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REVIEW OF LITERATURE

NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

SCOPE FOR FURTHER RESEARCH

ACKNOWLEDGMENTS

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APPENDIX/ANNEXURE

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10. **FIGURES &TABLES**: These should be simple, crystal clear, centered, separately numbered &self explained, and **titles must be above the table/figure**. **Sources of data should be mentioned below the table/figure**. It should be ensured that the tables/figures are referred to from the main text.

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QR WITH MOODLE FOR EFFECTIVE HIGHER EDUCATION

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ABSTRACT

E-Learning and M-Learning are the technologies which dominate and changed the face of the traditional teaching and learning. The limitations of the mobile and electronic devices used for E-learning and M-learning are almost overcome during these days. The students always prefer few components of traditional teaching methodology along with the new technologies. They are very much interested in face to face class room teaching and hard copies of the teaching materials. At the same time, they would like to see the video lectures rather than reading a book either in printed format or in digital format. Hence we have tried to put together the traditional teaching and learning methodology and the modern flawless mobile technology in a better way. By introducing the QR code in the hard copy of the learning material, it would be very easy for the students to get the access of a particular link JIT. The time taken to access a website is ten times less than the usual way of browsing a web page using the mobile devices. In this paper, we have made an effort to reduce the hard copies of the learning materials and to make it more interesting by giving links to the video lectures. This paper explains only the methodology of using QR code in the E-learning. The scope of this paper is not to discuss the impact of the QR code but how it can improve the students' academic progress and knowledge.

KEYWORDS
E-Learning, ICT, JIT, M-Learning, QR Code.

INTRODUCTION

I n a society, learning is a fundamental cognitive process of mental and social change over an entire lifetime [3]. Today, the organization of learning is changing, especially in secondary schools and universities due to digitization in the teaching and learning equipment's, delivery and also social changes. However, in this context, new technologies offer the opportunity to pupils and students to communicate and interact with multi-media learning resources and simulated environments for in-hand experience in their field [4]. Consequently, technology can enhance motivation, which is a vital aspect of teaching and learning, deliver information when needed, and encourage solving problems and satisfying curiosity. Most of all, new technologies also offer the possibility to scaffold learners through an extended process of capturing and organizing situated activities [6].

Nowadays, the use of computers in education has mostly been focused on enhancing teaching and learning in formal settings, typically in the traditional classroom or computer lab. This form of teaching and learning are called e-learning and it has a restriction for JIT learning experience due to heavy hardware devices. However, learning does not only take place within such formal learning settings! The use of mobile devices could expand learning possibilities and solve the problem of being tied to a particular location. This contemporary method is called "M-Learning" [8].

Generally, the combination of e-learning and mobile computing is called Mobile Learning (M-Learning) and promises the access to applications that support learning anywhere, anytime and JIT [1]. However, most of the proposed examples in the past uses handheld computers or laptops and are mainly supporting adults in the workplace—people who know what they want. Subsequently, M-Learning has become an attractive target application area for corporate mobile devices. However, meanwhile hardware is considered as a solved problem; innovative, affordable and usable software remains still the greatest challenge. Since the teaching field and methodology changes according to the devices which is recommended for learning. But this increases the complications of implementing M-Learning. Hence we should see the ways for implementing this technology without much complication [13] along with the traditional methods in which students are more comfortable.

WHY M-LEARNING?
A recent survey proves that mobile phones are no more going to be used only as a communication device. This era started from pervasive computing. It can be used as a still digital camera, video recorder, storage device and file compiler. Apart from all these, it can be used along with computers. Computers and mobile phones can be used in tandem to share information between them.

FIGURE 1: AVERAGE WORLD ICT STATISTICS TAKEN FROM THE 2010 ITU REPORT (Acharya&Teltscher, 2010).
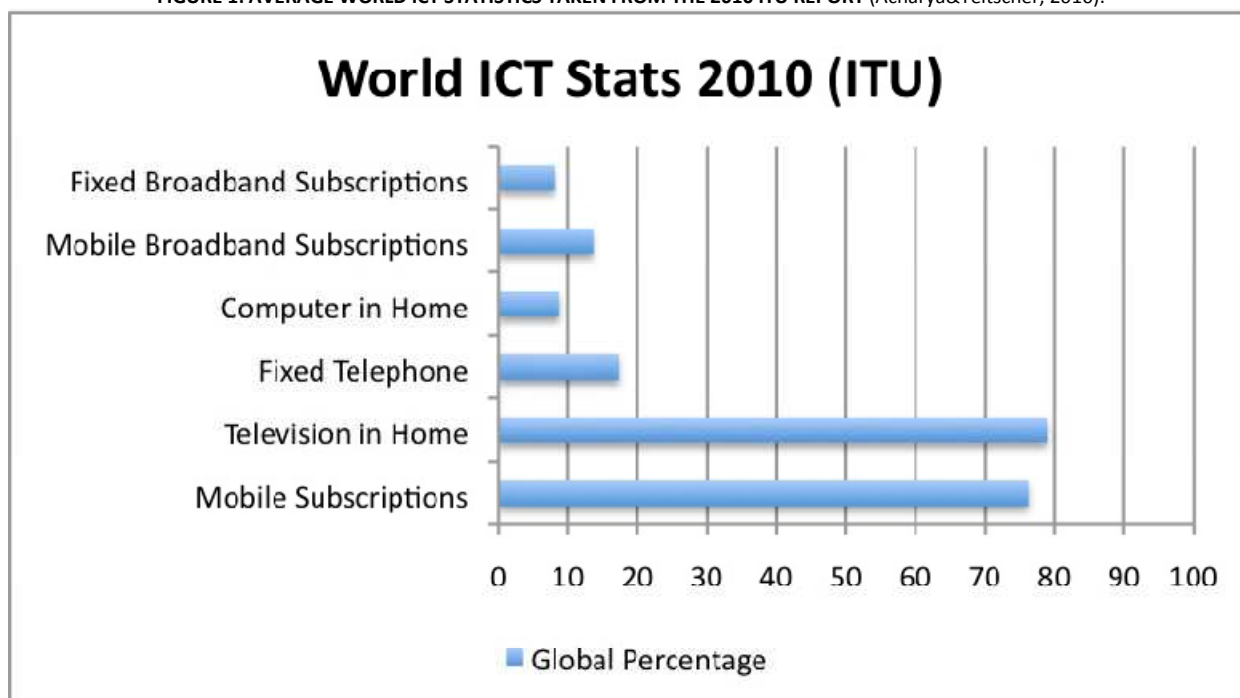
However, other than technologies, now days, education is not only for the regular students (full time students) but also for anyone interested in improving and developing himself. Awareness and necessity of education has become unavoidable for all age groups irrespective of their background. People have to learn throughout their lifetime (this is called lifelong learning) to keep themselves abreast and updated with the recent developments in their area of interest.

This is a great challenge as well as an opportunity to the academic community to provide services to the students as per their convenience. Since anytime and anywhere learning concept is the latest trend and so it becomes ever so important for everyone to be involved in the selection of technology as a means for lifelong learning. As of now e-learning is the hot cake for the students who prefer to educate themselves through distance education. But e-learning has its limitations as it helps students to study only from a particular place and not anytime. Hence the only alternative for this is m-learning. It helps students to learn anytime and anywhere[7] alongwith some advance features such as convenience, collaborative effort, portability, content and compatibility. M-learning is the answer and is sure to become a prime technology for any kind of education in the near future.

"Successful technologies are those that are in harmony with end-users needs"

- Ben Shneiderman (2002)[7]

WHY MOODLE?

Open Source Software's (OSS) are becoming more popular these days and dominating all the fields including education. One of such educational Learning Management Systems (LAM's) OSS is Moodle. Moodle is supported by the academicians and researchers in the educational field and also interested in promoting OSS. These people have included many dynamic and useful modules with Moodle to make it popular and useful for both teaching and student community. The main advantage of Moodle is the advantage of OSS like cost free and code availability of the software. Moreover the OSS can be freely downloaded with code and it gives rights to people to copy, modify and share with others without paying any fees. The expansion of Moodle is Modular Object-Oriented Dynamic Learning Environment and it is a famous Learning Management System throughout the world due to its versatility. The history of Moodle starts with a doctoral research by an Australian by name Martin Dougiamas. But as on today it has long list of people who have contributed for the improvement of the same. In the Moodle site www.moodle.org we can have more information related to the developers, users and links for downloading the software.

In the year 2010, in a survey the growth of Moodle was tremendous and it get 34.1% of the market of Education. This happened at the cost of blackboard, Inc., and "developed in house". In the business market also the growth is excellent. Moodle got good market share against the homegrown learning management System. Table 1 shows that Moodle is in the second place of the educational market.

TABLE 1: THE TOP 10 LMSS IN USE BY 668 EDUCATION ORGANIZATIONS, AS REPORTED BY ELEARNING GUILD MEMBERS IN THE LAST YEAR

	1 - 50 workers	51 - 500 workers	501 - 2000 workers	2,001 - 10,000 workers	More than 10,000 worke..	Grand Total
Blackboard, Inc.	37.9%	50.0%	68.2%	61.1%	51.1%	**56.7%**
Moodle	58.6%	50.0%	37.9%	42.6%	31.9%	**45.3%**
ANGEL Learning	6.9%	20.8%	8.3%	5.6%	14.9%	**10.9%**
Desire2Learn Inc.	6.9%	6.6%	5.3%	8.3%	8.5%	**7.2%**
Developed In-House	10.3%	1.9%	3.8%	5.6%	10.6%	**5.6%**
eCollege	5.2%	3.8%	6.8%	5.6%	8.5%	**4.2%**
Oracle	3.4%	3.8%	1.5%	0.9%	2.1%	**2.3%**
Resource Development Company	3.4%	0.9%	2.3%	0.9%	4.3%	**2.1%**
Articulate	5.2%			1.9%	4.3%	**1.6%**
Skillsoft, Thomson NETg	1.7%	0.9%	0.8%	2.8%	2.1%	**1.6%**

Source: Guild Research

Table 2 shows Moodle gained the first place in the business organizations survey even against the saba and Sum total systems. [26]

TABLE 2: THE TOP 10 LMSS IN USE BY 1,932 BUSINESS ORGANIZATIONS, AS REPORTED BY ELEARNING GUILD MEMBERS IN THE LAST YEAR

	1 - 50 workers	51 - 500 workers	501 - 2000 workers	2,001 - 10,000 workers	More than 10,000 worke..	Grand Total
Moodle	48.2%	24.6%	15.3%	12.7%	6.3%	**22.1%**
SumTotal Systems Inc.	7.3%	9.8%	12.3%	17.6%	24.8%	**15.4%**
Saba	11.3%	8.2%	10.4%	12.0%	21.4%	**13.7%**
Developed In-House	17.6%	13.1%	8.6%	8.1%	13.7%	**13.1%**
Blackboard, Inc.	16.6%	13.7%	9.8%	7.7%	7.4%	**11.0%**
Plateau Systems, LTD	5.3%	7.7%	9.2%	9.9%	13.7%	**9.4%**
Skillsoft, Thomson NETg	8.0%	7.1%	5.5%	10.2%	11.7%	**9.2%**
Oracle	6.0%	3.8%	6.7%	12.0%	8.8%	**8.0%**
Learn.com	4.7%	7.7%	11.7%	7.7%	3.1%	**6.3%**
GeoLearning	5.6%	7.1%	6.1%	4.2%	3.1%	**5.1%**

Source: Guild Research

The Moodle was used by Higher College of Technology (HCT) for a long time but it became very active and started using all the components of Moodle from the year 2008. Now it is altered in such a way that students can use Moodle for their studies as well as for their assessments. It is very convenient for the students to access their Moodle account either in the intranet of HCT or through internet outside the campus.

ADVANTAGES AND DISADVANTAGES OF MOODLE
ADVANTAGES
All the open source software's are available at free of cost along with the source code. Hence it can be customized to our requirements. It has a great flexibility in its implementation and usage. Even if we have any problem in customizing the software we may get the technical support from a large group of people. It has well tested updates and plug-ins. The great advantage is variety of tools and capabilities it has. It can be peer reviewed with high level of security. The popularity of this software is not due to its economic nature but due to the contemporary tools available with it. The customer satisfaction is greater compared to the company developed software's. Due to the open nature, top academicians and experts reviewed it and ensured the quality, reliability, accuracy, accountability, collaboration and greater communication. Because this software is developed by a community with real interest in academics and who are all the experts in this field, it helps the whole educational world with high standard. The development speed is also rapid and knowledge sharing is very high among this community people. The experts from different geographical places developed this software in different languages. Hence the reach ability is higher compared to other software's.

DISADVANTAGES
Even though Moodle has lots of advantages it has few drawbacks also. When we try to customize this software too much it creates lot of problem and people comment that it is not enterprise-ready. We may get technical support from various experts, but fixing problem will be our responsibility. This software takes care of most of the academic components, but when it comes to the administrative part of an institute, it is not suitable software. If we try to integrate with other software components of the organization, it has very less integration ability. It cannot be integrated with Human resource system, other students' management system, business process models, etc., even though we can customize this software it has less capability of assessment and grading system. Hence HCT is always relay on other software's for grading and result processing, also HCT still follow traditional assessment patterns to assess the students.

Many companies in almost all countries help educational institutions to implement web based Moodle. These companies take responsibility of hosting, software support, customization, training the employees and integrate with other applications.

QR CODE
Quick Response Code is the expansion of QR code and this is the trade mark for a type of matrix bar code. This is actually the extended technology of bar code used in Japan for the automotive industry. It is a label which can be read by the optical machines contains information related to an item or a URL, etc., it helps to read the information very fast and stores more data compared to the previous technology. It is a patent technology, but the patent holders are not exercising those rights. It has black modules or square dots as specified in the figure 3 with a white background. The data can be encoded using supported extensions, virtually any type of data or four standardized types of data like numeric, alphanumeric, etc., [30].

FIGURE 3: QR CODE FOR THE MOODLE LINK OF ORACLE COURSE IN HCT

QR CODE SCAN
QR code can be generated with various software packages. One of such web site is www.qrgo.me. This is the web site we used to generate the QR codes and used in the delivery plan of the course. After the generation and printed in the delivery plan it can be scanned by any mobile devices of the students. If a student having a windows phone like Nokia Lumina series phones then Bing search app can scan QR code. Similarly, the iPhone/iPod/iPad and Google devices can use 3rd Party applications because they are not having any native code reader with it. In general there are so many apps are available for Google Android Operating system to scan QR code reading. The another big giant in mobile phone industry is black berry, its App World applications can scan QR codes and load any URL on the device web browser. [29]

QR codes are used to store the URLs of the course materials and video lectures in the delivery plan. It is also used in HCT for many other purposes. In HCT to advertise any event they give the URL of the link in which the details of that event stored will be advertised in the college bus, signs, LED TV's, notice boards etc., Even the Lecturers has a QR code in their Id card and use as a business card. The students or visitors who have a camera phone with proper QR code reader software can scan and the image of QR code will display text about the business card details of the lecturer or contact information about the person. If the phone has a internet connection then it may load the URL of the link which is in the QR code. This act is called hardlinking or object hyperlinking. Finally it is also used to identify the location of a lecturer in HCT by retrieving the geo information by using the GPS associated with a location. [28]

IMPLEMENTED QR CODE FOR MOODLE IN HCT
Every semester after the student's registration, the course coordinator has to prepare CSV file of his subject and forward to the Educational Technology Committee (ETC). ETC gives access to the concern subject for all these students. Meanwhile the course coordinator has to upload all the course materials,

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sample assignments, Exams, Reference materials and additional video lectures in the Moodle. During the teaching week, course coordinators record their lectures and upload in the Moodle. All the relevant lectures for the particular subject will be made available in the HCT website's E-learning portal (Moodle). In the beginning of the semester Course Coordinator prepare a 6 page document called Delivery Plan in which they includes course aims, objectives, learning outcomes with each week schedule of teaching topics, assignment schedules, marking and attendance details. Now, in the new format of delivery plan each course coordinator has a QR code for the corresponding link next to the chapter title and other related topics. When the student scans the particular code it will open the video lecture of the staff to the student in his mobile device. The mobile devices are having access to the intranet of HCT, so it will not cost the student.This is much helpful when the student have not attended the particular class or in need of more reference materials. Thus it is possible to sync the student with teacher lectures. 10 percent of the sessions are made mandatory to the student to learn using Moodle through M-Learning at HCT.

FUNCTIONS OF THE APPLICATION

1. Student Scan the QR Video Code.
2. Mobile App identifies the Corresponding Course Video.
3. The video will be shown to the Student.
4. Monitoring will be done to evaluate the completion of the session.

CONCLUSION

This paper has attempted to develop a rational and systematic framework for assessing the effectiveness, efficiency and economics of Moodle software for higher education students in HCT. But this paper has not analyzed the independent variables of M-learning process using Moodle. Not all the dependent variables are considered for this research. But in this primary stage it gives positive signals for implementing Moodle and QR code delivery plan for the HCT students.

This paper has also presented the conceptual Moodle architecture with QR code Delivery plan that can be implemented in the HCT. This gives Anywhere Anytime Learning advantages to the learning community and helps to improve the efficiency of the teaching community at lesser cost. Apart from that the accessing speed and the organisation of the materials in the Moodle are very effective and impressive than the previous usage of the Moodle in HCT. However this can be used for the traditional teaching and learning environment as a supporting tool to make the cost of the resources required for higher education institutions. Further to this research it is very much required to involve all students and teachers for the effective M-Learning in the college level education for all the faculties using Moodle. It will allow the University/ College to adopt the common teaching and learning strategy throughout all the faculties which is more convenient for the student. However, measuring such differences was not the primary objective of these discussions and plans. Even without a measurable effect of using different teaching and learning tools, adopting tools to fit student preferences can improve student satisfaction. Further, this application can be extended to the secured Moodle M-Leaning environment for the distance learning students and part time students.

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