Learning Management System using Open Source Moodle for Computer Science students in Higher Educational Institute

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Abstract-- **Technology is been used in almost all aspects, including education. Anytime, anywhere learning is the new jargon in today's digital world. So there is a need to change teaching techniques to the technological changes. The recent trend of higher educational institute throughout the world is to use e-learning as it delivers more training to students at its fast, convenient and consistent advantage. A Learning Management System plays a vital role in this and it is software for delivering, tracking and managing learning instruction. There are so many LMS available like Moodle, Blackboard, TopClass, Ilias etc. Moodle is one of the best because its open-source, easy-to-use and also cost-effective LMS solution. In India, only very few higher educational institutions offer teaching-learning through LMS. Since it's a new paradigm of teaching-learning, students and teachers are unaware of its technology and its implementation. This paper reviews Moodle as the LMS (Learning Management System) for delivering online courses for Computer Science students in a higher educational institute. It describes the methodology in building and also the learning outcomes of a LMS. It gives an in-sight of the various facilities that can be used in Moodle like blogs, chat, forum, uploading of assignment, viewing or downloading e-content, news and assessment of students through online quiz etc.**

Keywords: LMS; Moodle;Open-source;e-learning

I. INTRODUCTION

The use of technology and the Internet has made education to undergo significant changes thereby bringing new methods of teaching and learning [1]. Students are part of the new digital age; their lives revolve around computers, smart phones, games and online messaging [2]. Recently one of the most widely used methods of teaching that is used to promote knowledge is being focused on online teaching-learning. The use of ICT in Education and particularly, the integration of Learning Management Systems (LMS) play a vital role in today's digital era. The Learning Management Systems (LMS) are technological learning environments that support online course delivery. They offer comprehensive synchronous and asynchronous services that support collaborative learning [3].

Most of the higher educational institutes in foreign countries offer LMS, the new paradigm of teaching-learning. But in India only few Universities and colleges offer teaching-learning through LMS. This is because of the lack of knowledge and awareness of the new paradigm. It takes time and effort to implement this new system of teaching-learning. This paper gives a clear picture of the open source Moodle for building an intranet portal for Computer Science students of a higher educational institution. Higher Educational institution can go for open source software as the cost of the software is less and the institute can have control over its future [4,5]. Moodle has been selected because it is one of the most frequently used LMS and enables the creation of powerful, flexible and engaging online courses and experiences [6]. This system runs on most webhost providers, and includes a constructivist (knowledge is generated through mediation and interaction with the environment) and social constructionist (learning by doing) approach to education [7]. So many reports have proved that Moodle rates well and is being used in a number of institutions and has a wide variety of active courses, available in many languages [8,9].

II. LEARNING MANAGEMENT SYSTEM-MOODLE

A. *Implementation of Moodle*

The tools that are used to implement Moodle is as follows:Server Side: XAMPP-win-32-1.8.2-3-VC9-Installer (Apache Server 2.4.7, MySQL 5.5.34 Database server, PHP 5.4.22), Moodle 2.4.7 Client Side: Any browser (Internet Explorer, Google Chrome, Mozilla Firefox).

Download XAMPP from the website http://www.apachefriends.org/en/xamppwindows.html and install it.Once installed XAMPP control panel will be installed where we can start Apache and MySQL. Download MoodleWindowsInstaller-latest-24 from the website and unzip the package. Once unzipped a folder named server will be created. In that we can find Moodle folder. Move that folder to C:/xampp/htdocs.Open XAMPP control panel (Fig.1) and start Apache and MySQL.
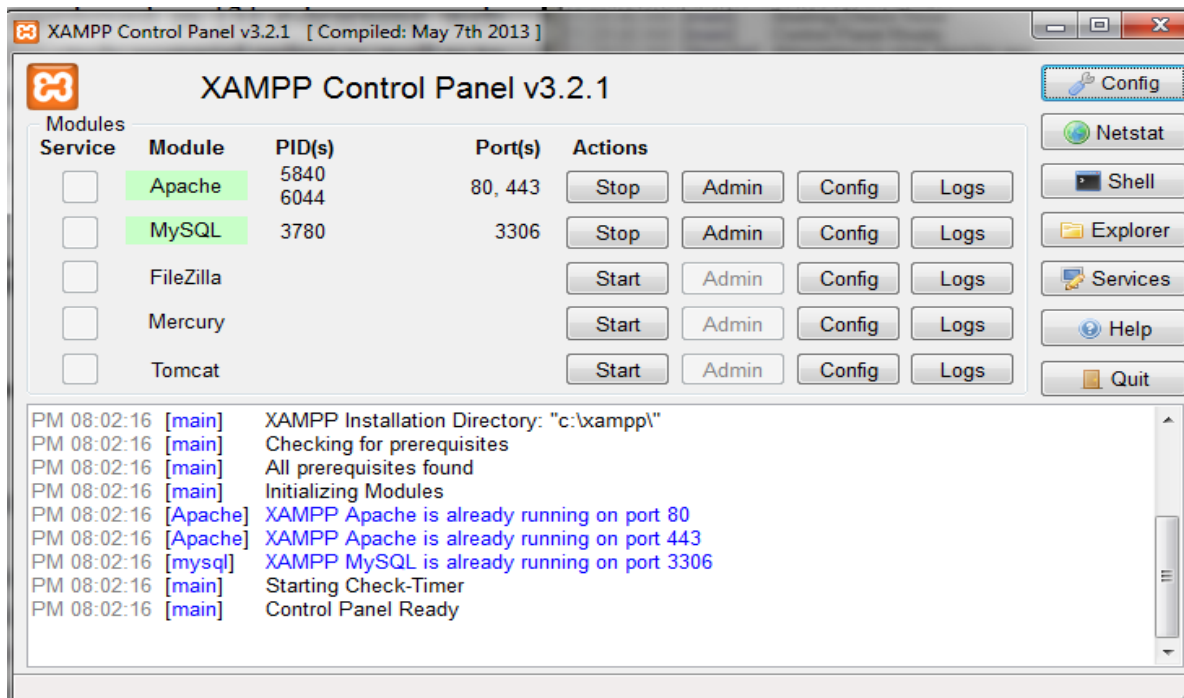

Fig. 1: XAMPP Control Panel

Open browser and type http://localhost/xampp where XAMPP for windows will be opened. In that click Security and XAMPP SECURITY PAGE will get opened. In that click http://localhost/security/xamppsecurity.php where it will ask to enter password for MySQL superuser root. By this we secure the XAMPP and MySQL directory.After that click phpMyAdmin where we can login by typing password which we have already created for the user root (Fig.2). Again open browser and type http://localhost/moodle where installation of Moodle starts. It will ask for Language option, select English. Then proceed by clicking next and all features will be added successfully. In one stage of the installation it will ask for username and password. Give the preferred username and password which will be used to login Moodle. After installation once again type http://localhost/moodle in the browser. Moodle login page will get opened. Give the username and password which we have already given during installation. Then Moodle home page will get opened. A database by name moodle is created and it stores all the data related to Moodle in phpMyAdmin. Next click config.php which is stored in C:/xampp/htdocs/moodle/config.php and modify in the line $CFG->wwwroot='http://localhost/moodle'; as $CFG->wwwroot='http://<IPAddress>/moodle' ie change localhost to the ip address of the intranet server.Then Moodle can be accessed by any computer on the intranet by typing http://<IPAddress of the server>/moodle on the address bar of the browser.
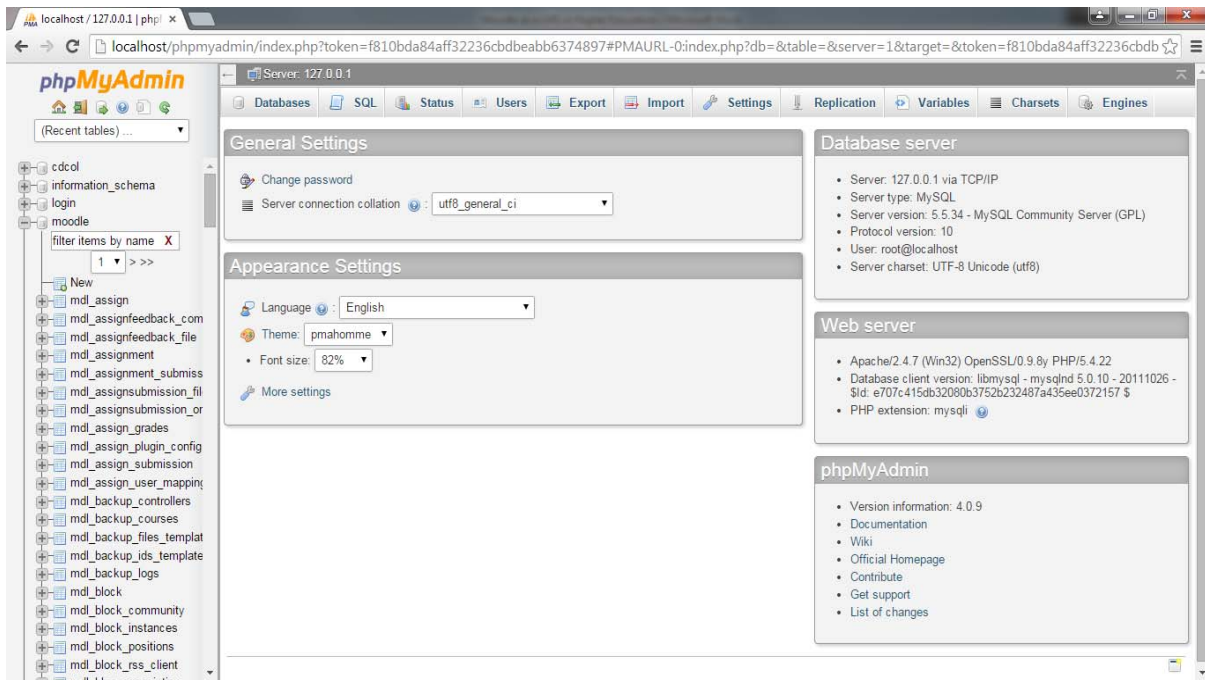
Fig. 2: PhpMyAdmin Panel

B. Moodle Usability

Moodle interface is very user-friendly. Once the moodle page gets opened we can customize the Front page (Fig.3) by clicking Edit settings under Settings. For all editing purpose we have to first turn editing on under Settings [10].We can add Full site name, Front page summary etc which appears on the front page of the moodle site. We can set theme for our site like Afterburner, Arialist, Formal white etc. To change the theme, click Site administration-Appearance-Themes-Theme selector. If we want logo to appear on the front page we can add in the theme's custom front page logo option.

User creation: Admin can create users by giving username, password, mail-id etc by clicking users under Site Administration. The details can be updated by the concerned user under profile option after logging in. Any number of users can be created. Users are the one who play a vital role in accessing the Moodle site.

Course creation: Courses can be created by clicking Courses under Site Administration. Any number of courses can be added and sub-category can also be added.
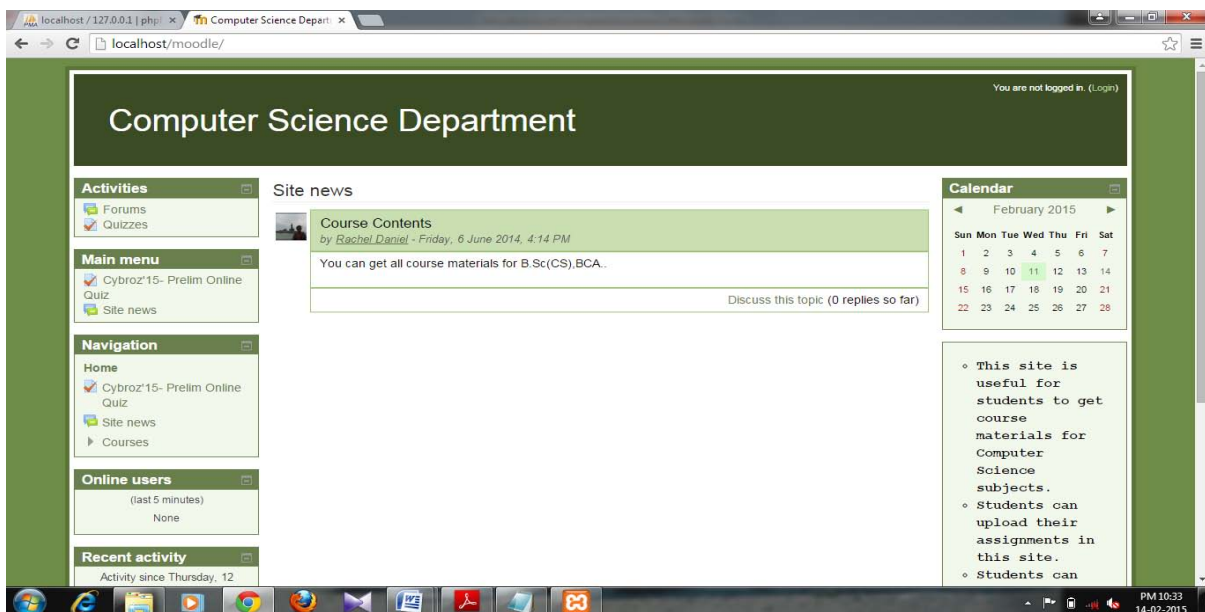

Fig. 3: Moodle Front Page

C. Moodle Features

1. **Assignment:** Students can upload assignments that is been given to them and they have to upload it within the time bound. By this the students are free from writing the assignment in paper and submitting. Since time bound is set the student is forced to submit their assignment within the particular date, failing to submit makes them to get zero marks. For adding assignment, click + Add an Activity or Resource and add select Assignment. (Fig.4)

2. **Forum**: News will be posted in news forum where the student can know about the current events happening in the world. Also announcements related to student's activity will be posted like payment of Semester fees, Exam fees, Seminars, Workshops, Examination date, Department activities etc. (Fig.4)

3. **Chats:** Chats can be created for each subject and the users can discuss on the subject by chatting with the staff or with other peer users.(Fig.4)

4. **Quiz**: Assessment can be done for students by adding questions for each subject and the questions can be of any type - multiple choice, true or false, short answer, essay, and short answer and so on. Grades or marks can be given accordingly. If we want the questions to be shuffled, we can select the option questions to be shuffled, so questions will be shuffled and given. We can import the questions from local disk or drive. The questions can be imported in any format as Aiken, Blackboard, XML format, Gift format etc. Each format has its own rule to be followed. For eg. Aiken format should be in the format given below:

   What is the full form of TCP/IP? →Each question should be on single line

   A. Transmission Control Protocol →Answer should precede with a single uppercase letter
   B. Transfer Control Protocol followed by a dot and then a single space.
   C. Transmission Control Packet After all the choices the answer should be given like
   D. Transfer Control Protocol ANSWER (all in big case) followed by colon (:)
    ANSWER: A space then the correct letter in uppercase.

   The file should be saved as plain text (txt) and then other encoding as UTF-8.

5. **Blogs & Wiki**: Teachers and students can work in a collaborative environment using blogs and wikis. For each subject blogs and wiki can be added. Student can create her own blog.

6. **Glossary**: Glossary can be added for each subject where it serves as dictionary and also easy for students to get definitions for some difficult terms.

7. **RSS Feed**: RSS stands for Rich Site Summary. News feed from websites can be included in front page of the Moodle site. Websites which support RSS can be identified by the icon ![icon] in their webpage. Students can view the RSS News feed and know about the latest events happening in and around the world.
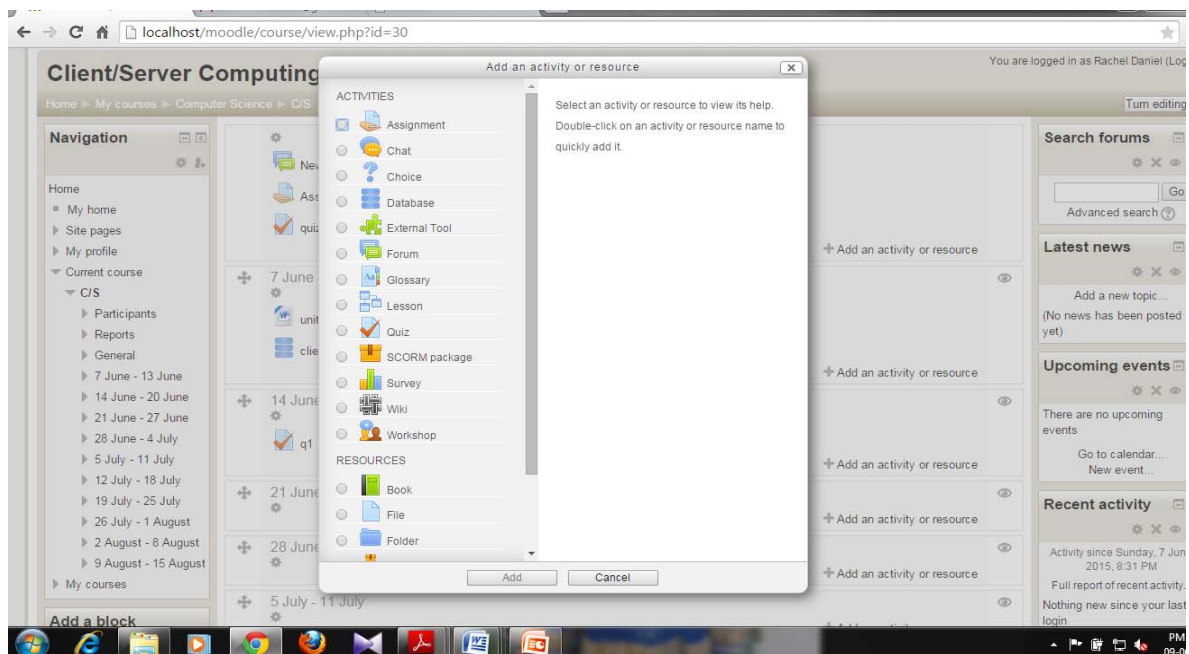

Fig. 4: Add an Activity or Resource

III. NEED OF LMS IN HIGHER EDUCATIONAL INSTITUTION

In today's technological world the need of LMS in higher educational institutions is growing rapidly. It is because that the students are no more interested in traditional way of education system. Providing education with the latest technology is necessary to keep the interest of students and engage them into the continual learning process. The young generation have a passion for technology and when it is integrated in the teaching-learning process they welcome it whole heartedly. The quality of education excels with the integration of LMS to the teaching-learning process [11]. Learning is self paced in LMS so the student can respond quickly or slowly depending upon his/her capability. Since its 24/7 students can access the LMS anytime, anywhere to get the subject notes, upload assignment or discuss in forums, blogs and chat. A student can enhance computer/internet skills with the usage of LMS.

A. LMS Moodle for UG & PG Computer Science students

LMS Moodle is likely to create the following effect on the UG & PG Computer Science students.

- **Improves Learning Skills** [12]

Learning through LMS improves learning skills of a student. In a LMS, the student is expected to go through from the beginning of the semester the forums, chat, blogs,quiz and as a result they get fully exposed to the subject and can improve their learning skills.

- **Promotes Content Development** [13]

It is necessary to have a web presence as it would promote content development related activities.

- **Improves Self Efficacy** [14]

Learning through LMS can help a student to improve self efficacy. The students individually have to respond to questions posted in blogs, forum and chat. So they think and act and learn better. Since students have peer-group interaction their interest grows and learns better.

- **Improves Self discipline** [15]

When a student learns through Moodle e-learning environment, it helps to develop their self- discipline.

- **Improves Communication** [16]

When students interact with faculty, peers through blog, forum, chat their communication skill gets improved.

B.Moodle Modelling [17]

Faculty may be trained to prepare instructional materials for UG & PG Computer Science students to post in LMS using Gagne's model shown below.
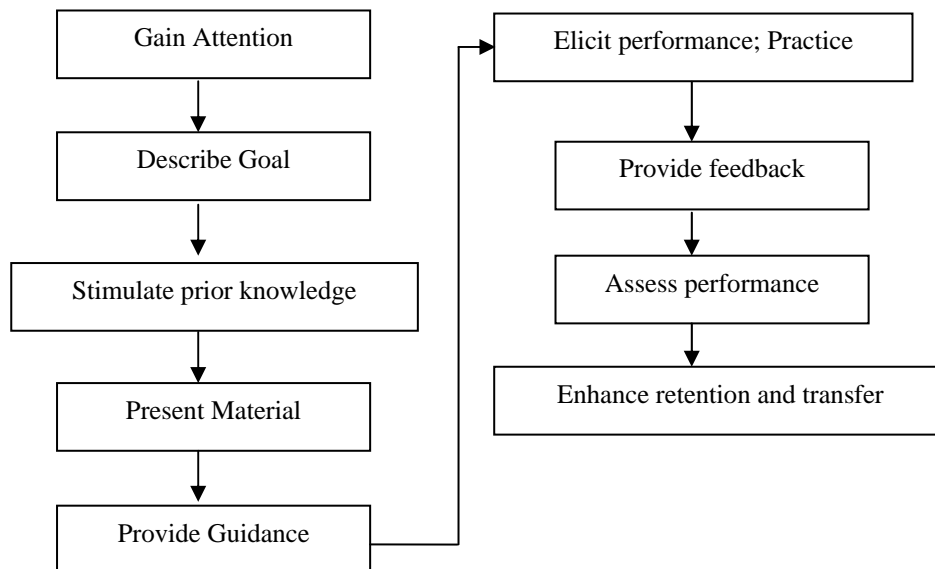

Fig 5: Block Diagram of Gagne's model

- **Gaining attention –** Putting proper headings or topics in the front page of the Moodle website gains attention once the user logs on to Moodle.
- **Describe goal –** The goal can be described by putting topic/week's goals and objectives in the topic summary area.
- **Stimulate Prior Knowledge –** A review quiz or assignment can be given to recall prior knowledge on the Computer Science subjects.
- **Present material –** Under the Computer science subject, E-content in the format of doc, ppt, pdf, audio & video links (YouTube) can be added. The students can log on to Moodle and download the content or view the content or hear audio or view video clippings of their related subjects.
- **Provide guidance –** Guidance can be given through forum, chat etc to students by Computer Science faculty.
- **Elicit performance(practice)**

  Students should be made to apply new ideas and skills they have learnt and also discuss with other peer

  through forum or blog or chat.

- **Provide feedback –** Feedback can be given through the Moodle forums or by giving comments on the blog.
- **Assess performance –** Assessment of students can be done through quiz, assignment on the computer science subjects.
- **Enhance retention and transfer**

  Since the students belong to Computer Science, project or case study can be given so they enhance retention and facilitate transfer to solve new problems.

IV. CONCLUSION

Traditional classroom teaching is often teacher directed and students can make only less contribution, if the class strength is large. However the online environment allows the students to contribute their learning experiences as they achieve both intended and unintended learning outcomes. LMS makes a student to be beyond the space/time constraints in teaching-learning process. We are approaching the age of Self-learning without which students; thereby teachers also may find it difficult to survive [18]. In this paper the authors have shown that Moodle can be preferred to build simple, low cost Learning Management System which doesn't require much complex features. Since its open source, Moodle can be used by the higher educational institutes for teaching-learning process.

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