

**LEARNING MANAGEMENT SYSTEM – SIGNIFICANCE AND
APPLICATION IN CIVIL ENGINEERING**

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Abstract — In teaching and learning process especially where it's engineering, due to complex numerical, equations, abstract nature and mathematics involved, it's challenging to present the content to students with great interest. With diminishing resources (e.g., continuous funding cut, frequent professional/academic staff career movement, lack of competent professional staff, inadequate laboratory infrastructures), teaching and learning of engineering courses become harder and it is progressively becoming difficult to teach basic engineering courses effectively. As a result, students cannot achieve effective learning outcomes. To overcome these challenges, foreseen solution is teaching learning process with learning material application. This approach is cost effective, user-friendly and attractive. The method comprises a real laboratory demonstration video clip, conduction of a real laboratory experiment and a computer simulation/modeling, presentations, real case studies etc. Educational management system is looking forward to improve the teaching and learning experience in higher education system also. Most of the universities in US, UK, Canada and Australia including 28 universities of Saudi Arabia are using different LMS systems and same can be thought of for India. In this paper various possibilities of application of LMS is given for Engineering to make teaching learning more effective.

Keywords- LMS, Software, Moodle, Teaching, Theory, Experiments, Lab, Assessment, Feedback

INTRODUCTION

To enhance teaching learning process, a learning management system can be adapted. This application can manage various tasks like documentation, single point monitoring, training, administration of student attendance, result etc. For LMS implementation in Civil Various software's are available e.g. Moodle which is considered as a best option due to its characteristics compared to other options like A Tutor, Eliademy, Forma LMS, Dokeos, ILIAS, Opigno, Open OLAT.

Need and Feasibility Review:

In the era of globalization, with use of latest technology and easy availability of internet, we can share knowledge easily. In this paper significance of LMS system in Civil Engineering is discussed and its features are compared for decision of implementation.

Laboratory performance is upmost important part of Engineering as without practice of practical its not worth to become Engineer. Dealing with materials, energy, knowledge, application, team work, time management are essential parts of lab performance. Due to change in curriculum less efforts of lab are noticed. Feisel and Rosa [1], Alam et al. [2, 3]. In spite of general agreement of lab importance less involvement now a days is due to factors like cost cutting, limitation in availability of resources, less occupancy of lab etc. Feisel and Rosa [1], Alam et al. [2, 3] Feisel and Rosa [1], Alam et al. [2, 3] For undergraduate education, students works at basic level and not for extracting data for any analysis or research purpose.

Analysis of data available and requirements for implementation:

Most engineering programmes like Civil Engineering need hands on practices to achieve academic objectives. On the other hand industries need students industry ready and they prefer if students can directly work for them without requirement of training. To achieve this objective, engineering educational institutions/ universities are required to invest and develop engineering workshops and practical laboratory facilities to equip students with both theoretical as well as hands on practical knowledge as per the workplace demands.

Due to financial limitation investment in resources is challenged and without good practices good Engineering programs are hit badly. To overcome these challenges, a cost effective and user-friendly three-step teaching and learning approach has been developed for laboratory experiments for engineering courses to enhance students' learning outcomes.

So the best solution is LMS. LMS contains different components or modules. It is also possible to enhance the content by adding good material, video clip, quiz etc. Which can help managing the course well. Student management

module contains student enrolment, student registration for regular and elective courses. It also helps conducting online exam with zero error. As no human intervention is required in this module, it provides 100% accuracy. Not only view but feedback system can also be introduced to save time and avoid partiality.

Many software are available as mentioned. Also comparison between each software is given in table 1.

Table 1: Comparison of softwares for virtual learning

Technologies	Features	Platforms and Tools
MS-Visual Studio.NET, MS-SQL Server	Tracking of learning, Testing, Registration, Online course material, Delivery, Offline course material, communication	Not Reported
Moodle	Assessment	Moodle
Moodle	Moodle features	Moodle
Not Reported	Quizzes, Assignment, Forum	Not Reported
Java programming	Not Reported	Not Reported
C, C++, Java, XML, SOAP	Account Management, Security Protection, Collaborative Learning, Student Activity Tracking, Feedback Collection, Online electronic Experiment.	Pentium IV 2.80GHz, 512MB RAM, Window 2003 server.
Stand-Alone, Web Based, Adaptive hypermedia, Semantic Web	Person and group information, person's profile and learning history, assessment, groupings of learning content, dynamic content sequencing, learner competencies, learning activities, searching across federated databases, connecting diverse eLearning tools.	Not Reported
Not Reported	Not Reported	CSCL tools: Collage and Gridcole
PHP5, Mysql, HTML, Javascript, XHTML, CSS	Carry out practical, assignments in astronomy, automatic control, chemistry, image processing, robotics, and real-time operating systems.	Ciclope software, Apache
Not Reported	Face to Face (F2F) Learning over internet, Discussing on forum, studying lessons, solving self test, creating seminars, course creation, examination, evaluation.	AHyCo Tool
Moodle	Student motivation and Interaction patterns.	Apache
Moodle	Share education institutes learning object repositories.	LOP2P Plug-in, Java lan-guage with JXTA frame-work.
Not Reported	Course access, video and animation, quiz, virtual classroom.	Adobe Connect Profession-al, Adobe Presenter, Adobe Captivate software, Adobe Flash, 3ds Max Studio.
Not reported	Virtual Lab Experiment for power system education.	LabView Player, Lab View Environment.
PHP,XML	Laboratory experiments in automatic control, biomechanics, and fluid mechanics	SysQuake Remote
Not Reported	Learning Management system features, online virtual experiment	Active Document (AD) system.

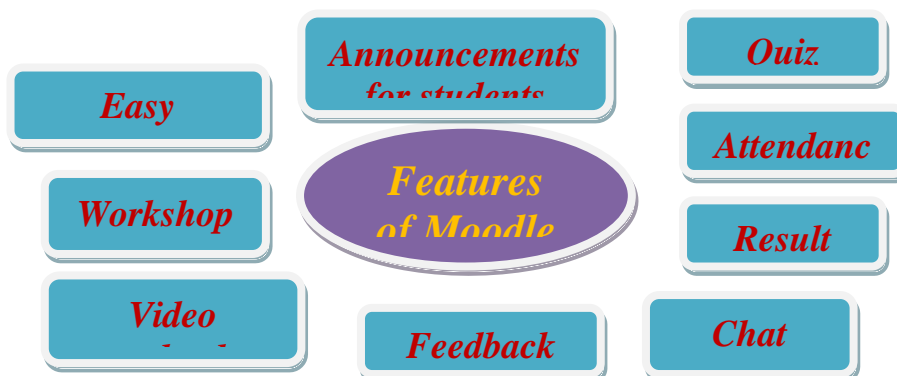
Source: Chirag Patel et.al. ,” A survey paper on e learning based learning management system , international journal of scientific and engineering research , volume 4, issue 6, June 2013. Moodle is considered best due to advantages listed as below. Tutor can be a known personality amongst students due to online classes of a particular course.

Tutors may give materials like lab experiment manuals, seminars, attest research papers, bibliography etc. To students by this platform. A space where students’ data can be easily dealt with (virtual secretariat) may be

constituted. It provides knowledge assessment and self-assessment opportunities by online testing. It enables good communication and socializing by means of chat or forum, both between trainees and with the teaching staff. By chat box, debate on topic is also possible along with communication with tutor.

Features of moodle :

The important features of teaching learning software are as shown in the chart. Due to easy availability of such tools time management for teachers becomes easy as once the material is uploaded it can be utilized for multiple classes. Students can refer material before the topic conducted in class which helps them to visualize the concept for practical applications for any doubt students can anytime contact teachers for their help. Very high skills of digitalization is not required to use this software as it is user friendly.



Theoretical foundation and related literature

Due to easy availability of computer and internet, paperwork is replaced by online system for communication. Due to this reason Engineering institutes are in need of virtual learning environment that includes theory part with visual demonstration. Learning management platform applications with different combinations are studied. (Popat, K, MacLean, H, Heppell, S., 2007). This system helps teachers to manage their course easily, by chat and conference facility synchronisation is also possible. Forum, blog etc. Provides enough opportunity to students and all such facilities can help managing academic requirement of students. (Weller, M., 2007). Due to its little level of complexity, only good universities having possibility of fulfillment of requirements technically can use it with added advantage if use in distance learning courses. (Oproiu, G. C., & Chicioreanu, T. D., 2012).

Moodle as a free of charge resource can be installed on server of institute. This has been proved till date as most adaptable virtual learning environment (VLE). It is open source supporting collaborative environment. This provides a platform to teachers to upload materials required as per bloom taxonomy and online meeting for doubt solving is available feature, so giving assignment, submitting one, checking and declaration of result is possible by this platform. Another important feature is logical and simple interface usable by digitally low proficient students easily. It can be used in government or non government educational institutes.

Lab Enhancement:

For enhancing lab sessions without practical exposure, three step solution is found out and it is the three-step approach comprises: a video clip of the real laboratory experiment by an experienced faculty member/academic staff hands-on conduction of the laboratory practice (including computer simulation) and necessary data collection, data analysis and report writing by students assessment and feedback for their work by an experienced faculty member/academic staff for the better learning outcomes

Video clip of the real laboratory experiment

By video, all experiments or hands on activities can be explained well. The video clip is can be made available online to access via the Learning Management System (LMS). Before coming in class or lab, students are expected to visit such material and it will be very useful in clearing the concept if they have background in mind.

As students become familiarized with the laboratory equipment, facilities, relevant theories and occupational health and safety issues well before they undertake the actual laboratory work, the duration of actual laboratory time can be reduced. The time reduction will not compromise the quality of laboratory practice education. But it can help to reduce operational and supporting technical time plus other logistic costs.

Hands on material uploading for experiments of laboratory

The real laboratory experiment/computer simulation can be conducted by the students with the assistance of a lab supervisor using the proper experimental setup/computer software/tools as described in the demonstration video clip. The experimental procedures, parameters to be measured, relevant theory and sample calculations are provided on

the LMS including the Virtual Laboratory Video. Students need to collect the necessary data for the experiments and then prepare a professional report by following the provided template and guidelines and finally, submit it on the LMS for assessment and feedback.

Assessment and feedback

After the conduction of real laboratory experiment, students need to analyze the collected data for the experiments or simulation and then write and submit a professional report for assessment by an experienced faculty member/academic staff. A rubric and a template can be provided to the students with a detailed guideline and marking criteria for the assessment of the report. To improve their understanding on the laboratory work, a detailed feedback report is provided via the LMS to the students after the assessment of the submitted work. For further improvement, students can redo the experiments if necessary to clarify their confusion. Because of the feedback, students can get better learning outcomes.

Moodle has added advantage of installing updates, continuous modification and enhancement is possible. It allows easy navigation. Due to flat view format, tools can be arranged individually. [Williams, Bryan (Sep 1, 2005)].

Technical Requirements. As it is open source available free of cost, it can be installed in any model of computer. [Terherst, Adrienne, (May 2, 2005)]. Requirements of Hardware platforms are Windows / XP/ Vista/ Pentium2-3/ MAC 9/ OS X. So with use of any hardware it can be used. Screen resolution either 800x 600 or 1024 x 768. High speed internet, any browsers, Supports multimedia Plug-in like Windows - Media Player, RealPlayer, Apple QuickTime, Acrobat reader, Flash player, Shockwave player, Java Applets, Java Mac OSx ec.

Conclusion:

Moodle is best fitted e learning software. It is fitted in economical requirements as its free of cost available, open source. It provides platform for teachers and students to communicate effectively, materials can be uploaded, attendance and results can be maintain attendance easily, visualisation before topic is covered in class increase the efficiency of understanding and application, quiz, discussion, forum etc. 24 X 7 helps students to solve their doubts immediately. Person with low technical proficiency can also use it easily. In any model and make of computer it can be installed from internet. It supports all plugins, easy navigation, installing updates, continuous modification and enhancement. So in filing the gap for requirement of industry ready students and availability of resources at academic institute this platform can contribute a lot.

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