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Best Practice of Moodle Implementation for E-Learning: A Perspective of Public University Lecturers

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Abstract

Moodle is a popular open-source learning management system (LMS) used for online learning and course management. It provides educators with tools to create online courses, manage learning content, track student progress, conduct assessments, and facilitate communication and collaboration among students and instructors. Moodle is widely used in educational institutions, corporate training settings, and various other learning environments around the world. The aim of this article was to study the best practices for implementing Moodle in e-learning, as perceived by public university lecturers. This study employed a qualitative approach, utilizing Focus Group Discussions (FGDs) among lecturers from public universities. All data were meticulously transcribed and subsequently analyzed thematically. The results show, experts agreed that three best practices were i) Optimizing the task of e-learning manager, ii) Utilize the restriction option to uphold student integrity and, iii) Implementing regular data backups. Therefore, this study enriches the field by providing practical recommendations for implementing Moodle, drawing from the insights of public university lecturers.

Keywords: *Moodle, E-Learning, Public University, Best Practice.*

Introduction

The education landscape is encountering fresh challenges and demands owing to the rapid and intricate shifts transpiring globally (Sharifuddin, 2024). Adaptations and enhancements to the current online learning framework have become imperative to match the evolving trends. E-learning has gained escalating significance within higher education and learning communities, constituting a fundamental element in numerous courses (alRikabi et al. 2022). Particularly amidst the profound technological advancements, catalyzed by the COVID-19 pandemic, the acceleration and integration of online learning have been substantial. This global health crisis not only impacted societies worldwide but also reshaped education paradigms, transcending the constraints of traditional time and location boundaries (Rapanta et al. 2020). One of the strategies is the utilization of Moodle, an open-source e-learning platform, to craft a robust educational environment conducive to both students and educators (Kononets et al. 2020). By furnishing an array of services that streamline teaching processes and administrative tasks, Moodle enhances overall educational efficacy. Furthermore, the examination of its influence on digital skills, paramount in the contemporary digital landscape, is a central focus (Abdul Musid, 2024).

Moodle (modular object-oriented dynamic learning environment) is a free e-learning software platform designed to let instructors create online courses that encourage interaction and collaborative production of learning content. It offers various possibilities for the 'teacher' to transition from 'the source of knowledge' to a facilitator and role model in the process of gaining knowledge and skills (Bojiah, 2022). The Moodle e-learning platform (MEP) includes various elements that make it useful in education and training. In reality, e-learning allows for the removal of time and location constraints that are common in conventional education throughout the world, as access to a course is now attainable with a simple Internet connection. In addition, e-learning allows for improved monitoring of students' learning progress. This is beneficial for

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both students and teachers since it provides a simple tool to assess students' learning levels. One of the most major benefits of Moodle is its ability to democratise education. Moodle makes high-quality educational materials available to a worldwide audience by offering access to Massive Open Online Courses (MOOCs) and open-access resources, removing obstacles to education for people living in distant areas or with little financial means (Bárcena, 2021). This accessibility is consistent with the wider educational aims of inclusion and fairness, improving schools' reputations as forward-thinking communities dedicated to offering equitable learning experiences.

In the higher education environment, the introduction of Moodle as an innovative e-learning platform has been a game changer, solving various difficulties inherent in traditional educational models while also revolutionising the educational experience for students and universities. Prior to Moodle's broad acceptance, institutions faced considerable challenges, including a lack of a flexible learning environment, difficulty adapting different learning styles, and the absence of an integrated platform for communication and course management. These constraints hampered education's accessibility, inclusiveness, and efficacy, particularly in subjects that require current materials and adaptation, such as computer science. Recent research by Nepal et al. (2021) underscores the importance of differentiated instruction in catering to individual student needs. They emphasize the role of teachers in adjusting content, process, and product to accommodate diverse learners' readiness, interests, and learning profiles (Nepal, 2021). Advancements in adaptive learning technologies have reshaped curricular personalization, as evidenced by recent research. According to Picciano (2017), adaptive learning is a data-driven approach that tailors instruction based on learners' responses and performance. The efficacy of adaptive learning platforms in improving learning outcomes and engagement across diverse educational settings (Picciano, 2017). More broadly, most of the literature propose a model to assist teachers in developing interactive courseware without being experts in multimedia programming or Web technologies, resulting in the adaptive presentation of multimedia elements to students via streaming while taking into account their specific needs (Yu, 2021). Hence, the advancements in technology in recent years have introduced Moodle as a widely recommended platform for adoption in universities worldwide.

Moodle's entry into the educational realm provided a comprehensive answer to these difficulties. Its user-friendly design, customisable features, and broad tool set have made it a cornerstone of online learning in a variety of fields, extending its usefulness beyond computer science to serve as the official platform for whole institutions. The platform's capacity to combine multimedia content—from texts and photos to videos and animations—enhances the learning environment by catering to diverse learning styles and increasing student engagement (Matias, 2022). Furthermore, Moodle's interactive capabilities, like as forums, wikis, and real-time chats, encourage student participation and communication, resulting in an inclusive and engaging learning environment, which is critical for increasing student retention. E-learning involves two types of activities: communication activities (e-mail, forums, conferences, online blogs, etc.) and exploration activities (mostly content navigation). These activities often take place on a Learning Management System (LMS). A learning management system (LMS) is a platform for administering, recording, and distributing e-learning content, providing registered students with access to a wide range of courses with highly customisable features (Vargas-Murillo, 2023).

From an administrative and lecturers standpoint, Moodle provides powerful capabilities for course management, student monitoring, and performance reporting, allowing institutions to successfully measure progress towards their Key Performance Indicators (Kononets et al. 2020). The platform's analytics features give significant insights into student engagement, performance patterns, and areas for development, which aids in continuous improvement initiatives and certification procedures. Moodle automates administrative procedures, allowing faculty members to focus more on teaching and student support, improving overall educational quality. To summarise, the incorporation of Moodle into higher education has solved the major issues of traditional educational paradigms by providing a flexible, inclusive, and effective learning environment. However, some issues have been raised by lecturers in Malaysia regarding the management of Moodle as the primary e-learning platform. The education landscape is encountering fresh challenges and demands. These issues include the readiness among lecturers of various age groups for managing e-learning, ensuring a secure environment for both students and lecturers, and addressing concerns about

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potential data loss during Moodle software updates in public universities. The aim of this paper is to discuss the best practices of Moodle implementation from the perspectives of lecturers in public universities. This study hopes to provide valuable insights into problem-solving for Moodle users, particularly lecturers engaged in its implementation.

Methodology

The focus group discussion (FGD) was conducted in January 2024 in Malaysia's public university involved 5 participants of lecturers practicing e-learning and adoption Moodle as main pedagogical tools in teaching and learning. According to Eeuwijk and Angehrn (2017), a small group consisting of only 3 to 5 participants is referred to as a 'mini-group' within the context of FGD. They were selected based on purposive sampling and position criteria as e-learning lecturer to ensure the enrichment of the data. Participants' anonymity was maintained through coding as shown in Table 1. Prior to FGD, all participants were conducted through email or phone to inform the aim of the study. Consent was obtained from all participants before FGDs, which were held at Universiti Malaysia Kelantan. Open-ended questions were used during the 3-to-4-hour session and the discussion was recorded. The researchers enhanced their comprehension of the data through manual transcription of the recordings (Nyumba et al. 2018). Thematic analysis was then employed to scrutinize the transcribed data, capturing the participants' viewpoints, emotions, experiences, and apprehensions. At last, this method was adopted to ensure the alignment and coherence of the information gathered from both the literature review and the findings of the discussions (Barratt et al. 2015).

Table 1 The Participant of the FGD

Participant Code	Role	Position
P1	Lecturer	Innovation Teaching and Learning Unit
P2	Lecturer	Vice Director of Innovation Teaching and Learning and Academic Leadership
P3	Lecturer	Academic Leadership
P4	Lecturer	Director of Center of Excellence and Academic Development
P5	Lecturer	Director of e-Learning

Result

Overall, all the experts in the FGD expressed their support and agreement regarding the significance of adopting Moodle and e-learning as pedagogical tools in teaching and learning (Abdul, 2024). During the initial discussions, experts shared their challenges in managing Moodle. These include, firstly, addressing readiness among lecturers of different age groups for managing e-learning in public universities. Secondly, ensuring the system provides a secure environment for both students and lecturers to engage in the teaching and learning process, as there is a risk of irresponsible actions such as hacking, cheating, and system manipulation if Moodle adoption is not carefully controlled. Lastly, concerns were raised about the updating of Moodle software, which may result in the loss of important data. Based on these three primary challenges, experts have recommended the following best practices for adopting Moodle; i) Optimizing the tasks of e-learning managers, ii) Utilize the restriction option to uphold student integrity and iii) Implementing regular data backups.

Optimizing the Task of e-Learning Manager

The role of the Moodle manager in a public university is crucial, as they oversee the management of the lecturer's Moodle sites, which encompass various subjects offered by the faculty. The e-learning manager, who is often also a lecturer, may face a significant workload, especially at the beginning of a new semester

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(Farah, 2024). This is because all teaching materials in Moodle for each subject and lecturer need to be transferred (export) from the previous semester to the current semester. The varying age groups among lecturers contribute significantly to the substantial responsibility of the e-learning manager. This is because some lecturers may lack interest in exploring and adapting to e-learning methods, preferring instead to rely on conventional teaching approaches. To optimize the e-learning manager's role, P1 has suggested convening all lecturers teaching the same subject and grouping them together in a set. Then, a template for teaching materials can be prepared as a master key, allowing lecturers to independently import all necessary materials.

'I believe that the role of a Moodle manager is challenging. Previously, managers were required to transfer or export all teaching materials for every subject and lecturer within their faculty, which was a significant responsibility and could become burdensome. Therefore, to optimize the manager's tasks, they can gather lecturers teaching the same subjects together and request them to handle the export of teaching materials themselves.

(P1).Panel of P4 added,

'I agree with the suggestion. If they encounter any issues, the manager could potentially arrange a brief online meeting to demonstrate how to transfer the teaching materials, using one or two examples.'

(P4).

In addition, all the experts agreed with the suggestions point out by P1 and P4.

Utilize the Restriction Option to uphold Student Integrity

Based on previous incidents, numerous students have shown a tendency to manipulate the Moodle system. For instance, some students were marked as attending online classes despite not completing them. In other instances, students repeatedly paused quiz timers, allowing them to answer quiz questions quickly and accurately upon resuming. These occurrences likely stem from manipulation or cheating, as students seek to achieve high grades with minimal effort. Below are the experts' opinions;

'I would like to suggest that lecturers implement restrictions option on their Moodle platforms. For instance, if a quiz is based on a recorded class, students should be prevented from accessing the quiz unless they have completed the recorded class. Attendance could then be granted only after all tasks have been completed. Thus, students would need to adhere to and fulfill each step within the designated timeframe to receive attendance credit.'

(P2).

A panel agreed and added,

'I strongly agree. Moodle is a good platform but without restriction it may affect students and the education integrity'

(P3).

These opinions received a positive response from all experts.

Implementing Regular Data Backups

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Since Moodle is software-based, the system will be updated to the latest version. This may result in some data going missing and potentially causing significant problems for users. Panel P1 suggested implementing regular data backups to address this issue.

'I believe that implementing regular data backups would be beneficial in preventing unexpected data loss.'

(P1).

A panel suggested,

'I agree. Perhaps we can decide the schedule to do data backups and remind all lecturers to do so.'

(P5).

All experts agreed with these suggestions. Ultimately, all experts agreed the best practices for Moodle's e-learning in public universities are i) Optimizing the task of the e-learning manager, ii) Utilizing the restriction option to uphold student integrity, iii) Implementing regular data backups.

Discussions

Enhancing the Moodle e-learning platform in a public university context is a complex task that calls for creative and cooperative solutions, particularly when it comes to organising and updating course materials between semesters. The work of an e-learning manager who is been appointed among lecturers, often juggling lecture and research obligations, is the root cause of these issues (Al-Hunaiyyan et al. 2020). E-learning managers, historically tasked with exporting or transferring all course materials for each lecturer and subject in their faculty, have seen notable workload peaks, especially during the start of new semesters. This approach is not only a huge burden but also time-consuming when it is considering the different needs and levels of technological skill across faculty members.

The first best practice suggested method for reducing the workload of the e-learning manager by encouraging a cooperative environment among lecturer of the same disciplines to export their learning and teaching material themselves in Moodle. This represents a significant change in the direction of more long-term and efficient e-learning system administration. This strategy, which revolves around giving lecturers the freedom to actively prepare and oversee their course materials, not only lightens the load on the e-learning manager but also instils in the instructors a sense of accountability and ownership. Assuring uniformity and quality of learning experiences across different sections of the same subject, the programme promotes a unified approach to course content by bringing lecturers together and giving them access to a standardised template or "master key" for teaching materials (Zabolotniaia et al. 2020).

This collaborative strategy also takes into account lecturer's differing interests in and skill levels with e-learning technology. One major obstacle is the unwillingness of some faculty members to use and adjust to e-learning platforms. One of the reasons is the age group of some lecturers. Their age or familiarity with traditional teaching methods can occasionally trigger this resistance. But by giving lecturer direct control over their Moodle sites, the approach fosters a culture of ongoing learning and flexibility in addition to facilitating experiential learning (Mpungose, 2020). Support tools like user-friendly manuals, individualised help, and training sessions can help smooth the shift even further and turn technology into an enabler rather than a hindrance. Furthermore, the use of a master template to standardise instructional materials not only makes updating and maintenance easier, but it also guarantees students a fair and cohesive learning environment. Regardless of the lecturers, having the same course material improves the learning process and gives all students an equal chance at success. This method also makes it easier to modify course materials to fit changing curriculum requirements or to use fresh pedagogical strategies, guaranteeing that the information is up-to-date and applicable (Athaya et al. 2021).

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In the digital age, the emergence of e-learning technologies has been a cornerstone of educational innovation, providing greater flexibility and access to knowledge. However, this evolution presents problems for the educational experience's integrity and fairness. One such problem, particularly in public colleges that use Moodle, a popular learning management system (LMS), is ensuring the integrity of student participation and assessment. Students exploiting system vulnerabilities to pretend attendance or manipulate quiz timings highlight a critical issue: the need for a more secure and equitable e-learning environment (Levy et al. 2013). This problem have been debated and critic as a huge issue that need to be solved in implementing e-learning in education system.

Thus, the second-best practice's recommendation is to include limitation choices in the Moodle platform addresses this issue directly, offering an approach that combines system functionality with academic integrity. This strategy ensures students fully engage with the topic before assessment by focusing on conditional access to quizzes based on the completion of necessary activities like recorded classes. Implementing conditional access serves several purposes. First, it imposes a sequential learning process in which students must completely engage with learning materials before performing exams. This not only assures a more equitable assessment procedure, but it also improves learning results by fostering deep engagement with the course content (Khan et al. 2021). Furthermore, this approach is consistent with pedagogical best practices, emphasising the value of structured learning routes in meeting educational objectives.

Using Moodle's ability to restrict access depending on task completion, educators can build a more controlled and integrity-focused learning environment. Lecturer can expand this feature to measure engagement with learning materials, like tracking the completion of video lectures before granting access to future quizzes. Such methods immediately combat attempts to circumvent the learning process, encouraging an environment of honesty and diligence. In addition to conditional access, improving Moodle with real-time monitoring tools could help to improve academic integrity. This could entail using analytics technologies to provide educators with insights into student engagement patterns and finding abnormalities that may suggest dishonest behaviour. When combined with timely feedback mechanisms, this will not only prohibit wrongdoing but also help students who are truly struggling, allowing for preventive and supportive actions.

While these modifications promise to dramatically improve the integrity of Moodle-based exams, and also raise technical and ethical concerns (Vaganova et al. 2017). Ensuring privacy and data security is critical, as is giving clear standards for the use of monitoring tools. Furthermore, lecturer must carefully implement these solutions to prevent compounding accessibility concerns, ensuring that all students, regardless of technical or physical limitations, can interact with the learning content on an equal basis. Restrictions settings in Moodle can be integrated into an e-learning environment to meet academic integrity concerns and greatly reduce burdens for educators and e-learning management (Azemi, 2024). Moodle effectively minimises the manual labour required to check attendance and evaluate student participation by automating the process of monitoring student engagement and compliance with course requirements. Because of this automation, the administration process may be more efficiently managed, giving teachers more time to devote to developing curricula and providing individualised student support (Araya, 2022).

Regular data backups in a Moodle context strengthen the system's resilience against data loss from software updates, system outages, and other unexpected events. Regular data backups protect educational content, student records, and course interactions, allowing for quick restoration (Caputi & Garrido, 2015). A stable and successful learning environment requires data integrity and reliability. Critical data is backed up frequently to protect student progress and interactions. In environments that closely monitor assessments and academic integrity, this is crucial. Fair and equitable student assessments require consistent and trustworthy data. Regular data backups also ensure operational continuity. Current backups allow Moodle to be restored promptly in the case of a system failure or data corruption, minimizing Downtime, and disruption to educational activity. Maintaining academic programmers' rhythm and ensuring learning without pauses requires continuity. Version control is another benefit of backups. Moodle updates, while required for security and functionality, might cause bugs or compatibility difficulties. If software changes interrupt learning, managers can revert to stable versions with a strong backup mechanism.

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Many educational institutions must comply with data retention and privacy laws. By protecting historical data for audits and compliance checks, regular backups assist assure compliance with these standards. This protects the school legally and emphasizes its commitment to safe and private learning. Several solutions are needed to execute Moodle data backups regularly. An automated backup schedule—daily, weekly, or bi-weekly—ensures consistent backups without manual control. Regularity is essential for collecting platform changes and additions. Backup data must be stored securely and remotely. Cloud storage offers scalability, security, and accessibility. Backup data must be encrypted during transit and storage to protect sensitive data (Suguna & Suhasini 2014). Another important technique is backup file integrity testing. Testing guarantees that backup files are not corrupted, and that data can be restored from them. This frequent verification is crucial to backup system reliability. Finally, a clear backup policy must be created and documented. It should describe roles and responsibilities, backup schedules, data retention policies, and data restoration methods. Clear documentation improves backup consistency and ensures stakeholders understand backup methods. Educational institutions can improve Moodle platforms' resilience and reliability by incorporating these measures to secure data needed for academic integrity and operational excellence. Data backups safeguard instructional content and provide a reliable e-learning environment.

Conclusion

The significant of this study lies in its exploration of the perspectives of public university lecturers on the best practices for implementing Moodle in e-learning. While Moodle's functionalities and widespread use are well-documented, there is limited research specifically focusing on the experiences and insights of lecturers in public universities regarding its implementation. By employing a qualitative approach through Focus Group Discussions (FGDs), this study delves deeper into the nuanced perspectives of these educators, shedding light on effective strategies and recommendations for Moodle integration within higher education contexts. Furthermore, the identification of three key best practices—optimizing the role of e-learning managers, utilizing restriction options to maintain student integrity, and implementing regular data backups—provides actionable insights for educators and administrators aiming to enhance their e-learning initiatives. Overall, this study contributes valuable knowledge to the field by addressing a gap in research and offering practical recommendations for Moodle implementation based on the perspectives of public university lecturers.

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