

# Mobile Learning for Undergraduate Engineering Students

J. Hemabala  
Educational Media Centre  
NITTTR, Taramani,  
Chennai – 113,India

E.S.M. Suresh  
Department of Civil Engineering,  
NITTTR, Taramani,  
Chennai – 113,India

**Abstract - Mobile learning is gaining much important in the new millennium. This research was carried out to find the acceptance level of the learners and teachers on the mobile learning environment. In this paper a pilot study survey results of 50 undergraduate engineering students at Chennai, India about their acceptance level of using the mobile learning in Education. This analysis of the quantitative survey results is presented on the mobile Learning in engineering college learning and teaching environments. This mobile learning is to improve the students or learners attention and motivate them into the learning practice. The major advantage of this mobile learning is used additional or supplemental source of learning any time; anywhere; any network; on any wireless device concept of their mobile learning system and the effectiveness of video lesson using in the mobile learning. It should increase the learning interest and communication to the learner's learning experience in their studies.**

**Keywords-Handheld devices (HD); Personal digital assistants (PDAs); mobile learning (m-learning), electronic learning (e- learning)**

## I. INTRODUCTION

In recent years, the advent of mobile learning technologies have been offering cheaper and more convenient communication so that students and educators can access information and communicate with one another anytime, anywhere ubiquitously by using various mobile devices [1]. Mobile learning is a method of using wireless and mobile technologies in education by extending access to a desktop-based online environment to handheld devices such as Personal Digital Assistant (PDA)'s used as part of mobile community. Mobile learning offers another vision using handheld devices (HD) in wireless classrooms for computer supported cooperative learning [Farooq et al. 2002].

This research paper describes the interdisciplinary research project (PhD) in progress. The main aim of this pilot study is to give the awareness of the mobile learning in India and improve the self study or individualized learning style in an adaptive mobile learning environment. The recent trends to focus on mobile learning as a supplemental to many universities and colleges to provide a unique

approach in personalized learning experience. Nowadays smart phones and PDAs are popularly increasing with the students. Mobile learning system with dynamically adapt the video content is an effective medium for individualized learning.

The teaching method of a traditional or conventional classroom learning environments is usually one-to-many. The teacher will dictate the notes in the class to the students and in case, if any student has got absent with the particular hour, student may loosing their class notes on that day. But in the next day student may copy the notes with other students but he/she couldn't understand his/her hand writing where he/she may face a problem in copying the notes from the other students for the absent class. This problem may be overcome or addressed by mobile learning environments. In wireless classroom learning environment is also one-to-many method of teaching but the technology is many-to-one, i.e. more functionalities / technologies like Bluetooth, Wi-fi, GPRS, etc., in a single smart phone. In this case no need to dictate the notes to the students, use this wireless technology (like Bluetooth, wireless fidelity (Wi-fi)) can transfer the digital content to the students. The same digital content may transfer to the student who is absent in the class hour without any errors or corrections. The student may get the benefit from this technology; instead of writing the notes he/she can read the lesson in the mobile learning environments. The students may have the benefit of getting the notes with the short period without any unlimited time and location. In 2006 Dan Francis, president of The Association of Independent Colleges and Universities of Pennsylvania (AICUP) said: 'Regardless of time and place, providing access to education for those wishing to be successful in this economy should become the cornerstone of educational institutions' attempts to prepare students success... this is what we all hope that education will do... what the data are showing is that education is leveling the playing field for people from different socio-economic categories' [5].

In this research study selected for third semester undergraduate bio-medical engineerin students, engineering college at Chennai, India. Here the different variables of attributes like understanding, easy to use, motivation,

convenient, and effective etc., are also to be analysed and explored.

## II. RELATED SURVEYS

The author describes to better understand and measure the students' attitude and perceptions towards the effectiveness of mobile learning. In this results of a survey of 186 undergraduate female students of Bachelor of Arts and Medicine (B.A & M.D) at Kind Saud University, Saudi Arabia, about their attitude and perceptions to the use of mobile technology in education. An analysis of the quantitative survey findings is presented focusing on the ramification for mobile learning practices in university learning and teaching environment. The author selected for three groups in the age range between 18-26 years, the questionnaire was developed in Arabic language [2]

The author explores the extension of e-learning into wireless handheld computing devices with the help of a mobile learning frame work. This frame work provides the requirements to develop m-learning applications that can be used to complement classroom or distance learning. The PUSH/PULL mechanism of frame work consists of personalized content and collaborative content. Mobile learning consists of a prototype application was developed to link wireless handheld devices to three course websites. The mobile learning applications were pilot tested for two semesters with a total of 63 students from undergraduate and graduate courses at their university [3].

The author describes the educational opportunities of teaching in a wireless classroom using mobile devices. Conventional classroom learning has certain weaknesses. A survey results from 200 undergraduate students from different universities in Malaysia. The questionnaire was distributed for the students and to find the weaknesses of conventional learning and the type of mobile learning applications used in a classroom. From the survey results, specific mobile learning applications are being developed for students and instructors, it could be used on Pocket PC, notebook computers and mobile phones [4].

## III. METHODOLOGY

The survey was conducted with 50 undergraduate students and 10 teachers in the same department as well as same college. In this survey used for the educational video lesson for Electro Cardio Gram (ECG) it takes around ten minutes. ECG can be used to measure the electric current produced by the person's heart. This video lesson explained about the practical demonstration of the measurement of ECG with block diagram, practical demonstration and animation diagram for heart functioning. The video lesson can be transmitted to the students and teachers via Bluetooth in their free hours.

A questionnaire was developed and design with 15 items to measure the students' acceptance level of mobile learning. A 5-point Likert scale with strongly agree; agree; neutral; disagree; strongly disagree was used from the main items. The study was conducted in the third semester bio-medical engineering students of undergraduate male and female students, age range of 19-25 years filled in a questionnaire. The questionnaire includes a covering letter and personal information sheet. The covering letter and personal information sheet was distributed to participants during their free or library hour. After collecting the personal information we have sent the questionnaire through email. All participating students were asked to complete a questionnaire which included all types of measuring elements of students. The data of this study was gathered by means of a paperless survey used by Google doc (Created a questionnaire by Google doc and email has been sent to the students and got the response from them). The questionnaire was received by email after a week.

The main objectives are,

1. Acceptance level of the students
2. Understanding level of the students
3. Usage of video lesson in learning system

The first objective is that the students' acceptance of mobile learning was measured using fifteen indicators. Elicit to each of the indicators on acceptance level and effectiveness of mobile learning was measured on a likert scale of 1 to 5 ranging from 'strongly agree to strongly disagree'. From the survey results strongly agree is very minimum hence it is combined a grouped with agree. Similarly, strongly disagree with disagree. Accordingly three parameters Agree, Neural, Disagree is reflected in the bar graph it shows in figure3.

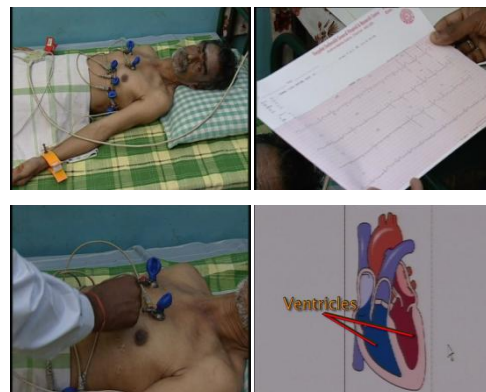


Figure1. The images in the video lesson

#### IV. RESULT AND DISCUSSION

The wireless handheld device is the good device to use in the higher education of learning. In this study wireless hand held devices used by the students are smart phones, iPads and notebook computers.

Five attributes were asked to the students of their personal opinion about the new devices. The first attribute indicates that the student have the wireless handheld devices / mobile phones or not. The figure 2 shows the 92% of students own a wireless handheld devices and mobile phones and 8% of students doesn't have the device but no one has not given any comments. The second attribute indicates that the 80% of students have video facility wireless handheld devices and the third, 60% of students may access the internet on their devices and 40% of students may not access the internet for the reason is 'costly' and 'not accessible'. Fourth, the new learning methodology can be appreciated in the next generation of learning because 80% of the students were willing to use their wireless handheld devices for learning. And the last question, 84% of students has positive impact on the wireless handheld devices and 16% has not given any comments, but no one has given the negative impact on the system. The survey result shows that the video lesson is more effective in the field of learning using mobile learning.

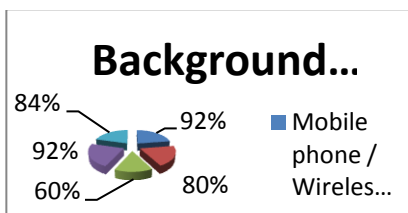


Figure2. Background analysis questions for student

TABLE I. THE QUESTIONNAIRE INDICATORS FOR STUDENTS

NO	QUESTIONNAIRE INDICATOR	M	SD
1.	Usage of video lesson in learning is <b>easy to understand</b>	4.62	1.26
2.	Mobile learning is the additional or <b>supplemental source</b> of learning	3.92	1.03
3.	Mobile learning can be used for <b>self study</b> or individualized learning	4.3	1.14
4.	Wireless handheld devices can be increased my <b>interest and motivation</b> in learning	4.14	1.10
5.	Mobile phones is <b>affordable</b> for every one	3.96	1.04

6.	Mobile learning will help me to change the <b>learning styles</b>	4.36	1.16
7.	Technology enabled learning will <b>create damage</b> in value system	2.52	0.65
8.	Mobile phones offers <b>more privacy</b> than other learning devices	4.26	1.12
9.	The learners can revise their lessons in an easy method through mobile learning with the <b>unlimited time &amp; location</b>	4.05	1.06
10.	Mobile learning is <b>easy to use</b> at the time of travelling by bus/car/train	4.68	1.28
11.	The learner feels <b>convenient</b> to carry their data with them to almost all the places.	4.14	1.09
12.	Mobile learning is the <b>greater flexibility</b> in where and when learning needs	4.28	1.13
13.	Use of mobile phone is <b>difficult</b> in academic environment	3.30	0.85
14.	<b>Creativity</b> will be achieved in mobile learning	4.06	1.07
15.	Mobile phones or wireless handheld devices can be <b>allowed</b> inside the classroom.	4.02	1.06

Table I shows the result on students' acceptance level for mobile learning, 96% of students agree that mobile learning is easy to use in travelling, 2% of students is neutral and 2% is disagree, 94% of students says that usage of video lesson in learning is easy to understand and mobile learning is self study or individualized learning or personalized learning and 4% of students is neutral for easy to understand and 2% was disagreed. 6% of students is neutral for self study or individualized learning. Similarly, 86% of students agree that the mobile learning can change the learning style of the students and increases the interest and motivation in learning and it has greater flexibility. 50% of respondents are disagreed that the technology enabled system cannot create any damage in value system, 34% of respondents are neutral and 16% of respondents are agreed the damage in value system. The wireless handheld or mobile phone is convenient to carry their data with them all the places is agreed for 80% of students. 14% of students are neutral and 6% are disagreed. The 74% and 72% of students are agreed that the mobile learning is used as the additional or supplemental source of learning and it is more affordable. The overall opinion about the mobile learning has acceptance by the students.

Six questions were asked to the teachers of their personal opinion about the devices. First, 100% of the teachers own a wireless handheld or mobile phones and the second, only 70% of teachers have only video facility. Third, 40% of teachers only to access the internet because they feel that it is 'costly' and 'not accessible' in their mobile phones. The fourth, the new learning method can be appreciated in the next generation of learning because 90% of teachers are willing to use their wireless handheld devices or mobile phones for learning. Fifth indicates the impacts on the device, 80% percent of teachers have positive impact and 20% has not given any comments. Finally, 90% of teachers are interested in developing educational video film. The survey result shows that the video lesson is more effective in the field of learning using mobile phones.

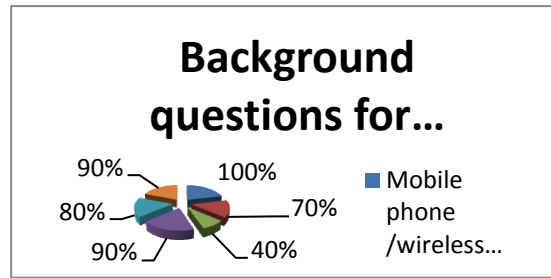


Figure4. Background analysis questions for teachers

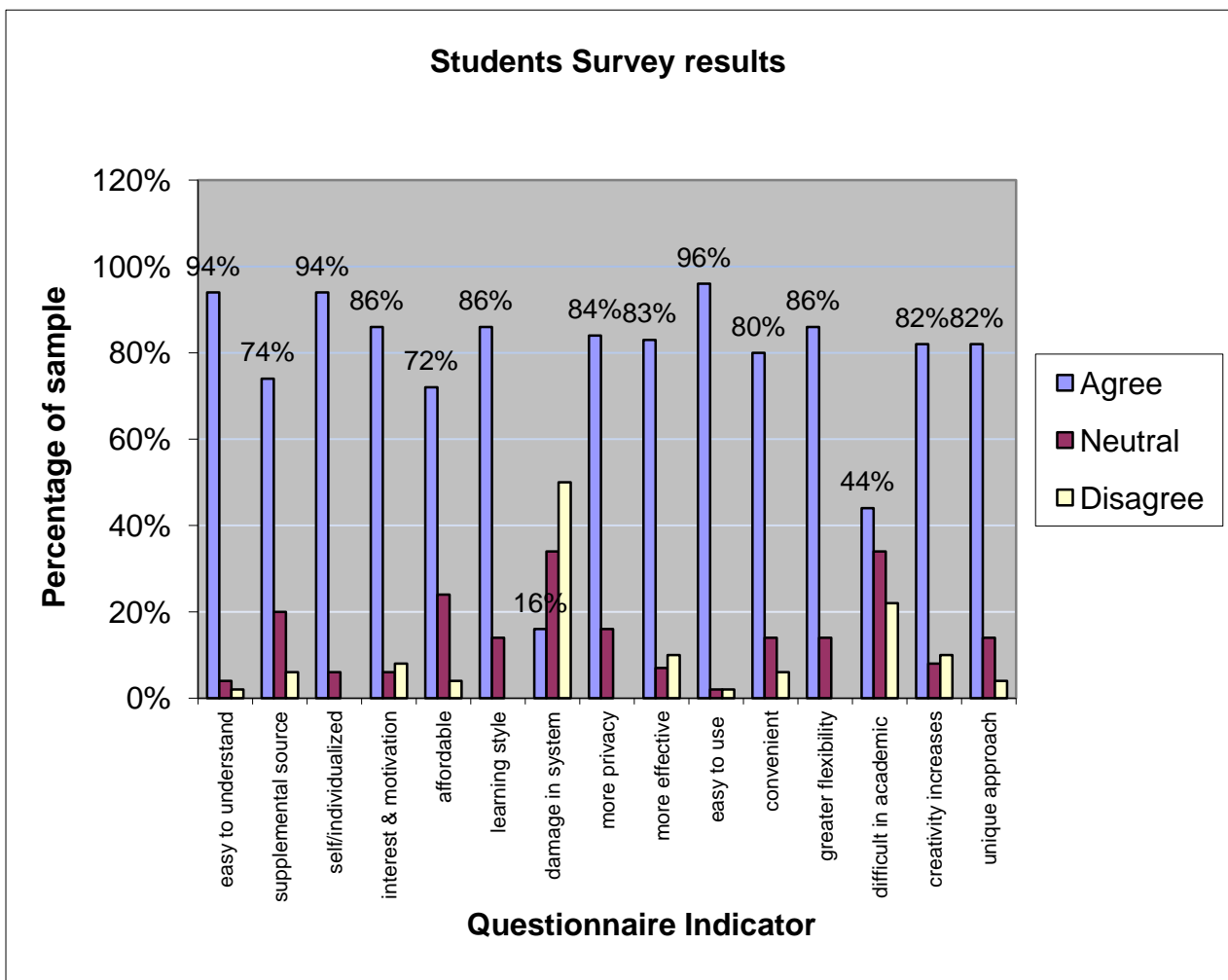


Figure3. Students survey results

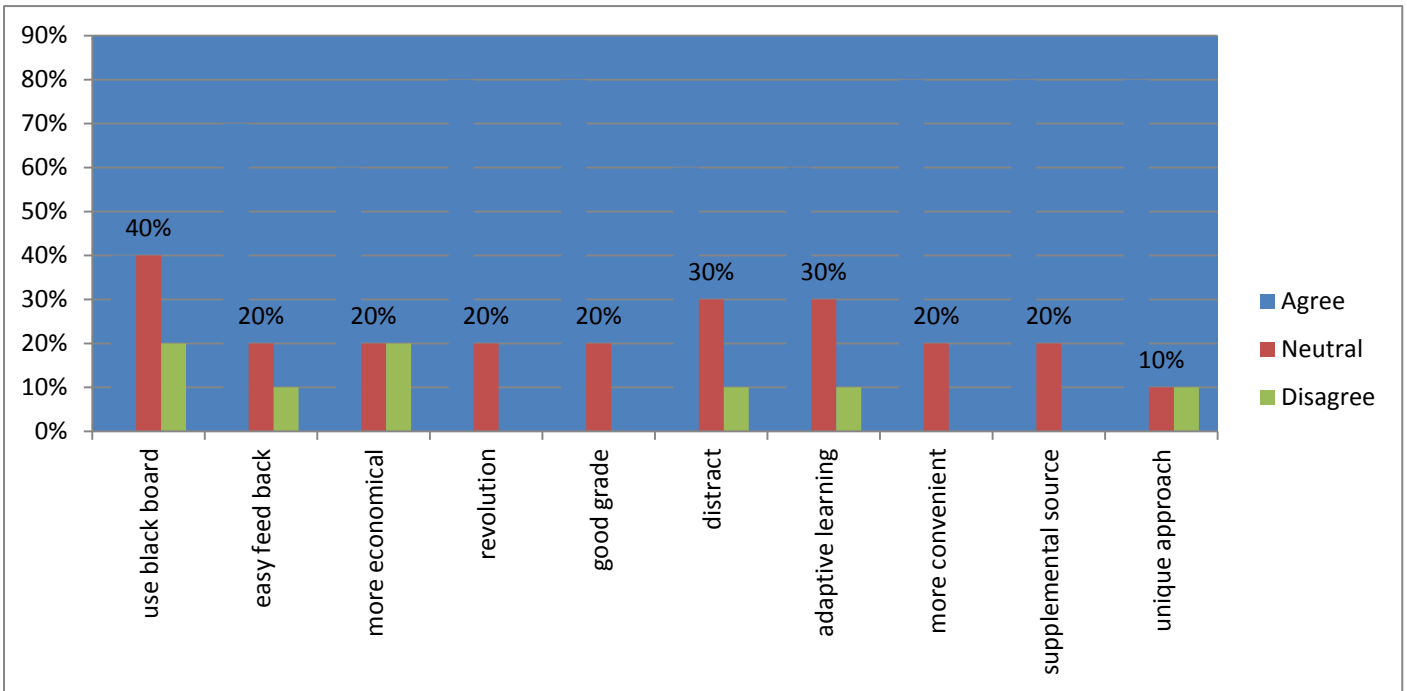


Figure5. Teachers survey results

TABLE II. THE QUESTIONNAIRE INDICATOR FOR TEACHERS

NO.	QUESTIONNAIRE INDICATOR	M	SD
1.	I would prefer to <b>use black board</b> in teaching than e-learning	3.3	1.9
2.	Mobile phones are simple and <b>easy way</b> to get the feedback from the students	4.0	2.32
3.	Mobile learning is <b>more economical</b> in terms of design and delivery of content	3.3	1.97
4.	Mobile learning is a <b>revolution</b> in e-learning to effectively build and deliver the content	4.2	2.45
5.	Mobile learning will help the student for getting <b>good grade</b>	4.0	2.35
6.	Usage of wireless handheld devices in class room will <b>distract</b> the students' attention	3.9	2.26
7.	Mobile learning can provide an <b>adaptive</b> learning environment	3.51	2.08
8.	Usage of video lesson in classroom is <b>more convenient</b> in teaching	3.9	2.33
9.	Mobile learning is the alternate or <b>supplemental</b> source of learning	4.1	2.39
10.	Mobile learning has become a <b>unique</b> approach in providing content delivery	3.8	2.27

Table II show that the results of the teachers' acceptance level of mobile learning. The survey results for 10 faculties in the same department and the same college. 80% of teachers are agreed that the mobile learning is a revolution in the field of e-learning, it is used to help the student for getting good grade, usage of educational video lessons in classroom is more convenient to explain the diagram it is not possible to draw it in the chalk board, and this new method is the additional or supplemental source of learning, 20% of teachers were disagreed these indicators. 70% of teachers indicate that agree the devices are simple and quick easy way to get the feedback from the students, 20% of teachers were neutralized and 10% were disagreed. 60% of teachers have indicating that the mobile learning is the adaptive learning environment, 30% of teachers was neutral and 10% were disagreed. This new learning method is more economical has agreed for 60% of teachers and 20% were neutral and 20% were disagreed. 40% of teachers are preferred to use of black board in teaching, 40% of teachers was neutral and 20% were disagreed. It indicates most of the teachers are using the multimedia based teaching in the classroom.

## V. CONCLUSION

This paper presented a survey from 50 undergraduate bio-medical engineering students on the awareness and understanding of the mobile learning. The results show that the learners are interested on this new device. This also provides that the concept of mobile learning can be easy to understand the video in learning and

easy to use in travelling. It has the convenient device to learn any time, any where, any device; any network and any data concept based on the current learning style and also provide an interactive and adaptive learning environment. The mobile learning is the best method for self study or individualized learning system. For future research, to conduct the pre and post test for students in universities and engineering colleges and compare the analysis for m-learning and other learning methods like classroom learning, e-learning.

#### REFERENCES

1. Chang.B.Lin.M, Ham.D.H., Lee.Y, Kangs cha .J. 2007, ‘Supporting multi-device for ubiquitous learning’ lecture notes in computer science 4469, page 457-467.
2. Dr.Fahad N. Al-fahad, ‘Students attitudes and perceptions towards the effectiveness of mobile learning in Kind Saud University: Saudi Arabia’. The Turkish Online Journals of Educational Technology – TOJET April 2009 ISSN : 1303-6521 Volume 8 Issue 2 Article 10
3. Luvai F. Motiwala, ‘ Mobile learning: A framework and Evaluation’ computer and education 49 (2007) 581-596, [www.sciencedirect.com](http://www.sciencedirect.com)
4. Devinder Singh and Zaitun. A.B. ‘ Mobile Learning In Wireless Classroom’, Malaysian Online Journals of Instructional Technology (MOJIT) August 2006 ISSN 1823:1144, Volume 2, Issue 2, Page 26-42
5. University Business, ‘Education as Equalizer’, Available:[http://www.universitybusiness.com/viewarticle.aspx\(Article ID: 217\)](http://www.universitybusiness.com/viewarticle.aspx(Article ID: 217))