Effectiveness of Moodle in Teaching and Learning

Janaki Bojiah*

Professor, Department of English, Velammal College of Engineering and Technology, Madurai, India

* Corresponding author: bj@vcet.ac.in

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Abstract: Education advances every day, and one such advancement is the Learning Management System (LMS) which has been used in various countries worldwide. It gained greater impetus when online education came into the picture in 2020 globally to the entry of COVID-19. However, LMS is still an unexplored topic in some regions of the world. This paper aims to spell out how the inclusion of LMS can provide an easy imparting of education and a very convenient way of transferring knowledge so that the institutes not exposed to such experience could know about this. LMS helps instructors manage all academic activities from anywhere, anytime, as it is online-integrated software designed to support education online or offline. This paper intends to enlist the usefulness of one such LMS called Modular Object-Oriented Dynamic Learning Environment (Moodle), an e-learning platform that facilitates impactful teaching and learning. Instructors and students who have used Moodle are interviewed in a semi-formal way. The descriptive methodology was used to identify the highlights of the responses. The results of this study bring the effectiveness of Moodle into the limelight so that institutions adopt it to enhance the teaching process in effective learning. Hence, it lists the limitations of Moodle where the scope for development exists and intends to recommend to educationists to invest in LMS to contribute toward the holistic development of 21st-century education.

Keywords: learning management system, Moodle, e-learning, student engagement, student participation.
1. Introduction

Ever since the intervention of technology in education, evolution has never stops. It simply started in the form of PowerPoint presentations, audio-visual instructional materials, live streaming and gradually it has been advancing in leaps and bounds [17]. The more the technology is explored, the more it must offer. The more the technology is infused in teaching, the more it commands students’ attention [30] despite its demand for the Internet [24]. As today’s youth are considered as ‘digital natives’ [52], they look for more of e-resources [12 and 15] and enjoy acquiring knowledge from them [34] using a varied range of smart devices [37]. Now-a-days, there are too many digital applications available to enhance the teaching learning process and [46] confirms that these have intensified the motivation level of the students, resulting in commendable teaching experience and enjoyable learning experience. One such application is the Learning Management System popularly known by its abbreviation, LMS.

1.1. LMS: An Overview

A learning management system is a web-based application comprising a server that facilitates the fundamental functioning and a user interface that is accessed by the people to organize and manage a particular knowledge transfer process. An LMS promotes various levels of advanced learning by offering ample online operations [29]. An LMS is a conducive platform for learning to be synchronous or asynchronous in nature [4, 21] where synchronous is teaching and learning happening at the same time [38] and asynchronous is not at the same time [16]. In either mode, it provides an interactive and conducive virtual learning environment for the dissemination of information [10]. An efficient LMS encourages integrated learning atmosphere for academic excellence with arbitrating configurations that establish chatting between individuals, discussions on the forums, professional training, etc. [25]. However, [8] identified that the challenges related to the technicalities of accessing and using the LMS to approach the instructors can affect the student engagement [22] and student performance [9]. Nevertheless, the autonomy of the student to learn at his or her own pace [13] is effectively achieved through LMS access [53]. LMSs are cautious about hackers and so they authenticate the user/users, assure that the login credentials are valid and offer filters at various stages to ensure privacy and safety.

1.2. Differences between Proprietary and Open Sources

Types of LMS entities exist that can equip the instructors to manage the academic process very effectively, but both need the support of the institution’s infrastructure and a logical decision making to accommodate this [32]. This process considers the availability of the resources and the skillsets of the people involved in the institution [55]. The difference between these two entities is the cost that is involved in purchasing a propriety system which gets operated through a code that provides a license or a subscription to access it. The most used propriety systems are Apex Learning, Blackboard, Edline, eSchoolView, Intralearn, PowerSchool, SAP Enterprise Learning, Saba Software SchoolWires, and SchoolPointe [31]. Open-source systems like MOODLE and WordPress can be accessed without any cost as they provide a free license [47]. As there are costs and limitations involved in terms of access to the resources, the educationists recommend the open-source systems and the administrative heads prefer them to establish a conducive online learning environment that offers various digital tools for the learner’s choice [3]. These open-source systems have progressed to accommodate more advanced features only in the web settings to customize their preferences and cater to the same. It offers more functional features for the extended usage and enhanced community source plug-ins. This paper intends to throw light upon such features of Moodle, the open-source learning management system, which is the most preferred among all [35, 43].

1.3. Moodle: An Overview

Moodle is an acronym of Modular Object-Oriented Dynamic Learning Environment that supports the instructors to create a quality curriculum and course materials to impart efficiently [7]. The learners find it easy to access synchronously or asynchronously to achieve a fantastic learning experience [4]. [33] described Moodle as follows, “Moodle is an LMS designed to provide educators, administrators and learners with a single, robust, secure and integrated system to create personalized learning environments.”
Moodle is free software that issued a license under General Public Licence that accommodates the modifications and is customized as per the requirements [54]. It has various standard and innovative features for supporting the teaching and learning process [23]. Moreover, it allows for extending system functionality using community sourced plug-ins. It interacts with many websites like Facebook, Wikipedia, TedTalks, YouTube, etc., to make the learning experience more relaxing and impactful [20]. Additionally, it motivates the learners to do group learning or self-learning [6]; in both cases, active learning indeed [1]. It is based on a template that facilitates user friendly navigation [51] so that even people with less technical knowledge can derive benefits from it [57]. It appears in a flat view with small blocks on it; each block refers to the various items associated with a course. These are available 24x7 to all the permitted participants with the standard format specified for them [36].

2. Methodology
Moodle was introduced at Gulf University, Bahrain, in the academic year 2020-2021. With limited training and knowledge, both instructors and students attempted to explore its features to strike a convincing level of knowledge transfer and knowledge acquisition. When a team of 10 faculty members and a class of 30 students were interviewed in a semi-formal manner with a series of open-ended questions, the effectiveness of Moodle and its noteworthy features as well as the compromising tools were brought forth. Descriptive methodology was adopted for the analysis of responses as it is a qualitative study.

2.1. Synchronous and Asynchronous Digital Tools
Too many smart tools are available to enhance the virtual learning environment [39]. Texting the instructor or the peers instantaneously to ask for more information or clarify doubts is proved to command candid responses. However, this takes more time compared to audio or video conferencing as they provide more of a real-time communication. The tone, mood, and intent of the communication are also more explicit in such conferencing. Whiteboard provides a platform to write and explain, as well as share MS Word, MS PowerPoint, MS Excel etc., for a more interesting and engaging lecture [49]. Web conferencing enables collaborative discussions and facilitates group communication effectively [14]. Though these types of conferencing demand commendable and consistent bandwidth, the usefulness of it outlives the cost involved toward the Internet [28 and 48].

Email messages help in the transfer of materials, e-books, web blogs, discussion forums, website links, databases, streaming video, streaming audio, narrated slide show, online bulletin boards etc. that are not so dynamic continue to be interactive asynchronously and have been identified to be the significant asynchronous digital tools that facilitate fruitful learning experiences according to [14]. The students access these in their own convenient time at a comfortable pace and do not guarantee responses spontaneously.

2.2. Administration
Moodle manages the student profile for each student. This comprises the student name, institutional ID, email address, parents’ details, guardian’s details in case of parents not being available, contact numbers, addresses, ailments of the student, if any - which help the instructors know the students well with respect to their background. In the same way, it is used to maintain faculty profiles as well. The head of the department can monitor the progress of all academic activities of an instructor sitting in his or her office within seconds on Moodle.

When an instructor is assigned a course for a class, Moodle helps him or her in managing the addition of the student list onto the class icon labelled with course code and course name. This helps manage attendance and decide who is a defaulter who should be warned about the lack of attendance. This helps in arranging for academic advising or counselling to determine the reasons for absence and unwillingness for engagement [11]. When a student absents himself or herself in one particular course class immensely, the class in-charge can discover the reasons behind it and take the issue further to the respective subject instructor or to the academic head. A series of warnings can also be issued using Moodle, which will remain an official record on both sides for quality assurance purposes.

2.3. Teaching and Learning
The inclusion of program intended learning outcomes (PILOs) and course intended learning outcomes (CILOs) helps monitor whether the activities and instructional materials are planned for the CILOs. At the end of the course, the attainment of the same can be acquired from Moodle to determine the areas of excellence and areas of scope for improvement to take the necessary measures. This helps in identifying the need for redesigning the curriculum or reframing the intended learning outcomes to improve better student performance. If more students do not reach a certain CILO, then either the level of difficulty of the outcome should be reduced or more intensive instructional materials should be developed [2, 5]. This contributes toward the annual review and periodic review with respect to the syllabus design.

Synchronous teaching and learning platforms like Google Meet, MS Teams, Zoom, etc., can be linked [27] to Moodle to keep track of class log [19]. A copy of every lecture could be placed on the course page labelled as per the date/topic for referring later and recurrently. This gives a series of lecture links to help
students follow the progression of the course when they absent themselves from the classes or to revise the portion to verify the acquired knowledge. These lecture links continue to be the tutorials for the slow learners to learn at their own pace [56].

The instructional materials like MS Word files, MS Excel files, MS PowerPoint, URL links, audio files, video files, Google forms, Google sheets etc., can be posted on the course page of the Moodle [26]. They are easily accessible to students and at their own convenient time. Nevertheless, the instructor can open a resource from the course page and impart the lecture. This helps in the enrichment of the teaching learning process in terms of the availability of a varied range of study resources, especially videos [42].

2.4. Assessments

Assessments play a pivotal role in any educational institute, be it conducted online or offline. Moodle continues to be efficient in conducting assessments also.

2.4.1. Quiz

Moodle offers MCQs, short answer, fill in the blanks, true or false etc., types of templates to conduct the quiz by limiting the number of submission attempts and specifying the start and end timings. Moodle itself instantly evaluates the objective answers and communicates the feedback for the respective marks to the students instantly or later, as decided by the instructor. However, it provides the flexibility to change any of these later if deemed fit by the instructor. Moodle also accommodates the infusion of Google forms for this purpose.

2.4.2. Assignments

Moodle provides ample opportunities to make assignments completely original and error free. Assignments are given to the students with the deadline and the specified number of attempts. Whatever the student submits Moodle checks for its similarity index and generates a report giving the details of the percentage of plagiarism and the sources that are copied from. This supports the instructors in evaluating the students’ writing or compiling skills and motivates the students to write originally.

2.4.3. Listening and Speaking Assessments

Moodle facilitates listening exercises that can be accessed and listened to by the students individually. They can replay the listening exercise ample number of times till they become convinced of having acquired the context [45]. Then, it is easy to record your answers and send them through Moodle, as it can accommodate such files in huge numbers without much effort. This helps the students submit the audio files on time as the submission time can be identified and keeps the student hassle free with respect to the clarity of the audio file.

3. Results and Discussion

Moodle facilitates online education in terms of ease and flexibility and that is why it is preferred in many countries in Asia [35]. Moreover, Moodle is a free open source that can create content, which makes it all the more likable [43]. An instructor can organize the academic activities like lesson plans, teaching aids, course materials, attendance, assessments, academic advising, academic events, social interaction, group activities, instant chatting, etc., in one platform [43]. Additionally, it enables the instructors to merge MOOCs into their pedagogies to engage the students informally in learning activities in the formal situations [7]. [50] suggests that one should plan the academic initiatives keeping in mind the expected performance, expected amount of efforts, and social factors that may mould the fabric of the academic procedures, and the available amenities. Moodle facilitates the best when promoting outcome-based education and tracking the course intended learning outcomes against program intended learning outcomes. These results indicate that Moodle brings in a better teaching and learning experience when devised and used in an appropriate manner.

3.1. Implications of the Study

Moodle can be recommended for a few reasons namely:
- To make the instructor’s role easy and effective;
- To make the student’s learning experience more comfortable;
- To enhance the teaching and learning processes to a greater extent.

The instructors can create and modify instructional content on Moodle, post the list of study materials and assessments for reference, help the students in clarifying doubts, engage them in discussions, provide constructive and timely feedback to show progress, track of student’s progress then and there, identify the weak students and arrange remedial classes accordingly, maintain the attendance record of students and so on. The students can access the instructional materials and learn the content at their own pace. They can connect with the instructors and peers for any academic activity round the clock. By these, Moodle facilitates a smooth and effective knowledge transfer hassle-free.

4. Conclusion

In a nutshell, Moodle is user-friendly, expandable, and dependable. The course content can be created, revised, recorded, and reused without much effort. Students who miss classes for defined and undefined reasons can still get a chance to follow the progress of the module/course. It generates a question bank and helps instructors to duplicate the set of materials for a
course when the same is repeated the next time. Moodle is flexible enough to accommodate the user demands and is proven to add value to the effectiveness of teaching and learning.

Moodle provides motivation to the students as they can study by accessing the course materials round the clock. Hence, it can be concluded that the Moodle provides perceived satisfaction, e-collaborative learning, and better academic results. The students proclaimed that Moodle as an online learning platform facilitates the various aspects of academics and enhances effective teaching and learning both in the synchronous and asynchronous modes. Furthermore, it commands better student engagement and promotes a positive learning attitude. Based on the results of this study, Moodle can help students engage in active learning, self-learning, and assure independent learning. Additionally, it is proved to result in the enhancement of improved study skills, integrated content development, collaborative learning, self-regulation, and social interaction.

5. Limitations and Future Research

Moodle can quantitatively track the access time of students [18]. Students tend to be obsessed with being tracked and so they may feel some discomfort and insecurity abiding this. Instead of placing a safe and conducive environment, it is threatened with the fear of failure and mismanagement of time. This may result in slowing down the progress of learning rather than promoting it [5].

Additionally, Moodle is not efficient enough to measure the real-time learning duration of a student be it qualitatively or quantitatively.

Though there are readymade templates available for generating the course content online, they have proved inefficient in catering to the needs of the subjects like Mathematics, Science, Engineering Drawing etc., as they demand practical exposure and demonstrative lectures [41]. Therefore, the training of the people in accessing Moodle becomes mandatory for the complete exploration of the features and plug-ins of Moodle.

As technology continues to evolve, the users always look for advanced features. Hence, it is never considered enough.

Owing to the lack of formal training as to how to use Moodle and due to lack of time, most of the competent features of Moodle are unexplored [44].

Online proctoring should be improved to command real-time integrity with respect to the conduct of examinations.

The lockdown browser attempts to stop the users from opening other tabs or windows but does not have the control of their other movements, such as referring to a book or looking at someone who is prompting. Plus, it corrupts the device in some cases.

Assignments are subjected to similarity check but who writes the assignment continues to be in need of authenticity and evidence.

Moodle does not keep the record of submission and removal of submission by the students before the instructor evaluates it. Though it maintains a deadline for submission, the number of attempts of the draft should also be calculated in terms of task accomplishments, which may be reflected in the academic performance to a greater extent.

Moodle can be compared with other learning management systems for further development of its functionalities. More workshop materials as to how to explore advanced tools of Moodle should be made available to make this LMS the most preferred. In this regard, more research on the technical and cost effectiveness part of it could be initiated. Intense research on specific tools of Moodle could bring into limelight the significance of the same. The scope to embed interactive tools like EDPuzzle into Moodle should be analyzed as this will bring a more vivid learning experience. Research initiatives should be generated to bring in online proctoring effectively using browsers in Moodle. Peer assessment of Moodle requires intense examination in the future.

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