

# MOLT: A Mobile Learning Tool That Makes Learning New Technical English Language Words Enjoyable

N. Cavus, D. Ibrahim

1 Near East University Nicosia, Cyprus

**Abstract**—There is an increase use of wireless technologies in education all over the world. In fact, wireless technologies such as laptop computers, palmtop computers, and mobile phones are revolutionizing education and transforming the traditional classroom based learning and teaching into *anytime* and *anywhere* education. This paper is about using the SMS messaging services of mobile phones for learning new technical English Language words. The system, developed by the authors, called Mobile Learning Tool (MOLT), has been tested with 45 first-year undergraduate students. Students' opinions have been collected after the experiment. Our results show that students enjoyed and were happy using mobile phones to learn new technical English Language words. We believe that if we add the improvements or modifications students wish to see in the MOLT system, then using the MOLT system as an educational tool will contribute to motivation and success of students.

**Index Terms**—Distance learning, e-learning, IT-use, mobile learning

## I. INTRODUCTION

The mobile phone market has grown rapidly in the last few years. According to Yahoo! [1] there are over 2 billion mobile phone users around the world. The wireless industry association, CTIA, estimates that there are over 204 million cellular phone users in the United States. The figures in China has passed 400 million mobile phone users (Xinhua News Agency – Associated Press, 23 February 2006). It is also estimated that there are over 5 million mobile phone e-mail users in the US [2] and this figure is expected to be over 100 million in four years [3] according to Dave Grannan, general manager of mobile e-mail at Nokia's Mobility Solutions.

The most common mobile device used by students is the mobile phone. Educators and students are looking to take advantage of mobile learning and are looking for an opportunity to use a system that provides a mobile learning environment [4]. There has been significant interest and growth in the number of institutions using mobile devices to support learning and teaching. Istanbulu [4] describes a mobile learning management system which has been developed to provide education through the Internet using mobile phones for engineering educators and students. Economides and Nikolaou [5] report that many educational organizations have started using handheld devices for learning. A mobile collaboration learning system is described by Vasiliou and

Economides [6] where students collaborate in outdoor learning activities using mobile devices.

Mobile learning, or m-learning for short, is a new concept, and is very closely related to e-learning. Stone [7] defines mobile learning as a "special type of e-learning, bound by a number of special properties and the capability of devices, bandwidth and other characteristics of the network technologies being used". Milrad [8] defines e-learning as "learning supported by digital electronic tools and media", and mobile learning as "e-learning using mobile devices and wireless transmission".

Mobile learning is often defined as learning that takes place with the help of portable electronic tools [9]. A portable device that supports learning may be freely moved, but learner is mostly stationary, even though they are using a mobile device. Although the device is mobile and portable, the learning as an event cannot be described as mobile [10]. Moreover, when people access information via different tools, there is still much usability, compatibility and accessibility related questions that hinder seamless mobility and mobile learning.

A survey carried out at the Near East University showed that only a very small percentage of students owned personal digital assistants (PDAs), thus making them unsuitable for m-learning experiments. Mobile phones on the other hand are relatively cheaper and a survey indicated that they are owned and used by every student at the University. The widespread use of mobile phones among our students has led us to consider how this technology might help us to improve the motivation of students and help in teaching.

The authors looked at language-teaching capabilities of mobile devices to consider how wireless technologies are being adapted to meet changing educational needs. An important question is how to create a mobile system for teaching new words, which has added-value features for its user. The aim of this experimental study has been to find out the potential of using mobile phones in teaching new technical English language words to first-year undergraduate students. During the experiment new words and their meanings are sent to students throughout the day in half hourly intervals, and their learning abilities were assessed by performing tests before and after the experiment.

## II. THE AIM

The aim of this experimental study has been to find out the potential of using mobile phones in teaching new

technical English language words to first-year undergraduate students to support their normal English language lectures.

In order to reach this aim the authors have sought answers to the following questions:

1. What are the opinions of students about the mobile phone based learning system?
2. What are the students' suggestions for the development of the system?

### III. METHOD

#### A. Setting

This experimental study has been carried out at the Near East University, Department of Computer Information Systems (CIS), during the Spring 2007 semester. In order to send the SMS text messages, a Windows based program has been developed by the authors on a personal computer (PC), called the *Mobile Learning Tool (MOLT)*.

#### B. Subjects

The experimental study was carried out with 45 first year voluntary students, randomly selected and willing to participate in the experiment. Before the beginning of the experiment it was checked that all the participants had mobile phones and carried by them at all times. The model and the features of mobile phones used were not important in this experiment since any mobile phone can receive and display SMS messages.

#### C. Materials and Procedure

The material is the MOLT developed by the authors. The software is based on the Visual Basic programming language. The ActiveX control package Logicode GSM [11] was used in the program to format the SMS text messages and send them to a mobile phone attached to the PC via the Bluetooth interface. Any model of standard mobile phone could be used as long as it had Bluetooth interface. The mobile phone received messages and phone numbers from the PC and then sent these messages to the recipient students at the times requested by the PC. Figure 1 shows the block diagram of the system developed by the authors.

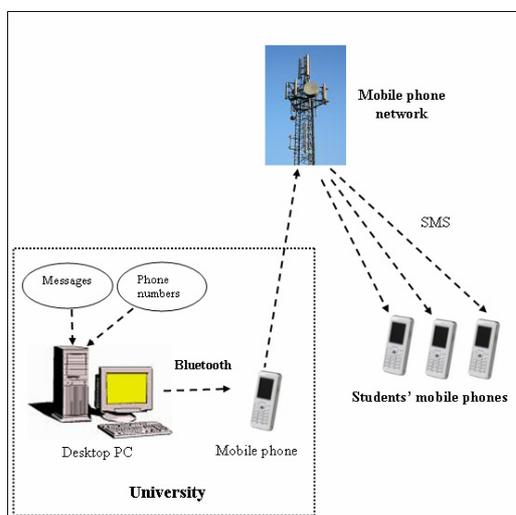


Figure 1. Block diagram of the system

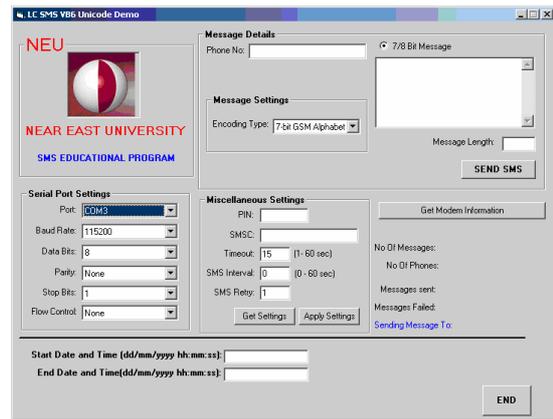


Figure 2. Snapshot of the screen

The computer program consists of a single *Graphical User Interface (GUI)* based display and Figure 2 shows a snapshot of the screen when the program is run. The program operates by entering the starting and ending dates and times of the experiment, and once started it runs throughout the experimental period, terminating automatically at the requested date and time. Before the program is run two text files are created: File *MESSAGES.DAT* stores the messages (ie, the selected technical English words and their meanings) to be sent to all the students. Similarly, file *PHONES.DAT* stores mobile numbers of all the students participating in the experiment.

#### D. Application

The operation of the computer program is as follows:

- The program operates within the hours of 09:00 am to 17:00 pm which is the normal office hours. Dunn and Dunn [12] have found that the optimal time to learn is during the day time (30% during the morning, 30% during the afternoon, 30% in the evening) and this is one of the reasons why the experiment has been carried out during the day time.
- Every half an hour the program reads a new message from the messages file and sends this message as an SMS to all of the students participating in the experiment.
- Students receiving the messages are expected to read and learn the new words wherever they happen to be.
- 16 messages were sent daily during the 8 hour operating time. In total there were 48 messages. These 48 messages were arranged randomly in three parts A, B, and C, each part having 16 messages, and each part was repeated 3 times during the experiment. Thus, the experiment was completed in 9 days.
- The messages were sent in the following sequence:

- Part A messages: days 1, 2 and 7
- Part B messages: days 3, 4 and 8
- Part C messages: days 5, 6 and 9

The importance of repetition in learning cannot be under-estimated. Learning to speak a language, learning to swim, playing a game, learning to type, or driving a car are all learned with repetition. Spaced repetition has been known to improve learning [13]. This is why the messages were repeated and same messages were sent on three separate days.

### E. Data Collection and Analysis

Students were asked to carry out a written survey at the end of the experiment in order to receive their feedback on the use of the MOLT system. “The Scale of Student Opinions in the MOLT System” was prepared by authors in the form of a questionnaire related to students’ opinion. Content and validity of questions were investigated by 12 experts (experts of educational technology, assessment and measurement experts) in this field and were found to be satisfactory. The internal consistency of the questionnaire was found to be .94 using Cronbach alpha. Nineteen carefully prepared questions were given to students to answer in the class. The questionnaire consisted of two sections. The first section of this questionnaire is formed in 5-point Likert scale type questions, consisting of 15 items, with 5 being a response of *Strongly Agree* and 1 representing *Strongly Disagree*. Each question was phrased so that *Strongly Agree* represented a positive reaction to the MOLT system. The second section of this questionnaire consisted of seven carefully prepared questions to find out what improvements or modifications the students wished to see in the MOLT system.

## IV. RESULTS

Two major goals of this experimental study have been:

- Observe the usage of the MOLT system with undergraduate students and obtain feedback on their opinions of this m-learning tool

### A. Opinions of Students about the MOLT System

The mean opinion scores and standard deviations of students’ survey responses are given in Table 2. At a glance, the results suggest that students had highly positive opinions of the MOLT system (14<sup>th</sup> question, M = 4.40).

The first question “*I found the MOLT system enjoyable*”, the third question “*I can easily remember the words that I received on my mobile phone*”, and the eighth question “*Using the current technology with the MOLT system has motivated me*” have the same high scores (M=4.38). One of the reasons for this is that students enjoyed using the MOLT system as a tool while learning as it brought greater flexibility into their learning as now they could learn anywhere anytime. We can say that the interest of students to the use of mobile phones have also helped them learn new words.

Another important result of the survey is response to the 5<sup>th</sup> question (“*I would like a similar system to be used in all of my other lessons*”, M=4.20). According to this result, we can say that students enjoyed learning with the MOLT system.

One of the well-known models used to evaluate the success of a training program is Kirkpatrick’s model [14]. This is a four-level model usually applied to technology-based training. The model consists of the following steps:

TABLE I.  
SCALE OF STUDENT OPINIONS IN THE MOLT SYSTEM

Survey items (N=45)		Mean	Std. Deviation
1.	I found the MOLT system enjoyable.	4.38	.91
2.	I think all my friends who used the MOLT system are happy about it.	4.33	.77
3.	I can easily remember the words that I received on my mobile phone.	4.38	.78
4.	The words I learned with the MOLT system have increased my vocabulary.	4.31	.95
5.	I would like a similar system to be used in all of my other lessons.	4.20	.92
6.	With the help of MOLT system I learned new words.	4.31	.82
7.	MOLT system helped me correct the meanings of words I knew wrongly.	4.20	.81
8.	Using the current technology with the MOLT system has motivated me.	4.37	.92
9.	Using a new novel teaching tool has motivated me.	4.31	.95
10.	Because I am very occupied during class hours it is more difficult to learn new words. But I can learn and remember new words easier during my leisure time.	4.33	.88
11.	I would like to see the MOLT system to be used in next semesters as well.	4.40	.78
12.	I found learning new words with the MOLT system very effective.	4.20	.73

Scoring: 5 = Strongly Agree, 1 = Strongly Disagree

- Level 1 – Reaction: how did participants react to the training program ?
- Level 2 – Learning: To what extend did participants improve their knowledge ?
- Level 3 – Behaviour: To what extend did participants change their behaviour ?
- Level 4 – Results: What benefits resulted from the training program ?

Kirkpatrick’s model could have been used to assess the effectiveness of the MOLT system developed by the authors. But instead, student opinions about the system were measured using statistical methods rather than measuring their learning abilities.

### B. Student Opinions for the Improvement of the System

We have asked several questions in the survey to find out the suggestions of students for the improvement of the system. In response to question “*In your opinion what should be the word sending frequency in MOLT system?*” the majority of students (55.6%) preferred every 30 minutes, which was by coincidence the time used in the experiment. Also, in response to question “*Between what times do you think the words should be sent in the MOLT system?*” the majority (42.2%) preferred the interval 09:00 – 17:00, which again was the time interval used in the experiment. We also wanted to find out whether or not the system should be used at the weekends. In response to question “*Would you like to receive words at the weekends?*” the majority (73.3%) responded positively. This result shows that students enjoyed learning with their mobile phones even at weekends.

In response to question “*Would you like the MOLT system to be supported by chat and forums?*” the majority (84.4%) answered positively. Similarly, 88.9% said “yes”

to question “*Would you like to receive the summaries of lecture notes on your mobile phone?*” which again supports students’ preferences to use their mobile phones for learning. Majority of students (75.4%) also preferred to receive non-lecture based material such as adverts, exam results etc through their mobile phones.

We also wanted to find out whether or not students preferred any special effects to be added to the received words. In response to question “*Which effects would you like to see in received words?*” the majority (44.4%) said they preferred images, 28.9% preferred to receive animation, and only 26.7% said they preferred to receive sound effects.

Another feature students wanted to see in MOLT was a “search” facility. 92% of students said “yes” to question “*It would be nice if the MOLT system supported “searching” where I could search for a new word*”. Using the search facility students can ask the system the meanings of words they have forgotten, and remember these words easier after getting a reply.

## V. CONCLUSIONS

The survey results were very positive and in favour of the mobile phone based teaching system. All of the participants expressed their enjoyment of learning away from the classroom with the help of their mobile phones. Virvou and Alepis [15] who have studied the use of mobile phones in teaching also report that both instructors and students who evaluated their system found it to be very useful. Students suggested that other lectures should also use mobile phone based teaching to support the main teaching activities in the classroom. In addition, students preferred to receive university notices, exam dates, exam results etc to their mobile phones.

The frequency of sending the messages were thought to be satisfactory by the students. Stone, Briggs and Smith [16] found results very similar to ours as they report that students liked using SMS, and the response rates were high and the quality of the messages were very good. Furthermore, a large majority believed that receiving messages every half an hour was just right. The working period was also acceptable as most students preferred not to receive messages after 5:00 pm.

All of the participants expressed an interest in multimedia based messages and this is an important result of the survey. These results agree with the suggestions and results obtained by Kadyte [17] for the teaching of a foreign language using mobile phones.

The beauty of this system is that the learning process takes place away from the classroom environment while the students are involved with their everyday activities.

## VI. RECOMMENDATIONS

The overall goal of this study has been to value-add to the anytime and anyplace flexibility of m-learning. Although the teaching of new words using the mobile phones has been successful, the project can be improved in several ways:

- In the experiment only text based SMS messages are used. There are many words whose meanings are difficult to describe with words. For example, when describing what a “computer keyboard” is, it is more elegant and easier to understand if a “keyboard”

picture is displayed rather than sending a text several lines long. Most mobile phones support messages in the form of pictures and simple animations. In addition, it is easier to remember a picture than remembering its description. Sound can also be used, especially to teach the pronunciation of new words.

- MOLT system has been developed for the teaching of new technical words. The system can be enhanced and used for the teaching of other subjects as well. For example, brief summaries of lecture notes can be sent to students before the start of a lecture.
- MOLT system is currently uni-directional, ie, from the university to the student. The system can be made bi-directional so that student responses, feedback, or answers to particular questions can be received and processed by the lecturers.
- The use of Java enabled mobile phones is increasing as most phone manufacturers now offer such phones at low cost and with rich features. It is recommended by the authors that future mobile phone based teaching activities should be based on the use of Java enabled mobile phones. Students will then be able to carry out more complex and more enjoyable learning tasks, such as revision, solving multiple-choice questions, watching short interactive movies about lectures etc, instead of reading simple text as was the case in this study.

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AUTHORS

**N. Cavus** is with the Computer Information Systems Department, Near East University, Lefkosa, Cyprus, Mersin 10 Turkey (e-mail: nadirecavus@neu.edu.tr).

**D. Ibrahim** is the Head of the Department of Computer Engineering at the Near East University in Cyprus, Lefkosa, Mersin 10 Turkey (e-mail: dogan@neu.edu.tr).

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