The Impact of Mobile Learning on ESP Learners' Performance

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ABSTRACT

This study explores the impact of using mobile phone applications, namely Telegram Messenger, on teaching and learning English in an ESP context. The main objective is to test whether using mobile phone applications have an impact on ESP learners' performance by mainly investigating the influence such teaching technique can have on learning vocabulary, and how this can affect the learner's' ability to use grammar correctly and whether their writing skill is improved. The results showed that using mobile phone applications to teach a foreign language skill or subskill is fruitful and does impact learners' comprehension of vocabulary and grammatical rules. The results specifically indicate that mobile phones can be used in many different ways to teach and learn technical and semi-technical vocabulary easily outside the classroom, however, to teach grammatical rules and writing it is recommended that certain strategies be used due to certain limitations.

Keywords: Mobile learning, mlearning - ESP (English for Specific Purposes), language learning, college e-learning instruction.

INTRODUCTION

For many centuries, the assumption that learning only occurs in a classroom with the presence of a trained teacher has prevailed. However, educationalists and scholars in the 20th century, including Argyris and Schön (1996), Freire (1972), Illich (1971), and Knowles and associates (1984) have developed theories advocating transferring the learning experience to locations away from the traditional classroom, but at that time, little emphasis was placed on the mobility aspect of learning. Generally, mobile learning, or mLearning, is a relatively new multidisciplinary approach that attracts many researchers and builds on the assumption that learners are constantly on the move and are always using their cell phones, mobile phones, handheld devices, and laptops (Trentin & Repetto, 2013). The first generation of mLearning researchers investigated its mobility aspect; focusing on the portability, functionality, and smallness of the devices (Peters, 2007). Later on, Web 2.0 technologies and social networking sites were integrated making mobile devices more dynamic and promising. (Sharpe & Beetham, 2010)

It has been established that mLearning has offered new opportunities for both teachers and learners, as instructors in mLearning have more interactivity with learners and can create an active learning environment (Hutchison, Beschorner, & Schmidt-Crawford, 2012). Unlike traditional one-way knowledge transformation modes, as in a typical face-to-face environment, mLearning exposes learners to a variety of learning modes and allows them to be active elements of the learning process (Barhoumi & Rossi, 2013). Moreover, advanced technologies have made it easier for instructors to communicate with their learners via video, images or in text as sending

them instructional messages instantaneously and receiving their feedback has never been this feasible.

A review of relevant literature indicated that mLearning has rarely been employed to teach medical and allied health related English vocabulary in an ESP context. In addition, there were hardly any Arabic studies or studies conducted in Arab countries related to mLearning or more specifically to using mobile phones to teach English vocabulary to Arab learners. The aim of this study therefore is to explore the effectiveness of using mobile phones in English vocabulary learning and the impact mLearning can have on ESP learners and their performance.

To achieve the research objectives, we posed the following central question that is further divided into three subquestions:

1. Is using mobile phones to teach a foreign language a more effective approach to acquiring that language?

a. Does using mobile phones improve the efficiency of learning vocabulary?

b. Does using mobile phones to teach new lexical items improve grammatical achievement of the learners?

c. Does using mobile phones to teach new lexical items affect learners' writing skills?

Purpose of the Study

The purpose of this study is to investigate the effectiveness of using mobile phones in teaching allied health related vocabulary to learners at the Faculty of Allied Health Sciences (AHS) at Kuwait University, Kuwait, where English is the medium of instruction, and where students need the language to enable them to communicate effectively and correctly with their

colleagues, professors, and other health-care professionals. With the huge number of lexical items and little time allocated to teaching them, students often feel at loss and can hardly comprehend the words well enough to use them properly. Therefore, we decided to run this experiment and use a mobile phone application, namely Telegram, to teach students some of the vocabulary listed in their course book and then test their understanding and use of these words, which should eventually prove the effectiveness, or otherwise, of this method.

The Study

E-learning and mLearning have gained some credibility and status in the west; however, in the Middle East, little attention has been given to both "phenomena". From the overview of the literature, it is evident that most studies have been conducted in foreign countries, and studies reporting on quantitative evidence of the effects of mLearning on Middle-eastern learners are rare. Although several studies have shed light on the use of mobile phones in educational settings, mLearning has not received much attention in the Middle East, specifically the Gulf region, and further research should be conducted to investigate this issue. Despite the fact that researchers all around the world have studied the impact of mLearning in various subjects, such as science, humanities, and language art (Amry, 2014; Chu, Hwang, & Tsai, 2010; Nasser, 2014; Peng et al., 2009), little research has explored the use of mobile phones in teaching and learning English, especially in the gulf region. Therefore, this study has been conducted to help introduce mLearning to the field of ESP in the Middle East and the Gulf region specifically.

mLearning definition.

Due to the fact that different perspectives offer different views on mLearning, there has not been one specific definition to describe it. Each definition focuses on a different feature of mLearning, for example, its mobility, individualism, ubiquitousness, or its relation to e-learning. The earlier definitions of mLearning have always been technocentric and broad. Quinn (2000), for example, describes mLearning as an extension of e-learning happening through mobile devices. Another view suggests that mLearning is any kind of learning that occurs anywhere except a predetermined location; i.e. the learner does not have to be in a fixed place (O'Malley et al., 2003). Desmond Keegan's view on mLearning is closely related to O'Malley's as he emphasizes the mobility aspect of such learning. Keegan (2005) asserts that one characteristic of mLearning is that it uses devices that "citizens can carry and use everywhere around them". He continues explaining how these citizens should regard such devices as "friendly, personal, cheap, and easy to use" (p.3) in order for them to qualify as devices used in mLearning. Later, the MoLoNET programme defined mLearning as "the exploitation of ubiquitous handheld technologies, together with wireless and mobile phone networks, to facilitate, support, enhance and extend the reach of teaching and learning", (MoLeNET, 2010) laying more emphasis on technology and connectivity. In this study, when we use the term mLearning we basically foreground its accessibility, interactivity, and instantaneous sharing. More specifically, we refer to the process of using a mobile device to access and study learning materials and to communicate with fellow students, instructors or institutions (Koole, 2009).

Benefits of mLearning.

In this digital age, the educational needs of the growing populations can hardly be met in a traditional classroom environment. Therefore, new and improved media are being adopted and used to serve those needs. Distance learning, e-learning, and mLearning proved their success and usefulness particularly for individuals who cannot attend classes due to financial, physical, or geographical reasons (Al-Fahad, 2009). There are many benefits of implementing mLearning in an educational context some of which are its reachability, motivating features, and social interactivity. One of these benefits is related the mobility and reachability of mLearning; learners can have access at their convenience, i.e. anytime and anywhere. (BenMoussa, 2003; Camponovo & Pigneur, 2003; Ng-Kruelle, Swatman, Rebne, & Hampe, 2002; Turban, Lee, King, Warkentin, & Chung, 2002). With mobile devices, users can access network information anytime, anywhere. (Hahn, 2008) This freedom allows learners more space and less stress, which eventually motivates and encourage them. Moreover, mLearning through using a mobile phone offers learners a more personalized experience as they have the opportunity to choose the time, place and learning content (Narayanasamy & Mohamed, 2013).

Another potential advantage of mLearning is the fact that it is very motivating for both traditional and non-traditional learners, which can lead to an increased understanding of the taught content (Nikana, 2000). It is also argued that through providing the learners with a variety of learning methods we motivate them and help them understand the curriculum content more easily and in depth (Nikana, 2000). The collaborative nature of mLearning encourages group discussions and provide instant feedback, which eventually reinforces learning and increases

memory retention, and the motivation to learn is basically related to the use of personal mobile devices rather than the tasks themselves (Goodison, 2001).

Social interactivity is among the advantages of mLearning discussed, which stresses on the freedom mLearning offers shy learners who avoid participating in class. It encourages such learners to express themselves and share their ideas with their colleagues in a less stressful environment (Nikana, 2000). When learners are posing their questions and comments within an app, a huge part of the intimidation factor is taken away from the introvert learners (McQuiggan, Kosturko, McQuiggan, & Sabourin, 2015)

Other benefits include the relatively inexpensive opportunities mLearning offers, the diverse multimedia content, ease of delivery, and connectivity.

Limitations of mLearning.

The statistical data shows that mLearning does have a solid foundation, and there are many countries, specifically in Europe, where distance learning, e-learning, and mLearning have been introduced and implemented successfully (Wang & Higgins, 2006). The fact that mLearning is important and has its advantages has been well established by many researchers and educationalists. However, mLearning is still only considered for its assistance-only function, and it is argued that the potential of mLearning should not be exaggerated (Wang & Higgins, 2006).

Like any other approach, mLearning has its limitations, and below we shall discuss psychological and usability-related limitations. The psychological limitations build on the assumption that since mLearning happens anywhere and at anytime (Geddes, 2004), then realistically once learners are away from the traditional classroom, they prefer to use their mobile

devices to listen to music, watch movies, or update their status on social networking sites rather than use them for educational purposes (Wang & Higgins, 2006). Studies have shown that even in Japan, where mobile phones have come to be wearable computers and learners are thought to be the most likely to use such devices for learning, mobile devices are rarely used for educational purposes (Kimura, Goda, & Obari, 2011). Although the notion of using mobile phones in the classroom and outside it is motivating, if tasks are not chosen and planned carefully, learners may be unwilling to take part in the process as many lack the motivation needed to use mobile phone consistently. Moreover, even though scientists still have not proved that there is a direct connection between using mobile phones and brain, aural, or visual impairment, people still fear that constant use of mobile phones can cause serious health problems (Wang & Higgins, 2006). In 2005, a survey conducted in Europe showed that 60% of the participants agreed to restriction of mobile phones usage due to possible serious health risks (Siegrist, Earle, Gutscher, & Keller, 2005).

Kukulska-Hulme (2007) listed usability problems that include many aspects, one of which is the physical attributes that include small screen size, heavyweight, inadequate memory, and short battery life. Content and software application problems include a lack of built-in functions, the difficulty of adding applications, challenges in learning how to work with a mobile device, and differences between applications and circumstances of use. Moreover, there are network speed and reliability problems in addition to physical environment issues such as problems with using the device outdoors, excessive screen brightness, concerns about personal security, possible radiation exposure from devices using radio frequencies, the need for rain covers in rainy or humid conditions, and so on.

mLearning for English Language Teaching

Many researchers have tried to prove applicability of mLearning as modern ways of teaching and learning. Moreover, using mobile technologies have been demanded by learners who are somewhat forced to study anywhere and anytime (Evans, 2008). Since current portable devices respond to the needs of this generation, language learning is expected to benefit from the extensive possession of mobile devices such as phones and media players (Kukulska-Hulme, 2006). Although a number of researchers (Collins, 2005; Guerrero, Ochoa, & Collazos, 2010; Kukulska-Hulme, 2006; Ogata et al., 2006; Sandberg, Maris, & de Geus, 2010; Sarica & Cavus, 2009) have verified the advantages of mLearning in teaching English as a foreign or second language, a number of teachers are still hesitant to use mLearning in their curriculum.

Recorders and TVs have always been part of any traditional English language classroom. Then computers were introduced and studies have been conducted to study the effects of computer-based and web-based language learning in any educational environment. Researchers and educationalists have begun to investigate the use of technology as an instructional tool (Donmus, 2010) and it can be used to support collaborative learning (Fowler, Gasen, Roberts, & Saltzberg, 1996; Resta & Laferrière, 2007) or simply to encourage independent learning where foreign language learners have the opportunity to learn and practice a new language (Hoic-Bozic, Mornar, & Boticki, 2009).

Web 2.0 is the most recent internet-based technology and is currently used as a pedagogical tool to improve language learning and teaching. Studies have shown that Web 2.0 technologies, especially wikis, provide a great opportunity for collaborative writing activities (Cress & Kimmerle, 2008). Moreover, social networking sites have proven their usefulness in

improving learners' writing and reading skills as they help them use the language the have learned through writing or reading comments and messages (Sarica & Cavus, 2009). All in all, modern technologies can be considered as the infrastructure of any distance, electronic, or mLearning (Tayebinik & Puteh, 2012).

Learners' Perceptions of mLearning

Most current research is focusing on using mLearning applications in higher education. However, in order to build a sufficient mLearning system, learners' needs and expectations should be taken into consideration to make sure that it is both useable and acceptable (O'Malley et al., 2003). A number of studies have emphasized the positive impact of mLearning, learners' degree of engagement, its rule in improving course content, its accessibility, and how it improves collaboration and interactivity (Lehner & Nösekabel, 2002; Wentzel, van Lammeren, Molendijk, de Bruin, & Wagtendonk, 2005). Moreover, relatively good number of these studies have tried to investigate learners' perception upon the use of mLearning applications and tools in higher education (Cruz e Costa, Ojala, & Korhonen, 2008; Jacob & Isaac, 2007). The majority of studies focus on learners' perception upon the deployment of mLearning; however, little research has been done on measuring their perception prior to the deployment of such applications and tools.

Telegram Messenger

Telegram is a cloud-based mobile and desktop messaging app with a focus on security and speed. Telegram has many advantages over the other apps, and there are many reasons why in this study Telegram Messenger has been chosen as the medium of instruction. Firstly, Telegram Messenger has a friendly interface. Secondly, unlike other messaging apps like

Whatsapp, Telegram offers unlimited cloud storage; i.e. the size of the media and chats has no limits. Thirdly, Telegram is a free application that does not require any subscription fee nor does it show ads. Fourthly, users can access Telegram from multiple devices. Finally, The app prides itself on its enhanced security, which it attributes to time-tested algorithms which combine security with high-speed delivery and reliability ("Telegram Messenger," n.d.).

There is also a very important feature that makes Telegram the current preferred option, and it is related to sharing files. Telegram allows users to share all kinds of files with different extensions and sizes, which is something unattainable with other apps such as Whatsapp. Moreover, the number of members in a single group is relatively huge. A Telegram group can have up to 100 members. In addition, communication and interactivity are also key features as learners and their teacher can interact instantly, or it can be a one-way communication where the teacher sends messages and comments are restricted to have a better control over the group and organize the content.

LITERATURE REVIEW

Using mobile phones to teach and learn vocabulary started to appear in the literature only recently. For example, Browne and Culligan (2008), allowed learners to access vocabulary flash cards on their mobile phones, which proved to be beneficial due to the fact that learners were able to study at a time and place that suits them. In another study, Thornton and Houser (2005) asked learners to use their mobile phones in class to watch video lessons about English idioms, and then they were asked to answer short multiple choice questions to assess their understanding. The learners' feedback was positive as they found the method both fun and useful. Moreover, Levy and Kennedy (2008) sent SMS messages to their learners to review the material taught in

class, and learners were also asked to perform internet searches about what they are going to tackle in class the next session. More interestingly, Thornton and Houser (2005) conducted three researches in mLearning, trying to investigate the effectiveness of using mobile phones to new vocabulary items to Japanese students studying English, which is relevant to this study. The idea was to send emails, including vocabulary lessons, to students who can check their mobiles at timed intervals. Video-enabled mobile phones were also used to explain idioms to students. Students feedback was positive, and they thought that using mobile phones to learn new vocabulary is "a valuable teaching method" (p. 217).

Kiernan and Aizawa (2004) employed mobile phones to teach learners the structures of the target language by exchanging emails. Kiernan and Aizawa (2004) further evaluated the use of mobile phones as tools for classroom learning. Freshman university students were surveyed and pre-tested to assess certain target learning structure. They were then subdivided into three groups: using cell phones text messages, using computer e-mail, and speaking. The study suggested that mobile devices prove to be an effective "language learning resource worthy of further investigation" (p.71). Lu (2008) investigated the application of the short message service (SMS) in second-language learning by examining the effectiveness of SMS vocabulary lists on the small screens of mobile phones. Results show that learners generally hold positive attitudes towards learning vocabulary by mobile phone.

In a study in Oman, Al-Aameri (2011) investigated the actual use and practices of mobile phones in teaching English at the University of Sultan Qaboos. Their behavior and attitude toward using mobile phones in educational and instructional environments were investigated, along with the problems they face during the process of learning a new language by this medium.

The researcher administered a questionnaire to a sample of 100 students taking an intensive English course for the sciences program at Sultan Qaboos University. The findings show that the use of mLearning in the classroom is still limited. They also prove that students do like to use mobile phones, whereas teachers in Oman do not encourage this method of teaching because of concerns that such devices are great distractors for both teachers and students.

Hayati, Jalilifar, and Mashhdi (2013) used SMS to teach English idioms to Persian students. The result of their study showed that m-learners learned more compared with traditional learners. Most students valued the mLearning, considering it a highly effective medium. Badaki, Naderi, and Ayati (2013) studied the effects of mLearning on students' achievement in medical science. Result showed mLearning affected students' achievement positively, increased motivation to learn, and made learners more active.

Another study by Hwang, Wu, Zhuang and Huang (2013) found that mLearning has a positive effect in learning by improving students' learning achievements with less cognitive load than traditional learning. A study by Jabbour (2013) on Lebanese students found that mLearning has positive effects on both students' learning and the interaction with other students and instructor. Amry (2014) conducted a study in Saudi Arabia to assess the effects of mLearning on students' attitudes and achievement. Results showed a significant difference in students' achievement because of the mLearning setting. Findings revealed that mLearning has allowed learners to access learning resources anywhere anytime, which allows them to learn more and therefore has a high positive impact on their test scores.

METHODOLOGY

Participants

The participants were 40 undergraduate students studying at the Faculty of AHS, Kuwait University. They were all enrolled in course 181. The class was not streamed, and the students were randomly assigned by the faculty's student affairs office. All participants were females aged 18-20 years in their first academic year. They were randomly divided into two equal-sized groups with 20 students in each group.

Research Design

An experimental research design was used to test the effects of using mobile phone applications on learning vocabulary and learners' performance in grammar and writing quizzes. To combat any fatigue, order, sequence, or practice effects, the researchers opted for a counterbalanced design. In a repeated measure design, counterbalancing is a method used to control for order effects by exposing each subject to all, or randomly selected, orders of treatment (Cozby, 2009). In experiments where subjects are exposed to all of the treatments (repeated measures design), the behavior of the subjects can be affected by fatigue and other extraneous factors. To avoid this, counterbalanced design is considered one of the best techniques that reduce the possible influence of the order of treatment or other factors affecting the results.

In this study, the simplest type of counterbalanced measure design was used where there are two conditions, A (traditional) and B (mobile). The goal was to test every subject for both conditions. Hence, we divide the subjects into two groups, as in (Table 1), where one group was

treated with condition A while the other with condition B, then following that each group was treated with the opposite condition.

Table 1

Counterbalanced order for the two groups

	Group One	Group Two	Time span
Condition	A (Traditional)	B (Mobile)	6 weeks
Assessment	Unified Test	Unified Test	
Condition	B (Mobile)	A (Traditional)	6 weeks
Assessment	Unified Test	Unified Test	

Procedure

This study investigates the effectiveness of using mobile phones to teach new English lexical items to students at the College of Allied Health Sciences (AHS) at Kuwait University. Recognizing the importance of English to future health care professionals, the faculty of AHS at Kuwait University offers four English language courses for those who intend to be health-care workers. The courses focus mainly on the two receptive skills: reading and listening, and the productive skills: writing and speaking. Vocabulary is also taught, yet less emphasis is placed on teaching this (sub)skill as little time is available to teach the vocabulary extensively and communicatively. Students at AHS are expected to pass each course with a minimum of 120 new lexical items. However, due to the lack of sufficient time and the large numbers of students, the researchers decided to experiment by utilizing mLearning to teach students new lexical items in a more interactive and motivating way. The experiment was conducted within a period of 12 weeks; both groups were tested every six weeks.

First, two conditions of teaching were prepared, (A): *traditional*, and (B): *mobile learning*. In condition (A), the traditional, face-to-face method of teaching was used. In condition (B) mobile learning was utilized through the use of a mobile phone application called Telegram Messenger and every day, for six weeks, one lexical item was sent to the learners on their mobile phones; the message included the lexical item, its part of speech, its definition, example sentences, Arabic translation, visual representation, pronunciation, and sometimes a short (YouTube) video in case of a procedure or medical process. Messages were sent at different times during the day, but never on weekends or after 9 pm.

Second, the sample was split into two groups (1) and (2) with 20 students in each group, and both groups were tested every six weeks. During the first six weeks group (1) was taught new lexical items using the traditional method of teaching (condition A) while Telegram messages (condition B) were used to teach the exact same words to group (2); then both groups were tested. Later, for another six weeks, group (1) was taught a new list of words using Telegram Messenger (condition B), whereas group (2) was taught traditionally (condition A), and both groups were tested again by the end of the 12th week. The tests were unified, and the same language teacher taught both groups under both conditions.

Tools

Several tools were used in this research. Two multiple-choice vocabulary tests with forty items, two multiple-choice grammar tests with forty items each, and two writing tests were used to measure students' understanding and improvement in the subject taught. All tests were standardized and formally prepared. They were reviewed by the course coordinator and a group

of teachers to ensure their content validity. They have been tested on large sample populations and have been revised to eliminate any invalid or unreliable items.

Methods of Analysis

For this study, various methods of analysis, including descriptive and inferential statistics, were used to scrutinize the data collected. The descriptive analysis measures conducted were means and standard deviations. These procedures were used to describe the overall performance on the tests. Pearson correlation was used to calculate the reliability of the multiple choice tests (test-retest technique). To compare the means between the two groups and calculate the difference within each before-and-after both measurements the paired-samples t-test was used.

Data Analysis

As shown in Table 2, descriptive analysis indicated that students did better in the mLearning condition (B) than they did in the traditional condition (A) in all tests and overall test scores.

Table 2

Means and standard deviations of participants' performance in the tests

Test	**Vocabulary**		**Grammar**		**Writing**		**Overall**	
Condition	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Traditonal (A)	30.98	5.28	41.76	5.90	34.00	3.33	106.74	11.56
mLearning (B)	35.55	5.03	44.16	5.60	34.31	3.64	114.02	12.45

In order to test if there was a significant differences in the students' performance between the two conditions, paired sample t-test was used to compare differences in the overall test scores.

Table 3

Result of paired sample t-test of participants overall score in the two conditions

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Traditional - mLearning	-7.29	8.44	1.33	-9.98	-4.59	-5.46	39	.000

Results showed a significant difference (alpha = 0.05) in the overall test score: $t(39) = -5.46$, $p < 0.001$, $d = 0.43$. Students' performance in the overall score of the mLearning condition was better (M=114.02, SD =12.45) than the traditional condition (M =106.74, SD = 11.56).

To gain a deeper understanding of which area of language learning was more affected by the mLearning strategy, paired sample t-tests were run to compare each of the three parts of the test: grammar, writing, and vocabulary.

Table 4

Results of paired sample t-test of participants score in the three subtests in the two conditions

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Voc(A) – Voc(B)	-4.58	4.46	.705	-6.00	-3.15	-6.49	39	.000
Gram (A) – Gram (B)	-2.40	4.06	.643	-3.70	-1.10	-3.73	39	.001
Wri (A) – Wri (B)	-.313	3.37	.533	-1.39	.766	-.586	39	.561

Results showed a significant difference (alpha = 0.05) in the vocabulary test score $t(39) = -6.49$, $p < 0.001$, $d = 0.519$ as the students' performance in Vocabulary test (B) (i.e., after mLearning) was better ($M = 35.55$, $SD = 5.03$) than Vocabulary test (A) ($M = 30.98$, $SD = 5.28$). Results also showed a significant difference (alpha = 0.05) in the Grammar test score $t(39) = -3.73$, $p = 0.001$, $d = 0.263$ as the performance in Grammar test (B) (i.e., after mobile learning) was better ($M = 44.16$, $SD = 5.60$) than Grammar test (A) ($M = 41.76$, $SD = 5.90$). Conversely, the results indicated no significant differences (alpha = 0.05) in the Writing test score, $t(39) = -0.586$, $p = 0.561$, $d = 0.009$.

Results and Discussion

In this study, students used their mobile phones outside the classroom to learn new vocabulary essential to their studies, specifically medical and allied health terms. According to the results of this study, using mLearning to teach students new vocabulary helped them a great deal in understanding the new words, and eventually comprehension of these new words helped them to pass their grammar quizzes easily and successfully, but barely affected their writing. The findings show that using mobile phone applications to teach students new vocabulary is effective as the results indicate that their overall performance generally improved. These results are in agreement with the studies of Badaki, Naderi, and Ayati (2013), Hayati, Jalilifar, and Mashhdi (2013), Mitra and Steffensmeier (2000), which found mLearning to be effective in teaching and learning situations. When it comes to vocabulary, the results of the paired-samples t-test have shown that post-test scores are statistically higher than the pre-test scores, and this means that students scored higher in the vocabulary test at the end of the study, which indicates that using

mobile phone applications improves students' performance greatly especially when compared to traditional methods of teaching, which confirms the findings of Amry (2014), Hwang, Wu, Zhuang, and Huang, (2013), and Jabbour (2013), who found that mLearning had a positive impact on students' achievement.

The current study offers five principal findings. The first is that the employment of mLearning increases learners' ability to learn and use new vocabulary properly. The second finding indicates that learners' improved performance in vocabulary positively affects their performance in grammar. The third finding, however, shows that using mobile phones to teach students new vocabulary had little impact on students' performance in writing. Writing tests scores did not show much change after the use of mLearning. In fact, some studies assert that the impact of technology on students' performance in some areas is not significant (Avers, 2004). The fourth finding shows that using mobile phones to teach a foreign language, in this case medical and allied health, vocabulary is a more effective approach to acquiring that language. Similarly, the final finding demonstrates that mobile phone use has a positive impact on the academic performance of students in general. Students showed positive attitudes toward the use of mobile phones in learning new vocabulary, and they enjoyed and participated daily in the process. This result agrees with the findings of Al-Aameri (2011); Hayati, Jalilifar, and Mashhdi (2013); and Thornton and Houser (2005) as their results show that learners generally have a positive attitude toward mLearning. It also confirms the findings of Jonassen, Carr, and Yueh's (1998) study, which reveals that mixing pleasure with learning is one of mLearning's biggest benefits.

CONCLUSION

In conclusion, it can be said that the use of mobile phones for language teaching and learning can be more effective than traditional methods of learning. Mobile phones can and should be used for learning and teaching purposes because they are easy to operate, accessible to all, and preferred by many learners.

The study showed that students were intrinsically motivated to use their mobiles to learn new terms because they realize that the acquisition and use of medical and allied health vocabulary is of crucial importance to their current studies and future professions. The overall results did show that using mobile phones to teach new lexical items is more effective than applying traditional vocabulary teaching and learning methods. Students' scores in the grammar tests showed how the deployment of mLearning positively affect their understanding. This is due to the fact that learning new vocabulary through mLearning eased answering the grammatical questions without any ambiguity related to difficult wording. The study also demonstrated that using mobile phones to teach vocabulary did not have a significant effect on writing skills; students' performance in writing tests remained the same. It is our conclusion that instructors should benefit from mLearning as one of the effective and motivating methods of instructions.

The results indicated that mobile phones can be used in many different ways to teach and learn technical and semi-technical vocabulary easily outside the classroom. Currently existing mobile phone applications and programs under development can be employed to teach not only vocabulary but also other grammar-related topics. It is crucial to mention, however, that grammar and writing skills need different types of treatment and presentation because these are more complex skills. Applications such as Telegram can be used to review students'

understanding, but not to present a new grammatical rule or procedure writing owing to the small screen size and the complexity of the subject matter. These two skills can be introduced traditionally and perhaps practiced by the deployment of such applications and programs. It is recommended that further investigation of how to use mobile phones to teach grammar and writing be implemented.

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