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Impact of Mobile Learning Technology on Engineering Students

Meenu Bharti, Research Scholar, Neelkanth Group of Institution, Meerut
Dr. Pankaj Kumar, Director at Neelkanth Group of Institution, Meerut

ABSTRACT

Engineering students and professors may access information and interact with one another at any time and from any location, using any wireless device, any data network, or any network. We need to transform engineering laboratories into virtual labs and portable study materials (in a pocket) in wireless and mobile communication research, which is currently focused on and connected to engineering education research. The primary goal of this research is to raise knowledge of mobile learning in India, as well as to increase self-learning or personalised learning styles in an adaptive learning environment. This study employed a quasi experimental approach to assess student performance in engineering education using video courses delivered via mobile learning. To collect the data, seven UP engineering institutions, associated colleges, and a private university were chosen from three districts. This study made use of smart phones, mobile phones, wireless devices, tablet PCs, and personal digital assistants.

Keywords:- Mobile learning, engineering education, ICT awareness

INTRODUCTION

Education is more important in this modern world for survival and for cordial relationship with others. Today every one across the globe wants to know about the past, the present and the future. In the past, with knowledge of the importance of education, it was taught in many ways. In current political scenario, every nation wants to overpower others. Hence, all nations, are allotting more funds to education, next to defense. In most of the countries, science has provided a way to deliver education to all through mobile phones, satellite communication signals helps transmission from orbit across the globe and as mobile with Nano technology which has become an integral part of life. Nano technology has brought all the required modern facilities together in the form of handy equipments. Learning in older methods is costlier and time consuming and now mobile learning has overcome the education methods where mobile phones can be used for converting ancient learning method and other modes to modern method at an economical cost and user friendly.

Most research reveals drop outs starts at secondary school level as it is the age of adolescence. Mobile learning provides individual, all convenient facilities to study. Mobile learning also provides an opportunity for graduates to pursue their higher education. Community radio broadcast learning material can be clearly listened to over mobile phones in frequency modulation wavelengths and if needed can be recorded and replayed whenever necessary. Some smart phones even have the facility to record automatically at a particular time and keep it safe for the learner to listen during free time and / or before the examination.

Mobile Learning is a modernistic solution to the educational problems in this rapid development of wireless communication and sensor technologies. Wireless technology has provided wonderful handheld devices like cellular smart phone, Tablet PC, Personal Digital Assistants (PDA) and note book computers etc. These wireless enabled devices are more functional and powerful for their storage capacities and transfer of data. They are of small size, light weight, reusable, portable, cheaper and user-friendly, where the users can fetch their important data anywhere. These handheld devices are the major scientific innovations of the century and have become more popular across the globe and they are also marvelous devices which can be used for educational purposes effectively [1][2]. The development of digital media technology in the twenty first century has led to a rapid development of moving images as an educational medium. Higher education is experiencing a paradigm shift in how video-based learning resources are delivered. Internet technologies have enabled the delivery of interactive video-based learning while technologies like handhelds have enabled the flexibility of learning [3].

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Multimedia application information including video, audio files, phone calls, voice recognition, still images, mobile, web, interactive media can be delivered between server and client through many kinds of transport techniques (protocols) such as WAP, E-mail, SMS and MMS and HTTP. Mobile learning is the integration of data service and mobile service. Mobile learning uses the power of the network to enable learning of many things, at anytime, anywhere, at any place in the modern age of technological innovations [4].

Mobile learning uses the latest mobile phones and wireless network technology to achieve the effectiveness of the learning process. It offers more interactivity, greater flexibility, more functionality, reusability, interoperability, accessibility and educational experience with a single device. This paper is focused on the usage of video lesson in education using mobile learning system which paves way to the improvement of learner's knowledge, performance, achievements and individual learning system and also to develop their problem solving skills. The main motivation of the research is to attract student's attention and motivate them to learn difficult subjects and also to find alternative methods to ensure practice for students in the field of mobile learning.

MOBILE LEARNING (M-LEARNING)

M Learn 2002 was the first European workshop on Mobile and Contextual learning held at the University of Brimingham. Mlearn 2003 was the first conference held in London. Both were supported by the European Commission, and spawned the start of a series of international conferences on Mobile and Ambient Learning. The first comprehensive handbook of mobile learning was published on October 2005 [5], but accounts of mobile distance learning are still infrequent [6]. Some specific technological innovation is deployed in an academic setting to demonstrate technical feasibility and pedagogic possibility.

• **Miniature but portable E-learning**: Mobile and handheld devices are used to reenact approaches and solutions already used in conventional E-learning, perhaps porting some electronic learning technology such as a Virtual learning environment (VLE) to these technologies or perhaps merely using mobile technologies as flexible replacements for static desktop technologies.

• **Connected classroom learning:** The same technologies are used in classroom settings to support collaborative learning, perhaps connected to other classroom technologies such as interactive whiteboards.

• **Informal, personalized, situated mobile learning**: The same technologies are enhanced with additional functionality, for example location awareness or videocapture deployed to deliver educational experiences that would otherwise be
difficult or impossible.

• **Mobile training / performance support:** These technologies are used to improve the productivity and efficiency of mobile workers by delivering information and support just-in-time and in context for their immediate priorities [7]

• **Remote / rural development mobile learning:** This technology is used to address environmental and infrastructural challenges and it also deliver and support the education where conventional E-learning technologies would fail, often troubling accepted developmental or evolutionary paradigms.

Mobile learning is defined and conceptualized in terms of devices and technologies; in terms of the mobility of learners and the mobility of learning, and in terms of the learners experience of learning with mobile devices such as PDAs, smart phones or wireless devices [6].

The students can use the video as the alternate or supplement sources for his learning. In the adult point of view academic are very boring and vague. The teacher can develop the video for his type, and the student can use this as the supplemental source of learning which will be helpful and also motivate him to learn the difficult topics. Visual is more advantage than his/ her reading, if (s)he watch the video two or three times the observation of the particular subject will automatically. The characteristics of mobile learning as given in Mlearn 2002 – Mlearn 2011, WMTE'02 conference proceedings, is described.

Accessibility: Technology enabled equipment have made mobile connection easier and cheaper even to remote areas including islands and peaks where defense personal and tribal people who are nowadays coming into normal stream of life by way of education. Mobile learning is a boon to people

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living in such areas as they can easily learn by various means GSM, GPRS, Wi-Fi etc. without teacher and a classroom wherever which is not possible.

Flexibility: In case the user's mobile is non-functional due to some reasons, mobile learning facility can be made use of some other phone since everyone in the family have a mobile phone nowadays.

Immediacy: Course material sent through mobile phones can reach the learners immediately. In mobile learning system students can use the study materials immediately as and when uploaded and can read comfortably during their available time and the same can be stored and retained for a longer duration.

Interactivity: Mobile learners can interact or react easily and immediately with the coordinator or with co-learner's leading to flexibility. Learning becomes agreeable and meaningful.

Mobility: MOBILE the word itself clearly states that it can be taken to any place at any point of time. This facilitates ongoing learning at different locations at any point without any interruption.

Privacy: Learners who move from rural to urban area are not acceptable to the modern environment. They feel discomfort while studying with others who had learnt through English medium. Mobile learning provides privacy when compared to others sources like conventional learning. This also gives the facility of individual attention.

Portability: Modern equipments in the new scientific world like smart phones provide third generation technology for convenient handling by children to senior citizen. Modern smart phones are weightless, equipped with clear pictures and upgraded with the required modulations with internet facility. Portability provides an additional advantage to mobile learners.

Reusability: Mobile learners can go through the subject many times till they are familiar with that subject and can go through the subject repeatedly as it is stored in mobile and will be retained for a longer period and can be transferred to other systems which are easily accessible.

Reliability: Mobile learners' can easily rely on the up gradation of which, however course material cannot be interpreted or be made specific to a particular learner. But learners can exchange their views and thoughts with their co-learners compared to all source mobile material up loaded are reliable and be accessed with no significance.

Security: A protection system has to be provided in mobile phones to guard against virus.

REVIEW OF LITERATURE

Nian-Shing Chen (2008) has introduced a new mobile network concept named GroupNet which could be used to support group collaborative tasks. The mobility is perhaps the most characteristics of GroupNet that enables GroupNet to be established and operated anywhere. GroupNet concept proposed to design a mobile learning management system (m-LMS) which can support mobile learning for a small group of learners with effective social interaction within proximity.[8]

Dr.Fahad N. AL-FAHAD, (2009) investigates the students' attitudes and perceptions towards the effectiveness of mobile learning. The survey was conducted to explore and analyze the factor crucial in overcoming the possible hindrance of m-learning implementation in higher education, student perception of m-learning may be influenced by variables, and variables are gender, course of study and attitudes to new technology.[9]

Ju-Ling Shih etal. (2010) presents a mobile exploration activity that guides student at elementary school level to learn during a social science activity with digital support from mobile devices and wireless communication. An inquiry-based mobile learning approach to students support cognitive learning and increase their inquiry learning ability [10].

Susan Lea and Lyne Callaghan, (2011), conducted thirteen fully evaluated mobile learning trials involving students on different health and social care programmes and in different placement contexts (e.g. hospital, community settings and service users' homes). [11]

Mohammed Amin Almaiah etyal. (2014) investigate the perceptions of students in University Malaysia Terengganu (UMT) to move towards applying m-learning in their studies by using their mobile devices and to explore their expectations on mobile learning services. A total number of 91 undergraduate students majoring in computer science participated in the study. The findings show that the students have positive perception towards mobile learning and would like to use their mobile devices for both learning and administrative services.[12]

Baran, (2014) these different emphases reflect the expected but also the unexpected impacts of the introduction of these digital technologies in the learning process. In the history of m-learning, initial

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definitions were more device-driven (focusing in immediacy, convenience, access and mobility) while the latter ones are more personal and social-driven, exploring affordances that relate to new technological features of mobile devices such as location awareness, motion detection and augmented reality.[13]

Hj Hemabala, E. S. M. Suresh (2015) study used quasi experimental design to measure impact of the video lesson using mobile learning technology. The video lesson can be used for this study is Electromagnetism, this subject is common subject for both disciplines, the duration of the video lesson is 30 minutes. The smart phones and wireless devices tablet pc; personal digital assistants are used for this study. The video lesson can be transferred via Bluetooth technology within classroom, library and corridors in their free hours.[14]

Hj Hemabala, E. S. M. Suresh (2015) survey were conducted from engineering circuit branch teachers of affiliated colleges and deemed universities in Chennai, India. The survey used for video lesson to teachers and questionnaire is used to evaluate the effectiveness of mobile learning system. The smart phones, mobile phones and wireless devices tablet pc, personal digital assistants are used for this study. The video lesson can be transferred via Bluetooth technology in leisure hours.[15]

Hosam El-Sofany, Nahla El-Haggar (2020) considered an effective way to improve students' skills such as positive thinking, collaborative, communication, as well as it is considered the main part of major innovation in many e-learning research areas. As a result of the 21st. century requirements, skills were devel-oped to address the rising needs in higher education which causes a shifting par-adigm from the traditional methods of teaching to M-learning. In this research, we discuss the effect of using Mobile learning techniques to improve learning outcomes in Higher Education.[16]

Criollo-C, S.; et al. (2021) present the results of a literature review of mobile learning; the findings described are the result of the analysis of several articles obtained in three scientific repositories. This work also lists certain issues that, if properly addressed, can avoid possible complications to the implementation of this technology in education.[17]

Matzavela, V., Alepis, E. (2021) focuses on presenting the most important research parameters of m-learning during the last decade, while it also incorporates a novel empirical study in the domain. The utilization of educational data has been taken into consideration and is presented, aiming at ways to improve human interaction in the digital classroom.[18]

STUDENTS' SAMPLE

TABLE 1 STUDENTS' SAMPLE

Student's sample		Frequency	Percentage (%)
Gender	Male	299	59%
	Female	207	41%
	Total	**506**	**100%**
Management	Affiliated Colleges	351	69%
	Private Universities	155	31%
	Total	**506**	**100%**
Department	ECE	284	56%
	EEE	222	44%
	Total	**506**	**100%**

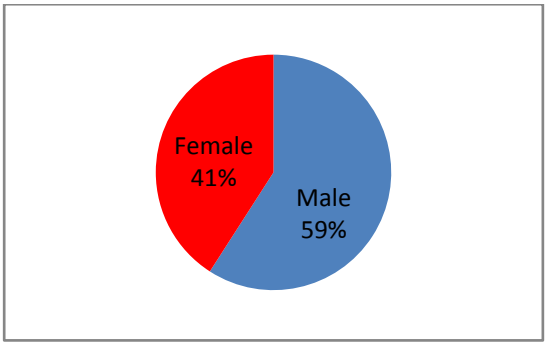

FIG. 1 STUDENTS RESPONDENTS GENDER

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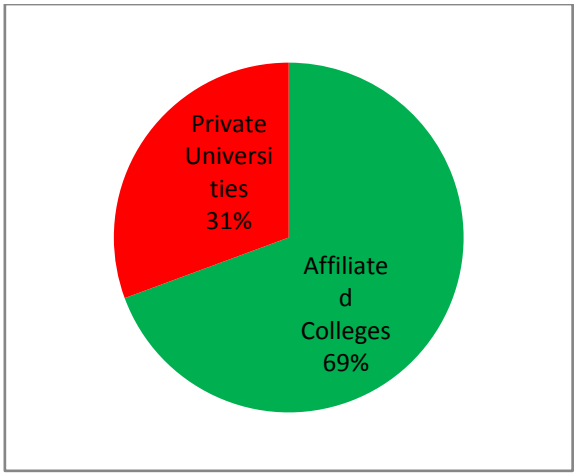

FIG. 2 TYPE OF MANAGEMNT

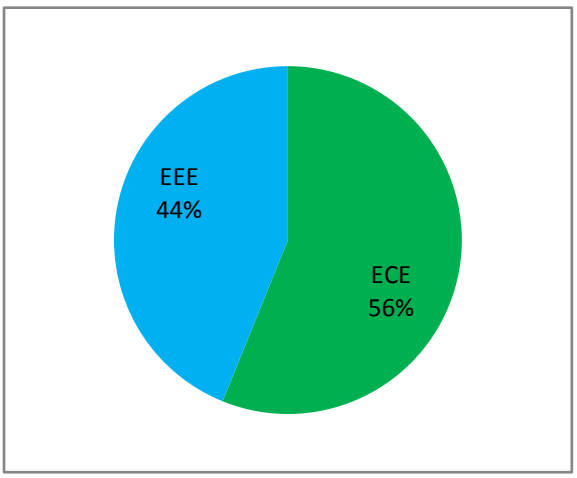

FIG. 3 DEPARTMENT

Students sample includes details of gender, type of management and department are shown in Table 1. In which 59% of students were male and 41% of students were female. The students of affiliated colleges were about 69% and 31% of students from deemed universities. 56% of students from department of electronics and communication and 44% of students from electrical and electronics engineering representing second year of study.

LEARNING STYLE

Watching **v**ideo lessons in mobile phones or wireless devices relies on the fact that students see the content of video on the screen and learn. The audio (oral) is used with the visual representation.

TABLE 2 LEARNING STYLE

Type of Learner	Total		Male		Female	
	No.	%	No.	%	No.	%
Auditor Learner	52	15	24	12	22	15
Visual Learner	87	25	60	30	48	32
Kinesthetic Learner	23	35	60	30	50	33
Tactile Learner	88	25	56	28	30	20
Total	50	100	200	100	150	100

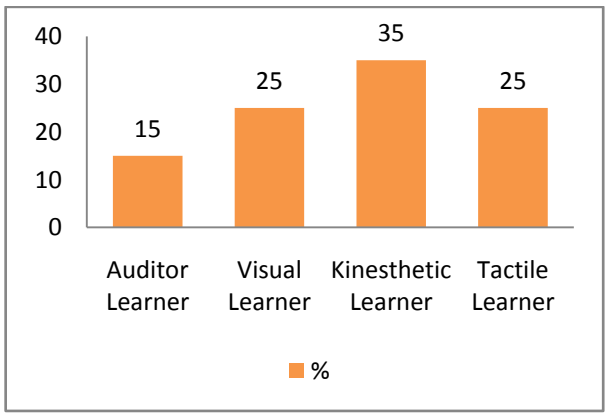

fig 4 Students - Learning Style

It can be in the form of oral presentations or subject experts in a real situation. It is generally presum kinesthetic and visual are capable of benefiting more f above Table 2 and fig 4, 25% of the students are visua kinesthetic learners, and 25% are tactile learners. As the video lesson is ideal for these kinesthetic learners

LEARNING HABIT

Students learn in many ways – by seeing and hearing, reading and writing, reasoning and logically and intuitively, memorizing and visualizing, etc., the ability of students to learn and its effectiveness depend on several factors. This research considers reading and writing, watching and thinking habits.

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READING:

From Table 3 and fig 5 indicate that 56% of the students have the reading habit from the beginning of the course. These students' review-reading assignments highlight important points, select reading strategy to improve the type of material and take effective notes. 25% of students were formed preparing just before the examination to achieve the normal requirement.

TABLE 4.3 LEARNING HABIT

Score	Reading		Writing		Watching		Thinking	
	No.	%	No.	%	N	%	N	
> 75%	196	56	182	52	217	62	189	54
0-74 %	88	25	148	42	84	24	126	36
< 60%	66	19	20	6	49	14	35	10
Total	350	100	350	100	350	100	350	00

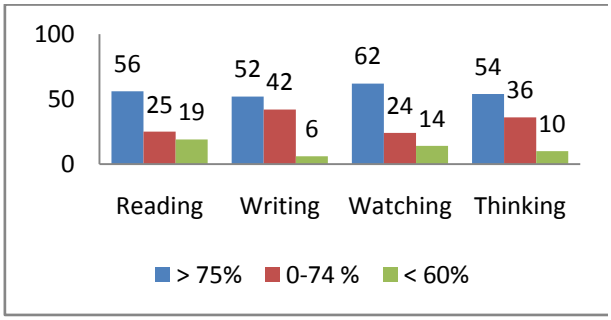

FIG 5 STUDENTS - LEARNING HABITS

WRITING:

From Table 3 and fig 5 indicate that 52% of students in engineering institutions are capable of writing the assignments with confidence and availing the ideas and facts of others. They effectively plan while writing assignments and are willing to revise the written assignments for intelligibility and coherence. Students are confident in speaking 42% of students need some support to come to the expected level.

THINKING:

The conclusion from Table 3 and fig 5, 54% of students are capable of quick thinking on the required information during the discussion of topic. They use brain storming for specific methods and willing to consider different views. These students are capable of detecting common errors. 36% of than need brushing up the necessary contents when the discussion

DATA ANALYSIS USING OSMAN'S MODEL - STUDENTS MOBILITY OF TECHNOLOGY

Table 4 Parameters under Mobility of Technology

No.	PARAMETERS	M	SD
Q18	With use of mobile phones is easy in academic environment	3.7	1.016
Q40	Mobile phones or wireless devices are easy for communication with teachers and other students.	4.1	0.659
Q13	Mobile learning technology is convenient for accessing information anywhere, at any time, any network, and any data on any wireless devices	8 3.9	0.924
Q23	Mobile phone offers more privacy than other learning devices	4.0	0.870
Q10	Mobile le rning technology has great flexibility where and when learning needs are present	3.9	1.004
Q32	Mobile learning technology is user-friendly	4.1	0.904
Q22	Watching video lessons in mobile phones is convenient in place of television	4.0	1.074

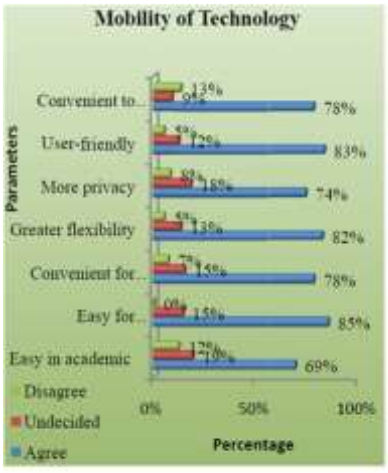

FIG. 6 % OF EACH PARAMETER UNDER MOBILITY OF TECHNOLOGY

- From Table 4 and fig 6 seven parameters under mobility of technology, the students have

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assessed by the effectiveness of mobile learning

- Highest mean value: 4.18 - mobile phones or wireless devices are easy for communication with teachers and other students
- Lowest mean value: 3.73 – With use of mobile phones is easy in academic environment
- Highest percentage: 85% of students agreed that the mobile phones or a wireless devices are easy for communication with teachers and other students, 15% were undecided
- Lowest percentage: 69% of students were agreed that the use of mobile phone is easy in academic environment, 19% undecided and 12% disagree.

MOBILITY OF LEARNING

From Table 5 and fig. 7 ten parameters under mobility of learning, the students have assessed the effectiveness, it is observed that,

TABLE 5 PARAMETERS UNDER MOBILITY OF LEARNING

No.	PARAMETERS	M	SD
Q38	Adoptive learning environment	3.78	1.055
Q37	Paperless	4.02	0.769
Q3	Supplemental source of learning	4.12	0.931
Q9	Interest in learning	4.00	0.963
Q27	Positive impact	3.94	0.918
Q17	Affordable	3.90	0.952
Q4	Self study or individualized learning	4.10	0.894
Q24	New opportunities	3.96	1.018
Q34	Easy in learning	3.93	0.895
Q19	Learning style	3.95	1.028

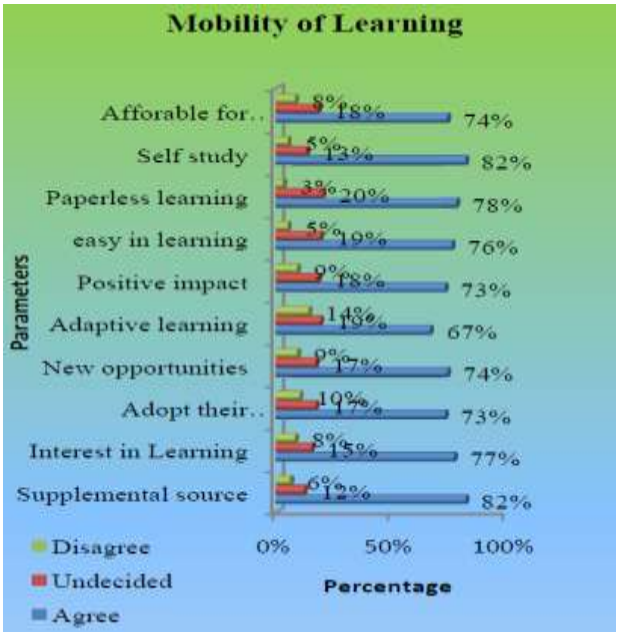

FIG . 7 % OF EACH PARAMETER UNDER MOBILITY OF LEARNING

n

- Highest mean value: 4.12 - mobile learning is an alternate or supplemental source of learning
- Lowest mean value: 3.78 - mobile learning can provide an adaptive learning
- Highest percentage: 82% of students agreed that the mobile learning is an alternate or supplemental source of learning, 12% undecided and 6% of students disagreed
- Lowest percentage: 67% of students are agreed mobile learning can provide an adaptive learning environment, 19% undecided and 14% disagreed.

MOBILITY OF LEARNERS

From Table 6 and fig. 8 five parameters under mobility of learners, it is observed that,

- Highest mean value: 4.19 - mobile learning is easy to use while travelling by bus/car/van/train

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- Lowest mean value: 3.90 – with usage of video lesson in classroom motivates the students to learn
- Highest percentage: 87% of students agreed that mobile learning is easy to use while travelling by bus/car/van/train, 8% of disagree. students are undecided and remain 5%
- Lowest percentage: 72% of students agreed that usage of video lesson in classroom motivates the students to learn, 17% undecided and 13% disagree

Table 6 Parameters under Mobility of Learners

No.	PARAMETERS	M	SD
Q39	Mobile phones or wireless devices a e simple an make it easy way to get feedback from learners and Teachers	4.10	0.660
Q31	With usage of video in classroom motivates the students to learn	3.90	1.083
Q29	Mobile learning technology is easy to use while travelling by bus/car/van/train.	4.19	0.858
Q21	Learner feels convenient to carry their data with them to almost all the places.	3.91	0.952
Q28	Learners can revise their lessons in an easy method through mobile learning system with unlimited time and location	3.91	0.910

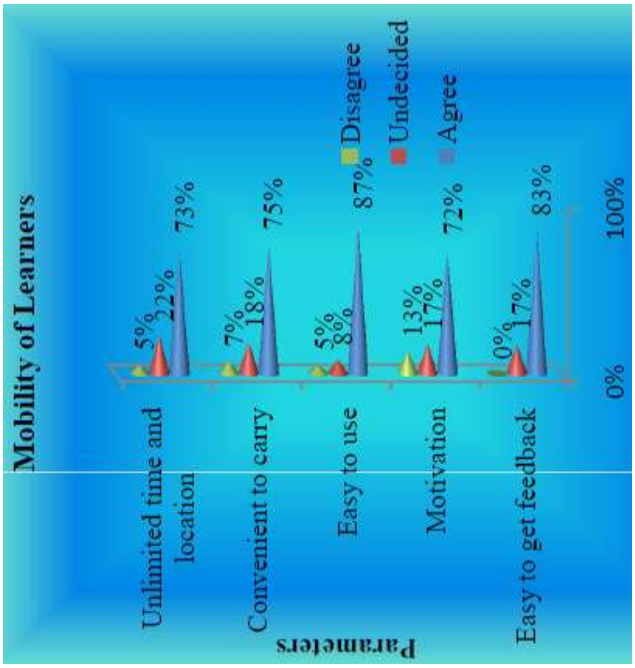

FIG. 8 % OF PARAMETERS UNDER MOBILITY OF LEARNERS

CORRELATION ANALYSIS

Correlation analysis of students' assessments of effectiveness on mobile learning technology as shown in the table 7

TABLE 7 CORRELATION ANALYSIS – MODEL – I

Category	Mobility of Technology	Mobility of Learning	Mobility of Learners
Mobility of Technology	1	0.754**	0.657**
Mobility of Learning	0	1	0.573**
Mobility of Learners	0	0	1

- The correlation coefficient between Mobility of Technology and Mobility of Learning 0.754, indicates 75% positive relationship and is significant at 1% level.
- The correlation coefficient between Mobility of Technology and Mobility of Learner 0.657, indicates 66% positive relationship and is significant at 1% level.
- The correlation coefficient between Mobility of Learning and Mobility of Learners 0.573, indicates 57% positive relationship and is significant at 1% level.

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The correlation analysis of effectiveness of the three mobility concepts of mobile learning technology as assessed by the students shows a positive correlation and hence it indicates that when effectiveness of anyone group increases, the effectiveness of other group also tend to increase.

ACHIEVEMENT BETWEEN MALE AND FEMALE STUDENTS

***Null Hypothesis*:** There is no significant difference in achievement between male and female students taught through the video lesson on mobile learning and electronic learning over conventional learning.

TABLE – 8 MALE STUDENTS – PRE AND POST TEST DATA

Scores	Pre-test			Post-test		
	CG	EG1	EG2	CG	EG1	EG2
00-04	16	10	11	0	0	0
05-09	81	75	72	16	0	0
10-14	122	1 7	131	118	19	9
15-19	71	69	77	101	130	85
20-24	9	8	8	60	114	147
25-30	0	0	0	4	36	58
Mean	11.55	11.73	11.8 0	15.92	19.52	1.30
SD	3.567	3.402	3.52	3.779	3.989	.472

TABLE – 9 MALE STUDENTS – PAIRED T-TEST AND EFFECT SIZE

		Mean	SD	Mean Diff.	't' value	Cohens' d	ffect ize	Sig 2-tailed
Pair1	CG	15.92	3.779	3.599	2.213	3.732	.881	0.000
	EG1	19.52	3.989					
Pair 2	CG	15.92	3.779	5.388	7.847	6.702	.958	0.000
	EG2	21.30	3.472					
Pair 3	EG1	19.52	3.989	1.789	3.428	2.714	.805	0.000
	EG2	21.30	3.472					

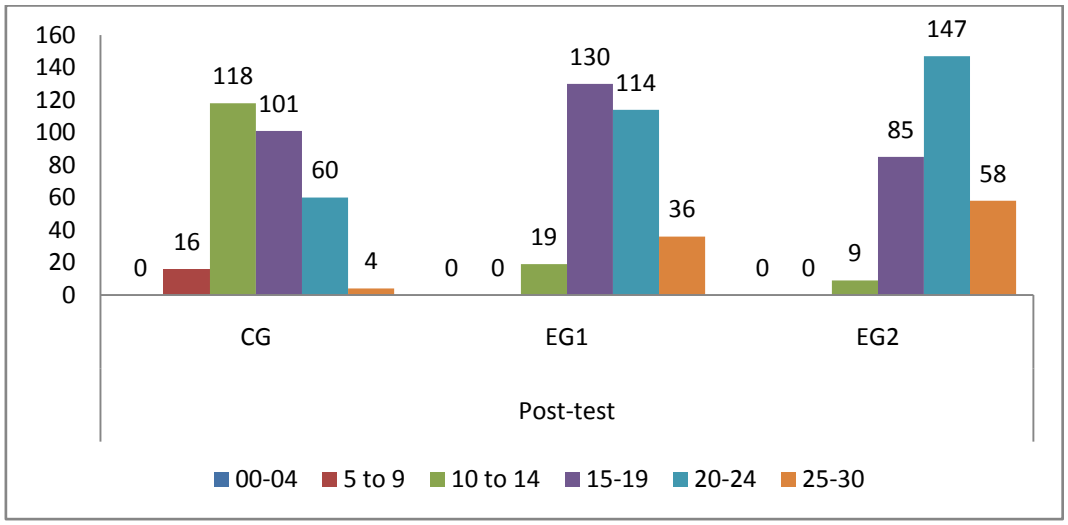

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FIG. 9 MALE STUDENTS- LEARNING OUTCOME

Analyze the effectiveness of the video lesson on mobile learning as assessed by students, their learning outcome of a subject based achievement test were ascertained to monitor male and female students of sample engineering colleges. Scores of male and female students on the pretest and posttest are taken for analysis. However, it is a universal common practice to measure the student's learning outcome on an achievement test as a method to measure student performance between male and female students. The marks obtained by the experimental groups and the control group, the relevant statistics in terms of mean, standard deviation and 't' value, in order to test the hypothesis.

A thorough observation of the Table 8 reveals an increase in the mean of the control group from 11.66 to 15.92 in respect of male students of control group. There is a substantial increase in mean value of the experimental groups in respect of the male EG1 from 11.73 to 19.52 and EG2 11.86 to 21.30. The lowest score by this experimental group is in the range 10-14. There are nearly 68% of male in the experimental group2 who have scored the maximum range 20-30. There are only 21% male students in the control group who have scored maximum range 20-30.

The Paired t-test analyzed the significant difference between the male students from CG (conventional learning), EG1 (E-learning) and EG2 (M-learning) with respect to the effectiveness of video lessons using mobile learning technology. Table 9 gives the mean, standard deviation, mean difference, t-value, Cohen's d value and effect size. However the differences between post test experiments mean difference between CG and EG2 are 5.388, the difference between the CG and EG1 mean difference is 3.599, and the difference between the EG1 and EG2 mean difference is 1.789. These results show that mobile learning is more effective than the other methods and found to be significant at 0.01 levels. The Cohen's d is used to measure the strength of the relationship between two variables. The effect size measure could then result in an insignificant. The statistical results analysis was found very large effect size is greater than 0.80 for control group (CG) and experimental group2 (EG2) as shown in the Table 9.

The observed from male student's performance in pre and post test results, since significance is less than 0.01, the null hypothesis is rejected at 1% level of significance. Hence it is concluded that there is a significant difference in achievement between male and female students taught through the video lesson on mobile learning over electronic learning and conventional learning.

TABLE – 10 FEMALE STUDENTS – PRE AND POST TEST DATA

Scores	Pre-Test			Post-Test		
	CG	EG1	EG2	CG	EG1	EG2
00-04	6	2	3	0	0	0
05-09	58	50	49	8	0	0
10-14	79	93	91	79	10	4
15-19	56	55	58	70	82	52
20-24	8	7	6	45	81	102
25-30	0	0	0	5	34	49
Mean	11.93	12.25	12.27	16.29	20.15	21.89
SD	3.555	3.459	3.486	3.756	3.886	3.431

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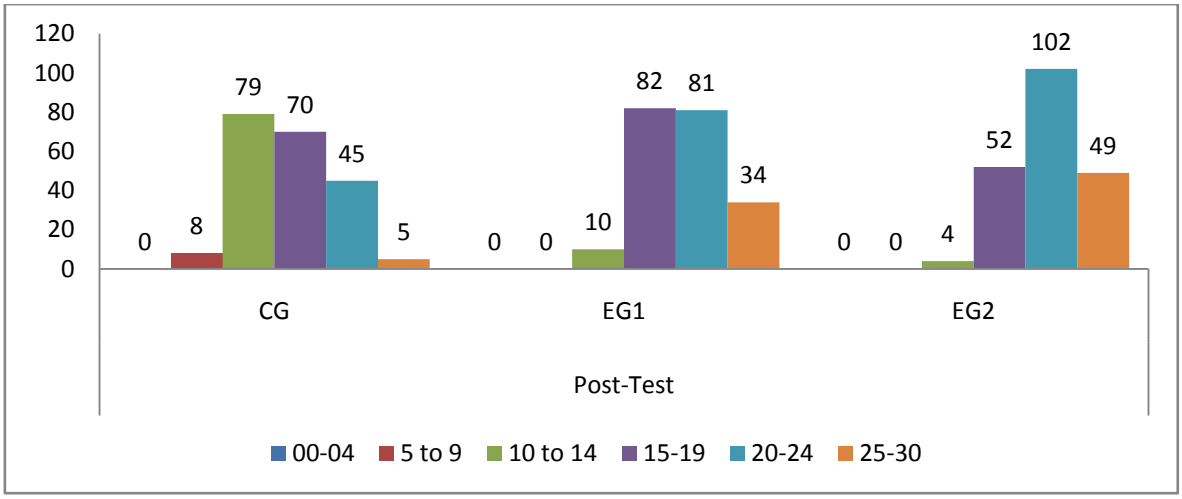

FIG. 10 FEMALE STUDENTS – LEARNING OUTCOME

The performance of the female students from control group, experimental group1 and experimental group2 conducted before the test mean value is similar presented in Table 10. The mean performance of the male in pretest of control group and two experimental groups is 11.93, 12.25 and 12.27 respectively. The mean performance of the female students in post test of control group and experimental groups is 16.29, 20.15 and 21.89 respectively. The performance of the female after the test shows that the students of experimental group show a remarkable improvement. In post test there are nearly 73% of female students in the experimental group2 who scored the maximum 20-30 range of marks while for control group high score only 24% of female students as shown in fig. 10.

TABLE 11 FEMALE STUDENTS – PAIRED T-TEST AND EFFECT SIZE

		Mean	SD	Mean Diff.	't' value	Cohens' d	ffect Size 'r'	Sig 2-tailed
Pair1	CG	16.29	3.756	3.856	3 .116	4.20	0.903	0.000
	EG 1	20.15	3.886					
Pair 2	CG	16.29	3.756	5.609	4 .238	6.86	0.960	0.000
	EG 2	21.89	3.431					
Pair 3	EG 1	20.15	3.886	1.744	1 .334	2.55	0.794	0.000
	EG 2	21.89	3.431					

The Paired t-test analyzed the significant difference between female students from CG (conventional learning), EG1 (E-learning) and EG2 (M-learning) with respect to the effectiveness of video lessons using mobile learning technology. Table 11 gives the mean, standard deviation, mean difference, t-value and Cohen's d value and effect size. However the difference between the EG1 and EG2 mean difference 3.856, and is 1.744.

The mean difference between the control group and experimental group2 (M- learning) of male is 5.388 and the mean difference between the control group and experimental group2 (M-learning) of female is 5.609. The mean difference between the male and female students is uniform. This is found to be significant at 0.01 levels. Hence, it is concluded that there is no significant difference in achievement between male and female students taught through the mobile learning over conventional learning and electronic learning is accepted. There is a difference in achievement by male students who underwent learning between classroom and video lesson on mobile phones or wireless devices. There is a difference in achievement by female students underwent classroom learning and video lesson on mobile phones or wireless devices. But there is no difference in achievement between male and female students undergone the same mobile learning. Both male and female students are exposed with the same video and material. This may be the reason that there is no significant difference in achievement between male and female students who undergone mobile learning.

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CONCLUSIONS

In this research study, data were collected through engineering teachers and engineering students from departments of ECE and EEE, the video lesson was delivered through desktop, laptop, mobile phones, smart phones, PDA, tablet PCs and wireless devices. The video lesson has transferred through communication technologies like Bluetooth, email, stored in DVD format and memory stick etc., 40 parameters were identified and analyzed with three models of frame work of fifteen variables with teachers and students. The three frame work models have been selected for data analysis. The first model has Osman's model has defined the mobile learning into three mobility concepts i.e. Mobility of Technology, Mobility of Learning and Mobility of Learners. From the model data were analyzed with students, osman's model results shows that 80% of students were accepted mobile learning has mobility of technology and learners; second model represented almost all the aspects of mobile learning has effective it has 80% of students were accepted mobile learning is Device Aspect, Learner Aspect, Social Aspect, Device Usability and Social Technology and third model shows the result has 82% of students were agreed mobile learning is user- friendliness.

From the students analyzed results shows that the mobile learning is used as the supplemental source of learning and it can be used for the self study or individualized learning system in the field of education. Learner is easy to motivate in learning and easy to use. From the teachers were analyzed results shows that the mobile learning is used the students getting good grade in the academic examinations.

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