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ENGLISH LEARNING via M-LEARNING TOOL

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ABSTRACT
Distance learning provided many teaching opportunities in recent years. Yet one of the significant disadvantages for e-learning when compared with m-learning is using the personal computers by web in front of a computer. Nowadays, there is increasing interest in the potential for supporting the mobile learning with the growing use of mobile devices which often includes wireless network connectivity, blue-tooth connections, various add-on hardware and software. The extended use of mobile devices and the technological development in the wireless networks simulated a new research field on mobile computing recently. Education can be counted as one of the most significant area for mobile computing. In this paper, a prototype is developed for a mobile phone by considering the previously written guidelines and tested on 30 undergraduate students. English learning class is selected as the pilot test to examine whether the application can be useful for effective learning purposes. The prototype is evaluated by using a survey to collect the perceived usefulness and other usability factors to detect required improvements. It is concluded that the perception of the students on the developed mobile product is positive and future recommendation is improving the content of this prototype to use it on other credit classes to support effective teaching.
Keywords: mobile learning, usability, human-computer interaction, distance learning

1. INTRODUCTION
Sort of Human-Computer Interaction (HCI) researchers have seen the opportunities to apply the mobile technologies especially to the education field by the increase in the popularity of mobile devices and wireless networks [1]. The portability and immediate communication characteristics of mobile devices affect the learning process by reaching resources and data transferring [2]. Additionally, there is a great growing in the mobile device sales in recent years. It is announced that the PDA/mobile phones sales are more than the personal computer sales in amount and major companies will switch to wireless networks in 2008 by a survey in United States mobile industry [3]. This technology will become inextricably part of the digital life for people around the world as the number of these devices increase because these devices can be adopted to access Internet resources without time and location constraints [4].
M-learning is often believed as a form of e-learning. Although it is related with the distance learning or e-learning, it is different in its focus on learning with mobile devices. The central component of mobile learning is the use of mobile devices [5]. M-Learning has some unique characteristics differs from distance learning which are ubiquity, convenience, location awareness and personalization [6]. M-learning is not only wireless form e-learning, it should be included the anytime/anywhere concept without permanent connection to physical networks with the advantages of flexibility, low cost, small size, ease of use and timely application [7]. It is proved that m-learning environment provides several benefits such as allowing students and instructors to spend their spare time while traveling to complete assignments or prepare classes [8]. The disadvantage of m-learning is the small screen size for the devices [2].
Various studies are completed in recent years about mobile learning. The studies on m-learning are started with the use of simple SMS (short message service) to remind students for assignment deadlines, encourage them to attend lectures and successful implementation is announced [6, 9]. It is

currently continued to study on m-learning to explore the use of email, web-browsing, streaming audio and video and MMS (multimedia message service) using the newest technologies [10]. Segall et al (2005) conducted a research to compare the usability of a quiz which is developed for PDAs as an application with traditional paper-pencil quizzes for a university credit course. M-learning is also being studied by developing interactive game and proved also its success in this area. Ketamo (2002) developed a game for mobile devices for teaching geometry to kindergarten children. Afterwards, a location based game is developed for the university students to make them become familiar with the university and around of it [12].
In this study, a prototype is developed by implementing guidelines for mobile interface design and tested on thirty undergraduate students to evaluate the application. Evaluation results are gathered to decide the possibility to use mobile learning for other classes in the university to support teaching techniques and improve the quality. English learning class is selected as the pilot test for the prototype and thirty students are allowed to register as users to access class resources and materials. The second section argues design methodology, surveys and participants to the test. Test results and discussions are considered in Section 3. Finally in Section 4, the study is concluded with future recommendations.

2. METHODS

2.1. Design Methodology

In this study, the first version of the prototype is completed with specific functionality. The prototype is developed for the English class. The aim of this study is to understand if mobile learning is possible to adapt successfully to our university for credit classes.

The guideline which is used while developing this prototype is written by collecting the information from the similar studies in this field. The best practices which are proper for educational applications are summarized below [14];

- Texts should be short,
- Images should be used in small size without losing the meaning,
- Scrolling should be avoided,
- Learning objects should be designed for a full screen presentation,
- Useful information should be displayed on a single screen.

2.2. Participants

Thirty participants are selected from the undergraduate student in Industrial Engineering department. The number of female and male students is drawn equally. The average age for the participants is 20.9 (StdDev. = 2.05). Participants are the same level in the English course. Feedbacks are obtained from the instructor and the exam scores. All participants have familiarity with the mobile devices. They are using in their daily life for wide range of purposes.

2.3. Survey

Usability is a software quality metric that covers learnability, satisfaction, effectiveness, usefulness and efficiency as factors [15]. Nielsen (1993) offered ten heuristics which can be used to get ideas about a system while evaluation and almost all usability problems fit well into one of these categories. These heuristics are simple and natural design, speak the user's language, minimize the user's memory load, be consistent, provide feedback, provide clearly marked exits, provide shortcuts, provide good error messages and error prevention.

The survey conducted for this experiment is based on the given evaluation techniques above. The factors given are considered while designing the survey to evaluate the usability of the m-learning application. A brief explanation is given to the subjects before starting the experiment by email. Seven points-likert scale is used to evaluate each item in the survey from 1 as "strongly disagree" up 7 as "strongly agree". The survey items are given in Table 1.

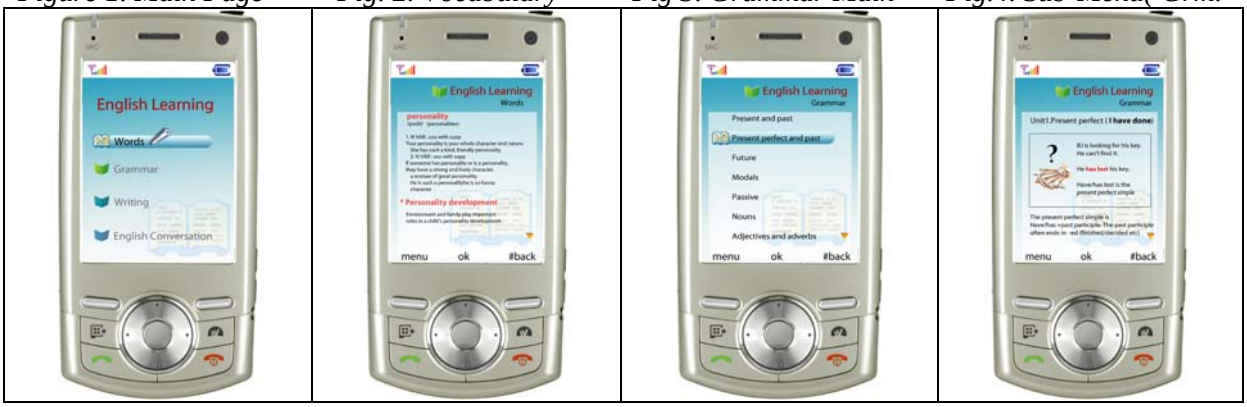
Table 1. Survey Items

1. It was easy to hold the device.
2. Interaction with the device requires a lot of mental effort.
3. It is hard to read the information on the small-sized screen.
4. The consistency and the standards of the interfaces helped me.
5. The interfaces are designed by minimalist approach.
6. The user control and freedom satisfied me about the application.
7. Information is easy to find.
8. System matches with the real life.
9. The application is flexible and efficient to use.
10. The application is easy to learn.
11. The application satisfied me.
12. I am encouraged to use m-learning technology for other classes.

2.4. M-Learning Application

The screenshots from the application is given in Figure 1 to Figure 4 below.

Figure 1. Main Page *Fig. 2. Vocabulary* *Fig 3. Grammar Main* *Fig.4. Sub-Menu(Grm.*



3. TEST RESULTS

This paper describes the development process of a prototype for M-learning environment and a survey is conducted on undergraduate students. Survey evaluates the perceived usability for the further design features. Also, it investigates the students are ready to use mobile learning applications to support their learning skills. The survey statements are written by considering the selected usability factors and heuristic evaluation parameters which are proposed by Nielsen (1993).

Table 2 represents the familiarity of the participants with mobile devices as background questions before starting the main survey.

Table 2. Participant's familiarity

1. Are you currently using a mobile device which is supporting wireless technologies?	79.27% YES
2. Do you use it when you have free time? (For instance while traveling from school to home)	71.45% YES
3. Do you use it to connect Internet?	53.92% YES
4. Do you have any idea about mobile learning?	42.50% YES

Generally, the participants are satisfied with the portability of the system. It was indicated that the using mobile phone as a learning device which is supported by wireless technologies is attractive. Also anytime / anywhere concept of mobile learning made them feel comfortable while operating the given tasks on the prototype. Table 3 represents the perceived usability scores for the m-learning application.

Table 3. Results for the survey items

Survey items	Mean	Std. Dev.
1. It was easy to hold the device while operating the given tasks.	4.3	0.7
2. Interaction with the device requires a lot of mental effort.	1.8	0.6
3. It is hard to read the information on the small-sized screen.	3.8	1.0
4. The consistency and the standards of the interfaces were useful for me.	4.4	0.8

5. The interfaces are designed by minimalist approach.	3.6	0.9
6. The user control and freedom satisfied me about the application.	4.3	0.8
7. Information is easy to find.	4.5	0.7
8. The application is flexible to use.	4.5	0.7
9. The application is easy to learn.	4.4	0.7
10. The application satisfied me.	4.5	0.6
11. I am encouraged to use m-learning technology for other classes.	4.4	0.8

According to the scores given for each item by the participants show that the most significant disadvantage of mobile learning is the small sized screens. Also, it is proved that the prototype is easy to use and learn without adding a lot of mental efforts. In design part, participants reported that the user control on the interfaces is efficient, the interfaces are consistent and searched information was easy to find in the system. The crucial outcome is based on 11th statement. It is encouraged the authors to develop the newer versions of the prototype for mobile learning environment to be used in other classes in the university.

4. CONCLUSION

The survey concluded positively and encouraged the authors to continue on developing the prototype for new versions with new features. The key limitation on handheld technology for the delivery of learning materials is the small screen size. Although, the small screen sizes will always be same, a new technology is developed to provide these devices to project on user's desk and a large screen image on the wall for a better and higher quality visual display of the content [4]. So the evaluation process was successful to provide feedback on what the students think about the prototype and their opinions on the m-learning to find out whether it is beneficial or not. The prototype is reported to be useful and easy to learn. Authors believe that there should be included some other parameters for evaluation and design phases. In the future studies, it will be improved and revised by implementing user-centered development methodology in detail. Additionally cultural factors have to be considered for comparison studies on mobile learning.

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