

A General Frame Work Tool For E-Learning Management System In Engineering Education

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ABSTRACT

E-learning is the training method of the future. It's not new education tool but it is highly needed for effective education. It has made a big revolution in the field of education with the advent of rapid growth of IT & ICT. Traditional Learning methods are becoming less popular and less effective. E-learning have attracted many educational institutes, students and academicians with its interesting features such as on demand, self-service and self-paced learning. The main objective of this paper is to identify the drawbacks in the existing methodologies and how those pitfalls are eliminated with the Technology enhanced e-learning. Utilization of e-learning systems would benefit both students and teachers. Student's assessments are very much accurate and their learning process can be improved. It also helps the teachers / faculties to design effective courses according to his /her needs thereby helping the students to use resources more efficiently. It is going to be the training method of the future. It is the term for all types of technology enhanced learning (TEL) in which technology is used to support the learning process. It could be simply defined as the pedagogy empowered by digital technology. In conventional education system, face to face learning approach is used. New learning approaches have been introduced and it was found learning the content though online has influenced many educational institutes. In this paper we have discussed the various trends of LMS (Learning Management System) tools. This paper also focuses mainly on e-learning & m-learning used in LMS. A literature survey has been done on how e-learning & m-learning has made an impact in the field of engineering education research and importance of personalization in e-learning. Based on the study, it was found that there is a lack of personalization in the traditional e-learning. Social n/w's and search engines play an important role in e-learning we proposed an idea to integrate social n/w's and search engines together with the help of ontology in order to achieve optimized personalized e-learning

KEYWORDS: E-learning M-learning Learning Management Systems (LMS) Technology enhance learning (TEL) Information learning technologies (ILT) Knowledge Based (KB)

INTRODUCTION

Learning that is facilitated by the information & communication technologies is called e-learning. In order to sustain in the future, especially the academicians need to be aware of the trends in the learning methodologies. E-learning is a transition from traditional education or [11] training to ICT-based, internet based personalized learning. Many virtual universities may emerge as a result of e-learning. E-learning uses internet technology and it significantly improves the efficiency of education. It aims at identifying the lack of knowledge oriented teaching and implementing means for effective utilization of e-learning to meet the changing conditions.

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[12] The objective of e-learning is to achieve anytime, anywhere and any place anybody learning. E-learning user internet technology and it significantly improves the efficiency of education. Online learning or electronic learning allows users to access learning contents and materials anytime, anywhere. Use of information with computer technologies to create learning experiences also defines the term e-learning. Information content is delivered via the internet intranet/extranet, audio or video tape, DVD, online portal with the help of information technology. E-learning allows the users to share and access materials in all kinds of formats such as videos, slideshows, words documents and pdfs. Many schools, educational institutes and universities have started using the e-learning approach to enhance the learning process thereby improving the overall performance of the students.

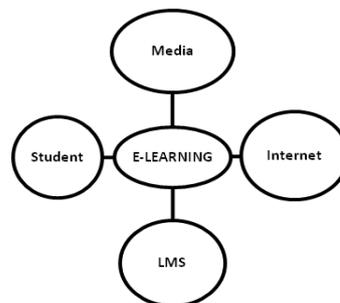


Fig. 1: E-LEARNING PROCESS



Fig. 2: E-LMS process (this figure viewed in online image)

Communication Technologies:

Synchronous activities involve the exchange of ideas and information with one or more participants during the same period of time. A face to face discussion is an example of synchronous communication. It occurs with all participants joining in at once, as with an online chats session or a virtual classroom or meeting. Virtual classrooms and meetings can often use a mix of communication technologies. In synchronous e-learning, the instructor reviews student answers and gives feedback, as in a traditional face-to-face classroom. Both the communities provide a general overview of the basic learning models.

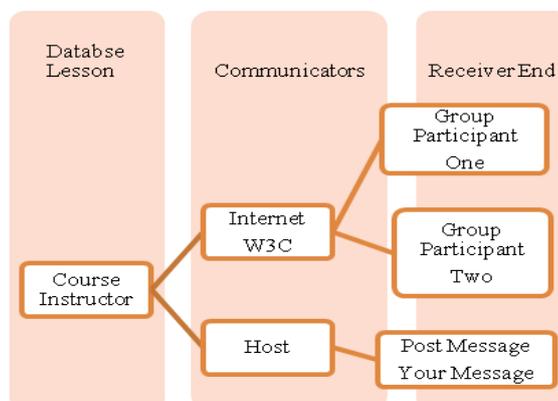


Fig. 3: Synchronous E-Learning Process

Webcasts, blogs, collaborative software and virtual classrooms are some of the technologies used in e-learning. Technologies used in e-learning are classified as synchronous and asynchronous activities use technologies such as blogs, wikis, and discussion boards. Here the participants may engage in the exchange of ideas or information without the dependency of other user's involvement at the same time. E-mail is also asynchronous in that mail can be sent or received without having the recipient's involvement at the same time.

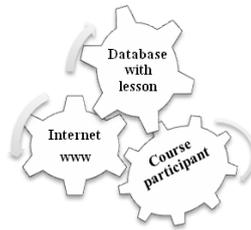


Fig. 4: Asynchronous E-learning process

Frame Work Tool For E-Learning Management System (E-Lms):

The identification of computer based technology (CBT), technology enhanced learning (TEL) to associate the m-learning and electronic learning includes the learner's style and data collecting, class contains the details of notes, videos, mails and books. The process of learning management system is used in education field with the semantic models of the World Wide Web application (W3C), It leads to the development of frame work designing tools. In this regard we have general frame work for LMS.

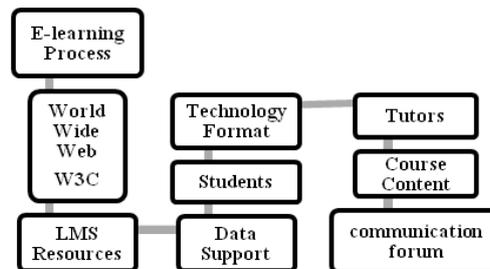


Fig. 5: General Frame Work Tool for LMS

Knowledge Based Training Model:

[13] Knowledge based Management (KM) is the process of capturing, developing, sharing, and effectively using organizational knowledge. It is a multi-disciplinary approach to achieve engineering organizational objectives by making the best use of knowledge. KM includes courses taught in the fields of business administration, information systems, management, library, and sciences. Other fields may contribute to KM research including information and media, computer science, public health, and policy. Several Universities offer dedicated Master of Science degrees in Knowledge Management. Many large companies, public institutions, and non-profit organizations have resources dedicated to internal KM efforts, often as a part of their business strategy, information technology, or human resource management departments. Knowledge management efforts typically focus on organizational objectives such as improved performance, competitive advantage, innovation, the sharing of lessons learned, integration, and continuous improvement of the organization.

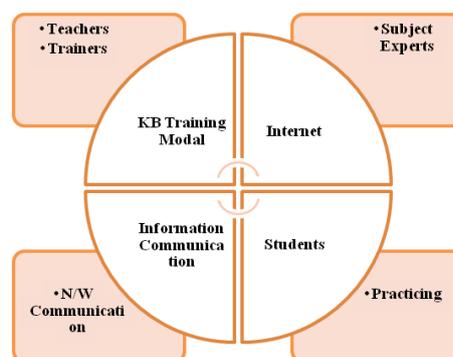


Fig. 6: Knowledge Based Management

Determining Knowledge Activities:

[13] Several activities work with knowledge based learning. Activities that scaffold learners, such as art projects and hands on activities, work best with knowledge based learning. Other activities that work well with knowledge based learning include working in groups and doing presentations for other students. The first step in using knowledge based learning is to make sure that we understand the knowledge that students already have. We can do this by talking to students, looking at work that they have already done, or having them explain to you what they know. Knowledge based Learning is best if it is done without too many tests and quizzes, although sometimes it might be necessary to use these things to determine the knowledge of a group of students.

Learning Management Systems Tools And Methods:

A learning management system (LMS) [8] is a software application for the administration, documentation, tracking, reporting and delivery of electronic educational technology also called e-learning. Learning management systems range from systems for managing training and educational records to software for distributing online or blended/hybrid college courses over the Internet with features for online collaboration Colleges, universities, and school, LMS to deliver online courses and augment on-campus courses. Corporate training departments use LMSs to deliver online training, as well as to automate record-keeping and employee registration.

Table 1: Different Learning Management Systems Approaches

LMS Approaches	Functions
E-Learning	Training Event Management (I.E., Scheduling, Tracking)
M-Learning	Curriculum And Certification Management
Face To Face Learning	Skills And Competencies Management
Knowledge Based Learning	Skill Gap Analysis
Video Chat Learning	Individual Development Plan (IDP)
OHP Learning	Assessing And Resulting
PPT Learning	Reporting
Chalk and Board Learning	Training Record Management

Different Learning Management System Tools:

- MOODLE
- COURSE SITE BY BLACKBOARD
- SAKAI
- LATITUDE LEARNING
- DOKEOS
- EFRONT
- SCHOODOLOGY
- ILIAS
- ATUTOR
- CANVAS
- ELMSLN
- GOOGLE CLASSROOM
- KORNUKOPIA
- MY ICOURSE
- NEO LMS
- OPEN SWAD
- OPEN CLASS
- OPEN EDX LMS

Here we discussed the [21] Websites link for latest LMS tools used in education field for enhancing the E-learning management.

*LMS Tools:**Moodle:*

Moodle is primarily aimed at the education market, but is also used by plenty of corporations for e-learning and training purposes, Moodle is totally free, It is an open source LMS that includes like student dashboards, progress tracking and support for multimedia classes, and additionally includes mobile friendly themes, support for third party plug-in and add-ons and the ability to sell courses using PayPal.

Course site By Blackboard:

The software is web-based and free, and allows the creation of up to five active “course sites”. Course Sites has the ability to login using popular web services like Face book and Gmail, and supports an unlimited number of students and easy integration with Blackboard’s other offerings.

Sakai:

Another open source solution, Sakai differs from Moodle in a few key elements. It is built on Java. Sakai integrates with Google Docs, and includes tools like a wiki, online testing, presentation slides and the ability to use Drop box as well.

Latitude Learning:

Latitude Learning is a “freemium” LMS that is free to use for up to 100 learners and then starts at \$1,000 a year with optional add-ons. It’s a largely web-based system and targets corporate training and B2B environments.

Dokeos:

Dokeos is another open source solution, this time built on PHP, Dokeos boasts a built-in course authoring tool, as well as pre-made quiz templates, private groups, and a chat tool, Oogie Rapid Learning” feature it’s easy to convert both power point.

E-Front:

[21] efront is an open source LMS, with a paid, hosted version available as well. efront includes an intuitive icon-based interface, a course creation tool, as well as internal chat and built-in forums.

Schoology:

[21] Schoology is a freemium LMS aimed primarily at educators. Schoology It includes mobile access, Google Drive integration, content creation tools, and access to a library of public courses and other content.

Ilias:

[21] ILIAS is an open source, web-based LMS developed at the University of Cologne in Germany. ILIAS is security certified by NATO and used in NATO’s high-security intranet as well as by several national defense departments and armed forces.

Atutor:

[21] This open source, Canadian LMS, ATutor is paired with another free/open-source system called content; content is in LCMS that allows for course and test authoring using the same functionality as the ATutor LMS.

Canvas:

[21] Canvas offers a paid version with pre-built course content and hosting, or an open source option that relies on you to provide the content, hosting etc. The open source version is free for individual teachers if you want Canvas to host it or free for unlimited users if you host it yourself.

Elmsln:

[21] Much like LMS built on Word Press, ELMSLN is a free extension for open source content management system Drupal. ELMSLN is a very active open source project, with a plethora of developers working on it and the advanced functionality it offers reflects this.

Google Classroom:

[21] Google’s free LMS offering is only available to accredited academic institutions. Google Classroom is also free for any number of students and teachers’, having been built by Google, Classroom integrates very well with other Google properties like YouTube, Docs, and Drive. An intuitive look-and-feel.

Kornukopia:

[21] This free, web-based LMS is already used at several hundred different schools worldwide. Kornukopia offers all its core modules free of charge to “valid schools,” though may charge at a later date for advanced or add-on modules.

Myicourse:

[21] Myicourse allows users to create online colleges which house multiple courses. If you decide to make your courses public, creating and running them is totally free.

Neolms:

[21] This freemium LMS, It allows accredited schools with 400 students or less to use the platform for free. The company also offers a paid LMS, MATRIX, for businesses and other organizations that are not accredited learning institutions, unfortunately, the free version of NEO LMS is limited to accredited schools, and some users have complained about difficulty exporting grade rubrics.

Open SWAD:

[21] Open SWAD (which stands for shared workspace at a distance is a product of the University of Granada. Its open source, but also available for free as a cloud-based system. SWAD is currently used by the National University of Asunción in. Opens WAD was developed primarily by Spanish speakers and this can be apparent in some of the terminology or grammar in the English-translated pages.

Open Class:

[21] Open Class is a totally free online education platform with a focus on social learning. It is used by organizations like nuskool and Abilene Christian University, This web-based tool puts a premium on social learning, and this is apparent with its integration of profiles, shares, feeds, and statuses, as well as option to video chat within the software.

Open edx LMS:

The biggest differentiator here is not any special functionality, but the fact that this tool is supported very publically by such heavyweights as MIT and Google. But tons of guides and help getting started with it. The tools also come with more than just the Open edx LMS.

Related Work:

Analysis of student attitudes towards e-learning [1]– this paper presents findings on the experiences and perceptions of technology-supported learning gathered from engineering students at two Libyan universities. An analysis of relationships between student attitudes towards e-learning and their demographic characteristics, access to technology, use of technology for learning, skill in technology, and satisfaction with technology is also included. The survey shows that all the participating students had positive attitudes towards ICT and e-learning; they felt confident in using computers, enjoyed using ICTs in their studies, believed in the benefits of e-learning, and would be interested in studying courses that used e-learning. In particular, students believed strongly that e-learning would give them the opportunity to acquire new knowledge and enhance their learning experiences.

Blended learning approach for engineering education an improvement phase of traditional learning [3] -An approach called blended learning (BL) is introduced in this paper so as to address the drawbacks of face to face learning in traditional education system. Face to face teaching system in the class room with only white board and marker cannot make interactive lecture first time of any subject. In engineering discipline's most of the students cannot get more attention to the class lecture because of traditional learning system. To improve the teaching and learning of traditional learning system, BLA has been used in which the teachers will upload his/her lecture/tutorial with video, audio, presentation or other related resource of a lecture in the university website before the class day. The students will download these resources and see it first then read the text lectures/tutorials; they also share this lecture with group through social media or other process so that they will be more able to understand about topics. After acquisition of knowledge on that topic, students will come to the class room. On the next day the teacher and students can discuss with the topic and then the students can ask questions, provide their ideas easily. Therefore the class can be more effective than the traditional teaching system. This paper suggests that blended learning (BL) approach is indispensable now in the engineering institutions for better understanding in engineering education's-learning.

Teaching computer programming online to first year engineering students [10]-In this paper, the author had introduced the audience to the format of an online education. Online computer programming course was developed to teach first year engineering students how to solve engineering problems using Mat lab. The learners' experience and the challenges faced by online learners are considered. Strategies to improve student-student, student teacher and student-material interactions are discussed. Technologies such as chartrooms, emails, blogs, webcam & microphone, videos, computer aided assessments are available for online learning to support the above interactions. This paper summarizes that implementation of blogs and chat rooms have significantly improved students' experience in a web-based course.

An Approach to Personalized E-Learning [14] –This paper focuses on personalizing the e-learning environment so as to meet the needs of the students in addition to the traditional lecturing method. Here, an Intelligent web Teacher approach has been introduced which is an e-Learning platform that enables the definition and the execution of personalized learning experiences, packaged in a Unit of Learning (UoL) (i.e. a course, a module or a lesson structured as a sequence of Learning Activities represented by Learning Objects

and Learning Services). The Learning Model allows to automatically generate a UoL and to dynamically adapt it during the learning process according to the learners' preferences and cognitive state.

The effect of e-learning approach on Student's achievement in Biomedical Instrumentation course (2) a study was made on using e-learning approach in teaching the course to the students. In this study, an experimental group of students was examined after studying a course using e-learning approach. Here the author has used the El-Gazzar Instructional Design Model since it was proved to be simple and efficient. The course was implemented using MOODLE-LMS. The students' achievement was examined before and after the experiment. The research results proved that there is a significant increase in gain in achievement. The e-learning has achieved efficiency greater than (80%) in achievement. Black's Gain Ratio and McGugian Gain Ratio are used to measure the efficiency by the author. It was proved that the e-learning has achieved larger effect size (more than 0.14) on achievement.

Personalized e-learning interface. [9]- Describes how an e-learning system should address the heterogeneous student group through the personalized e-learning interface and how it enables the student's views and access to materials based on their preferences. Several views like Themes, Time, Pedagogical methods, Media type / Intelligence, Proficiency stages, List of learning objects recommended by the system based on behavior of previous students, free text search etc., to be considered in implementing the personalized learning environment.

M-Learning Process:

The Mobile devices play an important role in E-learning. Mobile learning one is faced with tensions between functionality and mobility. The technologies involved in e-learning and m-learning are computers, laptop computers, PDAs Personal Digital Assistants handhelds palmtops, smart phones and Mobile phones and these can be arranged on a continuum. The smart phones have created more opportunities for the students to their improve learning habits. It is possible to communicate wherever and whenever it's necessary to get and share the knowledge. The basic element for mobile learning includes faculty, trainers, subject experts. This technology makes higher interaction between learners and lecturers.

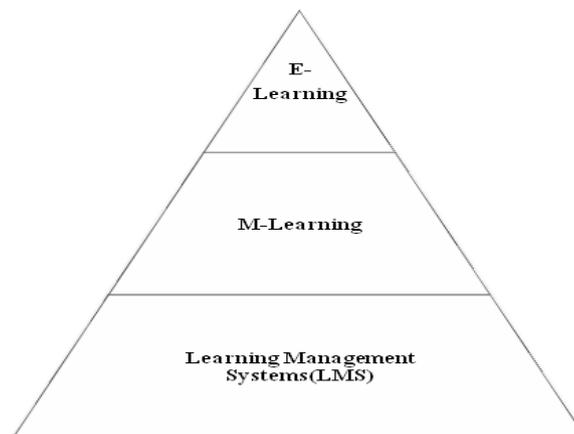


Fig. 7: M-LEARNING

Basic Elements of M-Learning Process:

- ✓ Mobile Device
- ✓ Systems
- ✓ Communications
- ✓ Connectivity
- ✓ Faculty, subject Experts, Trainers
- ✓ Students
- ✓ Source of Data
- ✓ Platform
- ✓ Evaluation cum Feedback

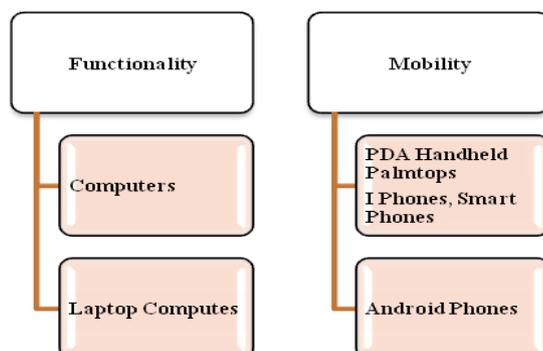


Fig. 8: Relationship between M-Learning & E-Learning

Survey Results:

A survey has been taken and it is reported already in the proceedings of 2015 International conference on Interactive Collaborative Learning (ICL) .It was found that e-learning approach has gained more attention of the engineering students and it has been widely accepted by the engineering institutes so as to make their students' learning more effective, enhance their student's performance and universal. The below table shows the survey results taken in the year 2015 and it also highlights the usage of different technologies like 3D printing, Cloud Computing etc. in percentage.

Table 2: This table shows that students have a positive attitude towards E-learning management systems

SURVEY RESULTS (N=375)	
E-LMS	SUCCESS %
3D printing	8.36%
Augmented Reality for Learning	3.02%
Cloud computing	6.49%
Digital accreditations	1.24%
E-books and digital libraries	8.18%
E-learning Platforms and Architectures	9.69%
Games & Virtual Worlds	3.56%
Gesture-based computing	0.80%
Intelligent tutoring systems	4.71%
Interactive video lectures and video conferencing	5.78%
Learning analytics and semantic web	2.31%
Learning Objects reusability and digital repositories	2.76%
Massive Open Online Courses	6.58%
Mobile and Ubiquitous Learning	7.02%
Open Source, Open Standards, and Federated Systems	4.09%
P2P online assessment	0.89%

Conclusion:

Finally it was observed that the e-learning is one of the fastest moving trends in engineering education. Telecommunications and (CBT) computer based technologies are converging to make online learning more of an interactive experience. The learning style and concept of personalization in e-Learning fulfills the needs of the students with different types of intelligence. Many educational institutes adopted different LMS tools and it was found that students also have positive attitude towards e-learning and their overall performance also have been improved through e-learning. Computer based technology created the big revolution to the better performance of digitalized education in all research fields. Through e-learning approach, information is available, everywhere but it is not easily accessible. Out future work is to design a smart search engine that provides results for the search query that is related to a user based on one's own interests, like & dislikes, specialization, usefulness of data while searching. In this regard, search logs will be maintained for every user thereby creating ontological profile so that a user can get his/her personalized search results. In future any one of the LMS for specialized domain we will create a new search engine. Based on ontological web analysis and sample reports will be collected. Based on the sample report, new modules/feature could be added so as to enhance the engineering education in e-learning approach and make it more efficient for all kinds of users.

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