce

36- A spokeswoman said that the pollution caused by the factory had been grossly ……………by environmentalists.
a. ignored   b. concluded   c. resisted   d. exaggerated

37- If I was so ……………………, how come I was making several hundred thousand dollars a year in salary and bonus.
a. obvious   b. unique   c. massive   d. mediocre

38- My way of thinking might be different from yours but it's equally………………………….
a. unique   b. essential   c. enormous   d. valid

39- Animals that had been reared in captivity can find it difficult to …………………………in the wild.
a. explore   b. abandon   c. resent   d. survive

40- He was sitting alone by the window with a/an…………… contraption on the bench in front of him.
a. obvious   b. unique   c. massive   d. valid

41- The people who were hurt in the accident were taken to the only hospital in the immediate………………… .
a. vicinity   b. source   c. variety   d. abundance

42- Rome was founded in the eighth ……………………… before Christ.
a. decade   b. century   c. conflict   d. solitary

43- He tried to run away from the police and was later charged with the crime of……………arrest.
a. resending   b. reserving   c. resisting   d. preserving

44- She …………………………the speech by reminding us of our responsibility.
a. exaggerated   b. preserved   c. concluded   d. resented

45- Mr. Jones' good intentions are …………………… .
a. massive   b. unique   c. unforeseen   d. undeniable

46- She……………………………her horse and rode off.
a. decreased   b. mounted   c. polluted   d. revealed

47- Turn the music down - I'm not……………………. against the noise.
a. igniting   b. prohibiting   c. hesitating   d. competing

48- How do we know if we have a hereditary ………………………………… towards a particular disease?
a. tendency   b. topic   c. tradition   d. burden

49- One shouldn't ………………… the difficulties of getting all the political parties to the conference table.
a. deceive   b. conclude   c. excel   d. underestimate

50- I've never ………………… in diving, although I've always been a good swimmer.
a. excelled   b. hesitated   c. competed   d. underestimated

Appendix B. Attitude Questionnaire towards Using SMS

Attitude Questionnaire towards Using SMS for Learning English Vocabulary	strongly disagree	Disagree	Neutral	Agree	strongly agree
1. SMS learning can be an effective method for learning English.					
2. SMS learning will increase students' motivation for learning English.					
3. SMS learning will enhance teacher–student interaction.					
4. SMS learning can provide flexible learning anywhere, anytime.					
5. SMS can supplement conventional methods of English learning.					
6. SMS can be used to learn English on the move.					
7. I would like to receive SMS on my mobile phone for learning English words.					
8. I think SMS is effective for learning English words.					
9. It is troublesome to read text-based instructional materials on mobile phone's tiny screen.					
10. SMS cannot be used for learning English since it is not cost effective.					
11. I prefer to use tablet rather than receive SMS on my mobile phone for learning English words.					
12. I prefer to use flashcards rather than SMS on my mobile phone for learning English words					
13. I would follow the predefined time intervals for reading short text messages.					
14. I prefer to receive English words via email on my PC rather than SMS on my mobile phone.					
15. I would like to pay for learning English via SMS.					

16. How many words do you think should be sent via SMS daily?
One /Two/Three/Four/More than four
17. At what time intervals do you prefer the words to be sent on your mobile phone?
Every hour /Every 2 hours/Every 3 hours/Other
18. How many times a day do you read each word message sent on your mobile phone?
Once /Twice/Three times/Four times/More
19. How would you like the evaluation to be done at the end of the study?
Paper-based /Via SMS/Orally
20. Would you like to learn other language components like grammar, pronunciation, etc. via SMS, too? Yes/No
21. Please make any further comments you may have relating to your experience on SMS-based learning.
22. Please comment on any other aspects of being a participant of SMS-based learning project that you are dissatisfied with.

Appendix C. Attitude Questionnaire towards Using Flashcard

Attitude Questionnaire towards Using Flashcard for Learning English Vocabulary	strongly disagree	Disagree	Neutral	Agree	strongly agree
1. Flashcard learning can be an effective method for learning English.					
2. Flashcard learning will increase students' motivation for learning English.					
3. Flashcard learning will enhance teacher–student interaction.					
4. Flashcard learning can provide flexible learning anywhere, anytime.					
5. Flashcard learning can supplement conventional methods of English learning.					
6. Flashcard can be used to learn English on the move.					
7. I would like to use flashcard for learning English words.					
8. I think flashcard is effective for learning English words.					
9. It is troublesome to read text-based instructional materials on flashcard's tiny paper.					
10. Flashcard cannot be used for learning English since it is not cost effective.					
11. I prefer to receive English words via SMS on my mobile phone than via flashcard.					
12. I prefer to use tablet rather than flashcard for learning English words.					
13. I would follow the predefined time intervals for reading flashcard.					
14. I prefer to receive English words via email on my PC rather than having the words on the flashcard.					
15. I would like to pay for flashcard to learn English.					

16. How many words do you think you should study via flashcard daily?
One /Two/Three/Four/More than four
17. At what time intervals do you prefer to study the words via flashcard?
Every hour/Every 2 hours/Every 3 hours/Other
18. How many times a day, do you study each word available on flashcard?
Once/Twice/Three times/Four times/More
19. How would you like the evaluation to be done at the end of the study?
Paper-based/Via SMS/Orally
20. Would you like to learn other language components like grammar, pronunciation, etc. with flashcard, too?
Yes/No
21. Please make any further comments you may have relating to your experience on flashcard learning.
22. Please comment on any other aspects of being a participant of flashcard learning project that you are dissatisfied with.

Appendix D. Attitude Questionnaire towards Using Tablet

Attitude Questionnaire towards Using Tablet for Learning English Vocabulary	strongly disagree	Disagree	Neutral	Agree	strongly agree
1. Tablet learning can be an effective method for learning English.					
2. Tablet learning will increase students' motivation for learning English.					
3. Tablet learning will enhance teacher–student interaction.					
4. Tablet learning can provide flexible learning anywhere, anytime.					
5. Tablet learning can supplement conventional methods of English learning.					
6. Tablet can be used to learn English on the move.					
7. I would like to use tablet for learning English words.					
8. I think tablet is effective for learning English words.					
9. It is troublesome to read text-based instructional materials on tablet's screen.					
10. Tablet cannot be used for learning English since it is not cost effective.					
11. I prefer to receive English words via SMS on my mobile phone than via tablet application.					
12. I prefer to use flashcards rather than tablet for learning English words.					
13. I would follow the predefined time intervals for studying words via tablet.					
14. I prefer to receive English words via email on my PC rather than having the words on my tablet.					
15. I would like to pay for tablet English learning applications.					

16. How many words do you think you should study via tablet daily?
One/Two/Three/Four/More than four
17. At what time intervals do you prefer to study the words via tablet?
Every hour/Every 2 hours/Every 3 hours/Other
18. How many times a day, do you study each word available on your tablet?
Once/Twice/Three times/Four times/More
19. How would you like the evaluation to be done at the end of the study?
Paper-based/Via SMS/Orally
20. Would you like to learn other language components like grammar, pronunciation, etc. on your tablet, too?
Yes/No
21. Please make any further comments you may have relating to your experience on tablet-based learning.
22. Please comment on any other aspects of being a participant of tablet-based learning project that you are dissatisfied with.