

**Effective E-learning using web based application**

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**Abstract:** *E-learning is raising field as a capable instructional medium as well as a ripe arena in which to conduct research on its impact on teaching and learning activities. The fundamental nature of e-learning as an instructional medium differs substantially from face-to-face delivery, thereby requiring more new features for course development, online assessment and interaction. Moodle is a software package for producing internet-based courses and websites. It is a Learning Management System (LMS) that allows better cooperation among learners, tutors and students. In this paper we explore the implementation of effective e-learning through moodle and also present how the various facilities of Moodle are used by tutors to provide interactive and inspiring learning experiences in providing higher education in various colleges of technology.*

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**Keywords:** *E-Learning, Moodle, Activities, Course development, Online Assignment, Quiz, Communication.*

**Introduction**

E-learning is a process of education in electronic form through Internet network or the Intranet with the use of management system for education. Broadly there are two approaches generally seen in e-Learning. Asynchronous e-learning commonly facilitated by media such as e-mail and discussion boards supports work relations among learners and with tutors, even when participants cannot be online at the same time. It is a key module of flexible e-learning. In fact, many people get online courses because of their asynchronous nature, combining education with work, family and other commitments. Asynchronous e-learning makes it attainable for learners to log on to an e-learning environment at any time and download documents or send messages to teachers. Students may spend more time cleansing their contributions, which are generally considered more considerate compared to synchronous communication. Synchronous e-learning, normally supported by media such as video conferencing and chat, has the latent to support learners in the development of learning communities. Teachers and students experience synchronous e-learning as more social and avoid disturbance by asking and answering questions in real time. Synchronous session's help learners feel like active participants rather than isolates. The process of e-Learning can be represented in the following e-Learning cycle model.

- Skill analysis. The learning manager analyses the learner's present skills and skills that are set as a learning goal, and obtains the necessary material information. The manager then searches for the related material.
- Material development. The developer creates the material outline structure and exercise questions. The material structure is linked with explanatory pages.
- Learning. The learner engages in learning that is suited to the need, that is, individual learning for knowledge acquisition, or collaborative learning for workshop-type learning.
- Evaluation. The learner carries out exercises and takes examinations using questions designed according to the learning goal. The learning manager makes the evaluation of each learner, using results of exercises and examinations.

There are two types of free platforms for online learning. First, there are those hosted on a public site and the user just register for signs up and uses the platform, but the platform "lives" on a server somewhere in cyberspace. The second type of platform is that that must be downloaded, saved and hosted on the user's own server. The free online class platforms that must be hosted on your own server are "open source applications" [1]. This means that the software is available free for limited use under the terms of the GNU General Public License (GPL). This actually means that the user can copy it, distribute it, even charge for it, but cannot get patents on it. Also, the source code must always remain open and available for viewing by anyone looking at the site so that it does not become proprietary.

### **Moodle for E-learning**

Moodle (Modular Object-Oriented Dynamic Learning Environment) is actually an Open Source e-learning platform. Moodle is a Course Management System (CMS) - a software package build to help educators to create quality online courses. Sometimes such e-learning systems are also called Learning Management Systems (LMS) or Virtual Learning Environments (VLE) [2]. Moodle presents an outstanding platform for resources and communication tools. It was created by Martin Dougiamas, a computer scientist and educator who extremely believes that a CMS should be created by an educator and not by an engineer [3]. To run, Moodle, it must be must first installed on a main server; an administrator configures the settings to enable access through login (user names and passwords). The user accesses Moodle through the Internet as it is web based and does not have to install anything locally. Moodle is written in php with an SQL database. Moodle has updates installed from time to time and so it is continually being modified, edited and enhanced. Moodle is a template-based system to which content must be added. This makes Moodle's interface very instinctive and allows for easy navigation. The whole page is accessible in a "flat view" format. It is laid out in small blocks and prepared around sections following a topic or weekly outline. Every section has its own tools such as lessons, quizzes, assignments, and forms. All blocks on a page can be independently arranged, and the elements within each section can be simply moved around or be hidden [4].

### **Technical Requirements**

Moodle being Open Source is not restricted to a particular set of technical requirements but can be installed on the majority CPU's whether they are old or new models, making it very dynamic [5].

- Hardware platforms: Windows 95, 98, 2000, NT, or ME/ XP/ Vista/ Pentium2-3/ MAC 9/ OS X. This means it can be used by practically anyone.
- The screen resolution may be set to either 800x 600 or higher to 1024 x 768.
- Internet connection may be via a simple 56k modem or a high speed ADSL Cable connection.
- Internet Browsers can differ from Mozilla Firefox, Internet Explorer. Opera and Safari browsers will not display the built-in HTML editor.
- Most applications can be opened and used in Moodle eg. Microsoft Word, Excel and PowerPoint. The Excel viewer and PowerPoint viewer work as well as will a simple word processor. Open Office can be used as an alternative.
- Supports multimedia Plug-in that include: Windows Media Player, RealPlayer, Apple Quick time, Acrobat reader, Flash player, Shockwave player, Java Applets, Java Mac OSx.

### **User Types and Access mechanism**

After the installation of moodle, we can get an administrator account and its password. With this account we can create courses, add users to the system, and manage other system functions. Moodle uses a role based access mechanism, and implements three major roles: administrator, teacher, and student. A user can be given any of these roles. A user can be a student in one course, and a teacher for another. A teacher can also be the system administrator. Only those with an administrator role can control and create courses or assign teacher role to others or assign administrator role to anyone else. When a user registers in a particular course then the student role will be given.

Moodle provides four types of access mechanism for students to join a course. The simplest method requires no authentication and allows any user to join the course. The second is a guest user mode where the user can go through the course, but cannot participate in any activity. The third mode requires the teacher to enroll each student directly one by one. In this mode the teacher has full control in adding or removing students. Both enrolment and removal are done through a simple interface that can be accessed through the *participant* link on the homepage. It shows a list of all valid users on the system and the list of current students. The fourth option uses an enrolment key set by the teacher. The teacher must share this key with all his students. Students must provide this key on their first entry to enroll them in the course. If the key is valid, the enrolment is complete, and further access does not require the key. Once all students are enrolled, it is better to change the enrolment key to prevent misuse. If any 'unwanted' student enters the course, the teacher can expel him as mentioned earlier. All these operations can be done by choosing the "settings" option in moodle course page.

### **Basic Features and Operations**

The vital features of moodle include tools for creating resources and activities [6]. These in turn provide the tutor (teacher) managing the course with various useful options. The Resources tab offers the tutor a choice of creating labels which are

simply headings for each topic or week, creating text pages or web pages with a combination of text, images and links, creating links to files or web sites/pages which can link to videos and other files, creating directories which are folders. Another useful and collaborative section is the Activities tab which includes: assignments, chat, and choice (one question with a choice of answers – answers are logged so statistics can be deducted), database which is a table created by the tutor and filled in by the students. Forum where everyone can post in response to discussion threads, glossary a type of dictionary created by the tutor with terms used and their meanings. Lessons offer the elasticity of a web page, the interactivity of a quiz and branching capabilities. Quiz enables the creation of various types of quizzes, survey is a questionnaire which gathers feedback from students, and wiki is a web page edited collaboratively. SCORM is a tool for enabling SCORM packages into the content that is packaged content which can be used on any Virtual Learning Environment. For a tutor to configure some basic settings before adding actual content there is a settings button in the administration block on the course page. Here one can select the format of the course, layout, number of weeks or topics and set the maximum upload size amongst others. Enrolment settings are accessed from here as well as availability and language. Roles can be administered giving different people different types of access.

### **Course Management**

There are three different formats for the course – Weekly, Social and Topic. The weekly format organizes the course into weeks, with assignments, discussion boards, tests, etc, all residing in a week-by-week block [7]. The Social format is built around a forum, which is good for announcements and discussions. The Topic format organizes everything by topics, regardless of how long they are. Our courses are in topic format. They are used for e-learning by our students, who use the resources by logging into the college web site and the choosing the link e-learning. The class notes can include lecture slides, documents in any format (PDF, HTML, DOC, etc), videos, audios, animations, graphics, etc in the content. Depending on the format chosen, we can organize the content topic wise or class schedule wise. Content can have different sub titles such as introduction, overview, survey, illustrations, animations, discussions, etc. Content must be prepared to ensure that there is something of interest to the weakest in the class and the brightest. Content should be visual and interactive and not heavily textual. The 'add resource' link on each block provides a range of options for adding content. File upload, hyperlink to web pages elsewhere as well as provision to create own web pages are provided. Course management can be changed by teacher and administrator. They have complete control over all settings for a course, including restricting other teachers.

### **Interaction**

The effectiveness of the e-learning system depends on the level of interaction provided among the students and tutors. In moodle all announcements relating to the course are made through news forum. We can add such discussion forums through the 'add activity' link in each block. Forums are quite versatile interaction and learning devices, when used carefully. We can ensure that comments and participation from students are responded through appreciation, relevant counter comments, constructive suggestions, etc. Being an unfamiliar medium, these little gestures go a long way to make the students feel comfortable. One could also consider giving credit to participation in forums as part of the internal assessment, to further drive up the interest. Moodle has additional communication mechanisms such as chat, mail, etc as well. We can set up the discussion board so that if anyone posts a response to our post, we can get an email. This can be used to remind us to check the system as and when there is something happening, instead of polling the system frequently looking for updates. The teachers can pose questions for discussion, encourage students to ask questions online and respond online. This, not only serves as a repository of interaction that other students can refer and use, it also encourages further interaction among students, clarifying and enhancing the discussion. Posing self test questions on major sections of the course is also useful as a feedback to the students.

### **Quiz**

Quiz module allows the tutor (teacher) to design and set quiz tests. Each question has a category. When we create a new question, it is stored in the selected category and these categories can be "published" to make them accessible from any course on the site. To create a new question, we must select the type of question from the pull-down menu. We have the option of adding, which includes: Multiple choice questions; True/False questions; A short answer question; A numerical question; Matching question; Description question; Random set; Random short answer; These questions are kept in a categorized database, and can be re-used within courses and even between courses. Quiz module includes grading facilities. Quizzes are automatically graded, and can be re-graded if questions are modified. Quizzes can have a limited time window outside of which they are not available. Quiz questions and quiz answers can be shuffled to reduce cheating. Questions allow HTML and images. Questions can be imported from external text files. Quizzes can be attempted multiple times, if desired. Attempts can be cumulative, if desired, and finished over several sessions.

We can make use of the question banking facility to build a repository of questions on the subject. This will be helpful to keep questions updated based on feedback, to vary the questions in the quizzes from year to year, and even in preparing university or class examination papers from time to time.

### **Assignment**

Assessments in any learning scenario plays a number of major roles in giving feedback to the student on where they stand with respect to the subject objectives and with respect to the class as a whole, and to the tutor on how effective the teaching has been. For the online submission of assignments we can use the 'assignment' option in the activity menu in the block for setting up an assignment. In moodle assignments can be specified with a due date and a maximum grade. Students can upload their assignments in any file format to the server where they are date-stamped. The use of a small enough file upload size will prevent large files from being uploaded choking the system. Late assignments are allowed, but the amount of lateness is shown clearly to the tutor. For every particular assignment, the whole class can be assessed (grade and comment) on one page in one form. Tutor's feedback is appended to the assignment page for each student, and notification is mailed out. The tutor can choose to allow resubmission of assignments after grading for doing the regarding. These assignments may be posed as simply feedback devices – not carrying any weightage towards the final score – or as a part of the subject evaluation scheme. In the former, the tutor has more freedom in posing questions and number of such assignments posed, but the response may be lower since students may not see any direct benefit.

### **System Protection**

Any kind of automation brings with it associated dangers. Computer systems are known for virus attacks, spams, hackers, etc. We can make sure that the Moodle server is well protected through usual security provisions in the network. The following points must be considered to increase the protection.

- Minimize the number of users with administrator role to reduce risk to the system.
- Take periodic backup of the courses. Courses can be packaged as a single zip file using the Backup function. These can be restored on any Moodle server.
- Once the admission is over, set the enrolment mode as through the key, and set the key to some difficult to guess string. It will prevent unwanted users getting access to the course.
- Specify upload limits that are reasonable wherever a student is permitted to upload a file.

### **Conclusions**

In this paper we have examined various supports offered by Moodle for E-learning. Moodle is a great tool for tutors because it is a platform to create and save teaching material easily and a collaborative online platform for teachers and students to learn together. Besides creating courses, it is also very useful to join the online communities to keep yourself updated with the world and to know a circle of scholars that will truly encircle the globe. On moodle.org website we can easily find a lot of modules, which are very useful to extend our Moodle site with them. These tools help us to make teaching more effective. Thus the implementation of the information and communication technology in education with e-learning through moodle allows improving effectiveness of the education. E-learning allows better cooperation among the learners, the tutors and the students. The accessibility, usability and student collaborative learning can be improved and higher motivation among the students and the teachers can be achieved with E-learning.

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