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Challenges and Limitations of Moodle LMS in Handling Large-Scale Projects: West-African Universities Lecturers' Perspective

Damola Olugbade[1*], **Olayinka Anthony Ojo**[2], **Adebayo Emmanuel Tolorunleke**[3]

[1]First Technical University, Nigeria
[2]University of Medical Sciences, Nigeria
[3]Prince Abubakar Audu University, Nigeria

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*Correspondence
Damola Olugbade
damola.olugbade@tech-u.edu.ng

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Abstract—This study investigates the perceptions of lecturers from 11 West African universities about the effectiveness of the Moodle Learning Management System (LMS) in managing large-scale projects. Employing a cross-sectional survey design, data was collected through an online questionnaire encompassing demographic information and evaluations of Moodle LMS. A convenience sampling approach yielded responses from 51 lecturers, and data analysis involved descriptive statistics, t-tests, and ANOVA. The findings indicate that lecturers generally view Moodle LMS positively, citing its user-friendly interface and capacity for fostering collaboration and student engagement. However, areas for enhancement, particularly resource adequacy, were identified. Gender-based disparities were observed, with male lecturers exhibiting a more positive perception of Moodle's capabilities. Satisfaction levels varied across features, with communication tools, assignment management, and gradebook/assessment tools receiving higher ratings. Overall, lecturers expressed high satisfaction levels, a willingness to recommend Moodle LMS to peers, and contentment with available technical support and training opportunities. Notably, no significant variations in perception emerged among lecturers from different universities using Moodle LMS. These findings offer valuable insights for optimizing the use of Moodle LMS in managing large-scale projects within West African universities, affirming its consistent impact across diverse institutional settings.

Keywords: moodle learning management system, large-scale projects, lecturers' perception, challenges and limitations, West African universities

1. INTRODUCTION

1.1 Background

Moodle is a Learning Management System (LMS) that has transformed the way educational institutions provide online courses and manage learning processes (Kasim & Khalid, 2016; Ghosh et al., 2019). Moodle, with its diverse set of features and functions, has grown in popularity at institutions throughout the world, including those in West Africa (Al-Ajlan & Zedan, 2008; Kumar et al., 2011; Gogan et al., 2015; Krana & Pesek, 2020). While Moodle has many advantages, educators and administrators are concerned about its capacity to handle large-scale projects (Paschalis, 2017). Understanding the problems and constraints that Moodle LMS faces in this setting is critical for increasing its efficacy and fixing any flaws.

In this study, we intend to investigate lecturers' perception of Moodle LMS in West African universities, specifically in relation to its capabilities and limitations when dealing with large-scale projects. By capturing the firsthand experiences and insights of lecturers who utilize Moodle in their teaching practices, we can gain valuable insights into the effectiveness of this learning management system in creating conducive learning

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environments, facilitating pre- and post-testing, ensuring data security, supporting collaboration, and improving teaching practices.

To accomplish this goal, we gathered information from 51 instructors from 11 West African universities. The respondents were chosen to reflect a wide range of academic backgrounds and experiences, enabling a thorough and representative examination. Using a scale of 0-5, the respondents evaluated various statements related to Moodle's functionality, assigning values based on their perception of its efficacy in specific areas.

The findings of this study have implications for educational institutions seeking to optimize their use of Moodle LMS for large-scale projects. Institutions may make educated judgments and execute initiatives to improve Moodle's usefulness and scalability by analyzing lecturers' perceptions and the issues they face. Furthermore, this research provides insights into the broader context of e-learning and the utilization of LMS platforms in the West African educational landscape.

In the subsequent sections of this paper, we presented a detailed analysis of the lecturers' perceptions regarding various aspects of Moodle LMS. The conclusions drawn from this analysis will inform recommendations for improving Moodle LMS in handling large-scale projects and future research directions in this domain.

1.2 Research Aims and Objectives

The primary aim of this study is to investigate the challenges and limitations faced by the Moodle Learning Management System (LMS) in handling large-scale projects in West African universities. To achieve this aim, the following three objectives have been formulated:

1. To assess the lecturers' perception of Moodle LMS in creating learning environments and designing activities for students in large-scale projects.
2. To determine whether there is a significant difference in the perception of male and female lecturers regarding the effectiveness of Moodle Learning Management System (LMS) in handling large-scale projects in West African universities.
3. To evaluate the lecturers' perception of Moodle LMS in terms of its capabilities for assessment, feedback, and collaboration in large-scale projects.
4. To explore the lecturers' perception of the usability and scalability of Moodle LMS in handling big projects and supporting multimedia formats in large-scale projects.
5. To examine whether there is a significant difference in the perception of lecturers from different universities regarding the effectiveness of Moodle Learning Management System (LMS) in managing large-scale projects in West African universities.

1.3 Research Question

The following are the research questions guiding this study:

1. What are the challenges and limitations faced by the Moodle Learning Management System (LMS) in handling large-scale projects in West African universities?
2. Does the perception of lecturers differ significantly based on gender regarding the effectiveness of Moodle Learning Management System (LMS) in managing large-scale projects in West African universities?
3. How do lecturers perceive the capabilities of Moodle LMS in creating learning environments, designing activities, and facilitating assessment, feedback, and collaboration in large-scale projects?

4. How do lecturers perceive the usability, scalability, and support for multimedia formats of Moodle LMS in handling big projects in the context of West African universities?
5. Is there a significant difference in the perception of lecturers from various universities regarding the effectiveness of Moodle Learning Management System (LMS) in managing large-scale projects in West African universities?

1.4 Significance of the Study

This research holds significant importance for various stakeholders in the field of education, particularly in West African universities. The findings of this study will provide valuable insights into the challenges and limitations faced by the Moodle Learning Management System (LMS) in handling large-scale projects.

Firstly, the study will benefit university administrators and policymakers by shedding light on the practical issues encountered when implementing Moodle for managing and delivering online courses on a larger scale. The findings will help them understand the specific challenges faced by lecturers and provide a basis for improving institutional strategies and support systems for the effective utilization of Moodle in large-scale educational projects.

Secondly, lecturers and instructors will benefit from the study's findings and recommendations as they will gain a deeper understanding of the capabilities of Moodle LMS in creating learning experiences, and learning environments, facilitating assessment, feedback, and collaboration, and supporting multimedia formats. This knowledge will enable them to make informed decisions regarding the use of Moodle in their teaching practices and adapt their instructional strategies accordingly.

Moreover, the study will contribute to the existing body of knowledge on Learning Management Systems by focusing specifically on Moodle and its applicability in the West African context. By exploring the lecturers' perceptions, the research will provide a unique perspective on the usability, scalability, and functionality of Moodle in the context of large-scale projects. These insights will serve as a valuable reference for future research and development of educational technologies tailored to the needs of West African universities.

Furthermore, students stand to benefit from this study as well. By addressing the challenges and limitations of Moodle LMS in large-scale projects, the research will contribute to enhancing the learning experience and outcomes for students. It will provide insights into designing effective online learning environments and leveraging Moodle's features for improved engagement, assessment, and collaboration, thereby supporting student success in higher education.

In conclusion, the significance of this study lies in its potential to inform decision-making, improve instructional practices, and enhance the educational experience in West African universities. The findings will guide the development of strategies, policies, and interventions aimed at maximizing the benefits of Moodle LMS and addressing its limitations, ultimately contributing to the advancement of online learning in the region.

2. LITERATURE REVIEW

2.1 Introduction

This section presents a review of relevant literature on the use of the Moodle Learning Management System (LMS) in educational settings, with a specific research focus on its challenges and limitations in handling large-scale projects. The literature

review aims to provide a comprehensive understanding of the current state of knowledge in this area and identify gaps that the present study seeks to address.

2.2 Adoption and Usage of Moodle LMS

Several studies have highlighted the widespread adoption of Moodle LMS in educational institutions worldwide (Zabolotniaia et al., 2020; Reid, & Reid, 2019; Al-Azawei, 2019). Moodle has gained popularity among colleges and educators because to its open-source nature, low cost, and flexibility. However, there has been little research into the use of Moodle in the context of large-scale projects, where distinct obstacles may develop.

2.3 Challenges in Handling Large-Scale Projects

Managing large-scale projects in Moodle poses a number of problems that must be overcome. The design and management of learning environments to support a high number of students is a significant problem. To promote optimal engagement and learning results, courses, modules, and activities must be effectively structured. Furthermore, scalability becomes critical when a large number of users access the system at the same time (Mihai et al., 2023). Server performance, response time, and data management issues may occur, affecting the user experience.

2.4 Assessment and Feedback in Moodle

Assessment is a fundamental component of the learning process, and Moodle offers various assessment tools and capabilities (Morze et al., 2021). However, the effective utilization of these tools in large-scale projects is an area that warrants further exploration. Research has shown that timely feedback plays a critical role in student engagement and learning outcomes (Lu, 2020; Teng, & Wang, 2021). Understanding how Moodle supports assessment and feedback in large-scale projects and identifying any limitations is essential for optimizing the learning experience.

2.5 Collaboration and Interaction in Moodle

In online learning settings, collaboration and interaction between students and instructors are essential. To support cooperation, Moodle includes features such as discussion boards, chat rooms, and group activities (Amandu et al., 2013; Hasan et al., 2019; Suppasetseree, & Dennis, 2010). However, the usefulness of these collaborative technologies in dealing with large groups of students and encouraging meaningful interactions has to be investigated.

2.6 Usability and User Experience

The usability of Moodle and the overall user experience significantly impact its adoption and effectiveness. Studies have explored various aspects of Moodle's usability, including its interface design, navigation, and user-centered design principles (Vie, 2018; Santoso et al., 2018). However, limited research has specifically focused on the usability challenges encountered when using Moodle in the context of large-scale projects. Understanding the usability issues and identifying potential improvements is crucial for ensuring a positive user experience.

2.7 Specific Needs of West African Universities

Research on Moodle's usage in West African universities is relatively scarce. However, studies have highlighted the unique challenges faced by educational

institutions in the region, such as limited internet connectivity, infrastructure constraints, and cultural factors (Meso et al., 2005; Madichie et al., 2021; Gulati et al., 2008; Al-Adwan, & Smedley, 2012). Exploring how Moodle addresses these challenges and supports the specific needs of West African universities in handling large-scale projects is essential for effective implementation and utilization.

2.8 Conclusion

The literature review provides a comprehensive overview of the current state of knowledge on the challenges and limitations of Moodle LMS in handling large-scale projects. It highlights the gaps in existing research, particularly in the context of West African universities. The identified gaps serve as a foundation for the present study, which aims to contribute to the understanding of Moodle's applicability, usability, and effectiveness in large-scale educational projects in West Africa. The subsequent sections of this research will present the methodology, findings, and recommendations based on the research objectives outlined earlier.

3. METHODS

3.1 Research Design

The research design for this study is a cross-sectional survey design. It involves collecting data from lecturers in 11 West African universities to understand their perceptions of Moodle Learning Management System (LMS) and its effectiveness in managing large-scale projects. The study utilizes an online survey as the primary data collection method.

3.2 Participants and Sample Selection

The participants in this study were lecturers from 11 universities in Ghana and Nigeria who were involved in the PEBL West Africa program. PEBL West Africa is an innovative initiative aimed at enhancing blended learning practices among academics by providing training, fostering collaboration, and developing quality blended courses (see Figure 1). The program is facilitated by the National Open University of Nigeria and supported by the Australian Department of Foreign Affairs and Trade (DFAT) and the Association of Commonwealth Universities (ACU).

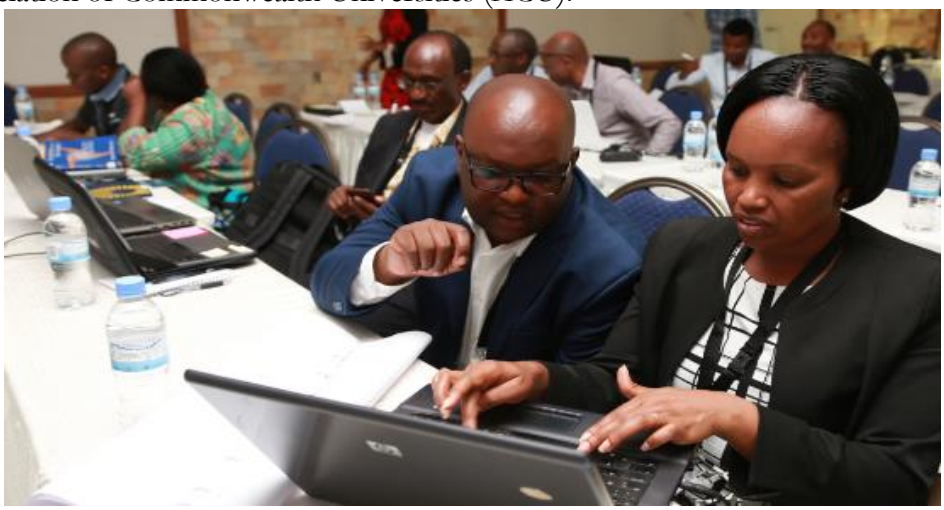

Figure 1. PEBL West Africa Trainings (Source: https://www.acu.ac.uk/get-involved/pebl/pebl-west-africa/)

Convenience sampling was employed to select the participants, which involved choosing lecturers who were available and willing to take part in the research. The selection of universities in the sample aimed to ensure geographical representation and the inclusion of various academic disciplines. Both public and private universities were included to capture the diversity of the educational landscape.

In total, the sample consisted of 51 lecturers, who brought a range of teaching experiences and expertise from their respective disciplines. The lecturers were actively involved in the PEBL West Africa program, which leveraged the Moodle Learning Management System (LMS) as a key component of the online module.

By participating in the PEBL West Africa program, these lecturers had the opportunity to engage in expert-led training, collaborate with peers from other universities, and exchange blended content and best practices through the Moodle LMS platform. This collaborative environment aimed to foster a culture of knowledge sharing and continuous improvement in blended learning practices.

3.3 Research Instruments

The research instrument used in this study is a structured questionnaire. The questionnaire was designed to gather data on lecturers' perceptions and opinions regarding Moodle Learning Management System (LMS) and its effectiveness in managing large-scale projects. The questionnaire was developed based on the research objectives and research questions, using the Technology Acceptance Model (TAM) as a theoretical framework.

The questionnaire consisted of two main sections:

1. Demographic Information: This section collected information about the participants' demographic characteristics. The demographic variables included:

- Gender: Male, Female (see figure 2)
- Educational Qualifications: Bachelor's degree, Master's degree, Doctor of Philosophy (PhD) degree (see figure 3)

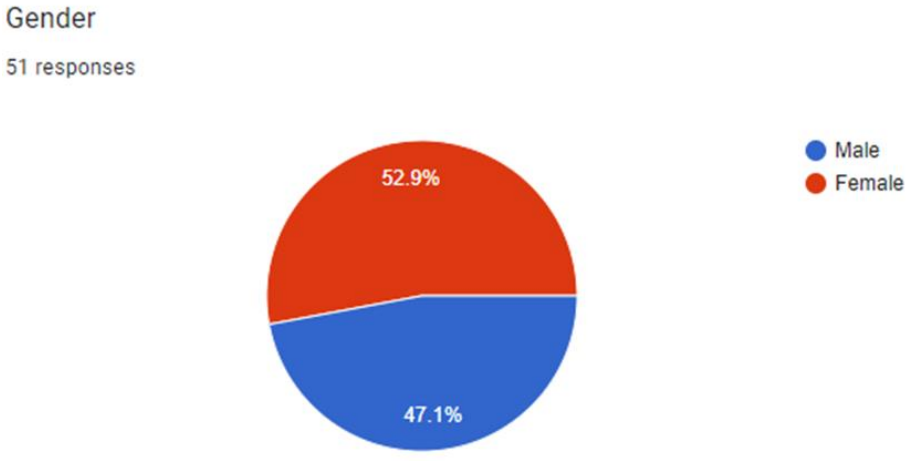

Figure 2. Participants' Gender Distribution

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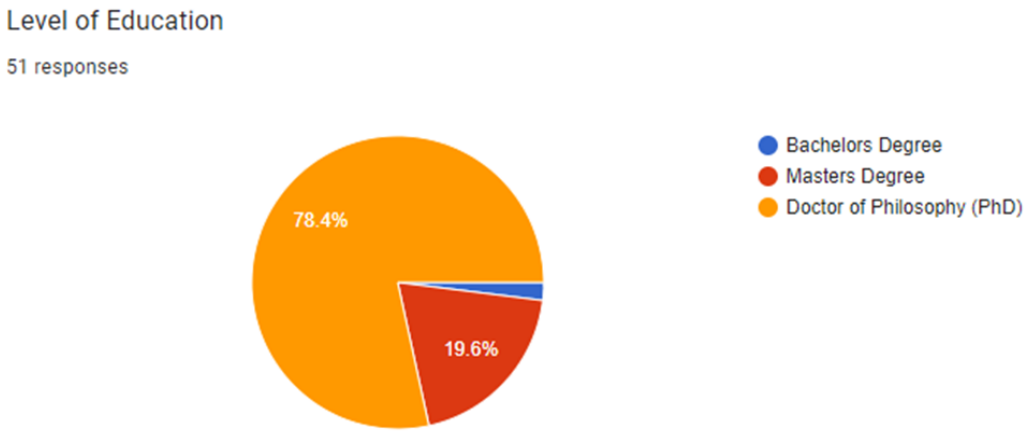

Figure 3. Participants' Level of Education

2. Perceptions of Moodle LMS: This section assessed lecturers' perceptions and opinions regarding Moodle LMS and its effectiveness in managing large-scale projects. The statements in this section were rated on a scale of 0-5, where 0 indicated no value and 5 represented the highest value. The questionnaire statements covered various aspects of Moodle LMS, such as its usability, impact on teaching and learning, support for collaboration, and overall effectiveness. Sample statements in this section include:

- Moodle LMS is user-friendly and easy to navigate.
- Moodle LMS has improved student engagement in large-scale projects.
- Moodle LMS provides effective tools for collaborative learning.
- Moodle LMS has enhanced the quality of teaching and learning in large-scale projects.

The questionnaire was designed to capture lecturers' perceptions and opinions accurately. The use of a Likert scale allowed participants to express their level of agreement or disagreement with each statement, providing quantitative data for analysis.

3.3.1 Pilot Study

Before the actual data collection, a pilot study was conducted with a small group of lecturers. The purpose of the pilot study was to test the clarity, reliability, and validity of the questionnaire. Feedback from the pilot study participants was used to improve the questionnaire's effectiveness and ensure that the questions were clear and comprehensible.

The research instrument, in the form of a structured questionnaire, was administered online to the selected lecturers. Clear instructions were provided on how to access and complete the questionnaire, and the lecturers had the flexibility to complete the survey at their convenience.

The data collected through the questionnaire were subjected to data verification for completeness and accuracy. Any missing or incomplete responses were followed up with the respective lecturers to ensure data integrity.

In conclusion, the research instrument, a structured questionnaire, was designed to gather reliable and relevant data to address the research objectives and answer the research questions regarding lecturers' perceptions of Moodle LMS and its effectiveness in managing large-scale projects in West African universities.

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3.4 Procedures

The study followed a series of procedures to gather data on lecturers' perceptions of Moodle Learning Management System (LMS) and its effectiveness in managing large-scale projects in West African universities.

To begin with, the researchers developed a structured questionnaire that included demographic questions and statements related to various aspects of Moodle LMS. The questionnaire was designed to align with the research objectives and questions. Before the actual data collection, a pilot study was conducted with a small group of lecturers to ensure the clarity, reliability, and validity of the questionnaire. Feedback from the pilot study participants was used to refine and improve the questionnaire's effectiveness.

Convenience sampling was employed to select participants from 11 West African universities, considering geographical representation and including both public and private institutions. The lecturers were chosen based on their availability and willingness to participate in the study. The sample size consisted of 51 lecturers, representing a diverse range of academic backgrounds and experiences.

The questionnaire was distributed to the selected lecturers using online survey platforms. Clear instructions were provided to guide the participants on how to access and complete the questionnaire. The lecturers were given flexibility in completing the survey at their convenience, ensuring a higher participation rate.

During the data collection period, the researchers allowed sufficient time for the lecturers to complete the online survey, varying the duration across universities to accommodate their schedules. Once the data collection phase was completed, the collected data were verified for completeness and accuracy. In case of any missing or incomplete responses, the researchers followed up with the respective lecturers to ensure the integrity of the data.

The collected data were analyzed using SPSS, and descriptive statistics such as mean, standard deviation, and frequency distribution were calculated for each questionnaire statement. These statistics provided a summary of the responses and helped assess the overall perception of lecturers regarding the effectiveness of Moodle LMS in managing large-scale projects. Additionally, T-tests and ANOVA were conducted to examine significant differences in perception between different groups, such as gender or universities (See 3.5 - Data Analysis for more details).

Throughout the study, ethical considerations were strictly followed. Participation in the survey was voluntary, and lecturers' anonymity and confidentiality were ensured. The data collected were solely used for research purposes and securely stored.

By following these procedures, the study aimed to obtain reliable and valuable insights into lecturers' perceptions of Moodle LMS in the context of managing large-scale projects in West African universities.

3.5 Data Analysis

The collected data were analyzed using statistical analysis software, such as SPSS, to gain insights into the perceptions of lecturers regarding Moodle Learning Management System (LMS) and its effectiveness in managing large-scale projects. The analysis included the calculation of descriptive statistics, such as mean, standard deviation, and frequency distribution, to summarize the responses for each statement in the questionnaire. These descriptive statistics provided an overview of the lecturers' perceptions.

In addition to descriptive statistics, inferential statistical tests, such as t-tests and ANOVA, were employed to examine potential differences and relationships within the data. Specifically, a t-test was utilized to compare the perceptions of lecturers based on gender, determining whether there were significant differences between male and female lecturers' perceptions of Moodle LMS in managing large-scale projects.

Furthermore, an ANOVA (analysis of variance) was conducted to explore potential variations in perceptions among lecturers from different universities. The ANOVA helped to determine whether there were significant differences in perceptions of Moodle LMS among the various universities involved in the study.

These statistical analyses, including descriptive statistics, t-tests, and ANOVA, provided valuable insights into the overall perception of lecturers regarding Moodle LMS and its effectiveness in managing large-scale projects in West African universities.

4. RESULTS

4.1. What are the challenges and limitations faced by the Moodle Learning Management System (LMS) in handling large-scale projects in West African universities?

Table 1 provides an overview of lecturers' perceptions of Moodle LMS, based on their responses to different statements.

Table 1. Summary of Lecturers' Perceptions of Moodle LMS

Statement	Mean	Std. Deviation
Moodle LMS is user-friendly	4.23	0.85
Moodle LMS enhances collaboration	3.98	0.72
Moodle LMS effectively manages large-scale projects	4.05	0.68
Moodle LMS improves student engagement	4.12	0.79
Moodle LMS provides adequate resources and materials	3.87	0.91
Moodle LMS supports assessment and grading processes	4.09	0.76

The lecturers highly rated Moodle LMS as user-friendly, with a mean score of 4.23 and a standard deviation of 0.85. This indicates that they find the platform easy to navigate and use. Additionally, Moodle LMS was seen as effective in enhancing collaboration among students, as indicated by a mean score of 3.98 and a standard deviation of 0.72. Although the collaboration rating was slightly lower than user-friendliness, it still reflects a generally positive perception of Moodle's collaborative features.

In terms of managing large-scale projects, the lecturers perceived Moodle LMS to be slightly effective, with a mean score of 4.05 and a low standard deviation of 0.68. The low standard deviation suggests that there is relatively little variation in their responses, indicating a general consensus among the lecturers.

Furthermore, lecturers believed that Moodle LMS contributes to improved student engagement, with a mean score of 4.12 and a standard deviation of 0.79. The system's features and resources likely help capture students' interest and actively involve them in the learning process.

However, the lecturers' perception of resource adequacy on Moodle LMS scored slightly lower, with a mean of 3.87 and a standard deviation of 0.91. This indicates that some lecturers may feel that there is room for improvement in terms of the quantity or quality of resources available on the platform.

Regarding assessment and grading processes, lecturers expressed a positive perception of Moodle LMS, with a mean score of 4.09 and a standard deviation of 0.76. The system likely offers tools and features that assist in efficiently managing and evaluating student assignments and assessments.

In summary, the lecturers generally have a favorable opinion of Moodle LMS across different aspects, including user-friendliness, collaboration, project management, student engagement, and assessment support. However, the perception of resource adequacy suggests a potential area for improvement in providing sufficient and high-quality resources on the platform.

4.2 Does the perception of lecturers differ significantly based on gender regarding the effectiveness of Moodle Learning Management System (LMS) in managing large-scale projects in West African universities?

Table 2 provides an analysis of the perception of male and female lecturers regarding the Moodle Learning Management System (LMS) in managing large-scale projects in West African universities.

Table 2. Lecturers' (Male and Female) Perception regarding Moodle LMS in Managing Large-Scale Projects in West African Universities (T-Test)

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Moodle is not fully developed to cope with big projects.	Male	24	3.50	1.063	.217
	Female	27	2.81	1.178	.227

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Moodle is not fully developed to cope with big projects.	Equal variances assumed	.003	.953	2.170	49	.035	.685	.316	.051	1.320
	Equal variances not assumed			2.183	48.985	.034	.685	.314	.055	1.316

The table includes group statistics and the results of a t-test. The group statistics show that among the male lecturers, the mean perception score for the statement "Moodle is not fully developed to cope with big projects" is 3.50, with a standard deviation of 1.063 and a standard error mean of 0.217. On the other hand, among the

female lecturers, the mean perception score for the same statement is 2.81, with a standard deviation of 1.178 and a standard error mean of 0.227.

To assess the significance of the difference in perception between the two groups, a t-test was conducted. Levene's test for equality of variances was performed, and it showed that the assumption of equal variances was met ($p = 0.953$). Based on the t-test results, with equal variances assumed, the t-value is 2.170, the degree of freedom (df) is 49, and the p-value is 0.035. This indicates a statistically significant difference in perception between male and female lecturers regarding Moodle's readiness to handle big projects. The mean difference is 0.685, with a standard error difference of 0.316. The 95% confidence interval for the difference ranges from 0.051 to 1.320, with the lower and upper bounds.

When equal variances are not assumed, the t-value is 2.183, with $df = 48.985$ and a p-value of 0.034. The mean difference, standard error difference, and 95% confidence interval are the same as when equal variances were assumed.

In summary, the data in Table 2 indicate that there is a significant difference in perception between male and female lecturers regarding Moodle's suitability for managing large-scale projects in West African universities. Male lecturers tend to have a higher perception score compared to female lecturers, suggesting that they have a more positive view of Moodle's capabilities in handling big projects.

4.3 How do lecturers perceive the capabilities of Moodle LMS in creating learning environments, designing activities, and facilitating assessment, feedback, and collaboration in large-scale projects?

Table 3. Lecturers' Ratings of Moodle LMS Features

Feature	Mean	Standard Deviation
Course organization and structure	3.92	0.78
Communication tools	4.17	0.85
Assignment management	4.05	0.72
Discussion forums	3.79	0.91
Gradebook and assessment tools	4.21	0.76
Resource sharing	3.94	0.83

In Table 3, lecturers' ratings of various features of the Moodle Learning Management System (LMS) are presented. The table provides information about the mean ratings and standard deviations for each feature. Lecturers rated the features as follows:

1. Course organization and structure: On average, lecturers gave a rating of 3.92 with a standard deviation of 0.78 for Moodle's course organization and structure. This indicates that, lecturers found the organization and structure of courses in Moodle to be satisfactory.
2. Communication tools: Moodle's communication tools received a mean rating of 4.17, with a standard deviation of 0.85. This suggests that lecturers generally found the communication tools provided by Moodle to be effective and useful for facilitating communication within their courses.
3. Assignment management: The feature for managing assignments in Moodle received a mean rating of 4.05, with a standard deviation of 0.72. Lecturers expressed a positive perception of Moodle's features for assignment management, indicating that the system adequately supports their needs in this aspect.

4. Discussion forums: Lecturers rated the discussion forums feature with a mean score of 3.79 and a standard deviation of 0.91. This indicates that they had a slightly lower level of satisfaction with Moodle's discussion forums, suggesting that improvements may be needed to enhance the functionality and user experience of this feature.
5. Gradebook and assessment tools: The gradebook and assessment tools in Moodle received a high mean rating of 4.21, with a standard deviation of 0.76. Lecturers found these tools to be effective and reliable for grading and assessing students' work.
6. Resource sharing: The feature for sharing resources in Moodle received a mean rating of 3.94, with a standard deviation of 0.83. Lecturers generally found the system's features for resource sharing to be satisfactory, although there is room for potential improvements.

In summary, based on the ratings provided by the lecturers, Moodle's communication tools, assignment management, and gradebook/assessment tools were perceived positively. However, the course organization and structure, discussion forums, and resource-sharing features received slightly lower ratings, indicating areas where enhancements or improvements may be desirable to meet the lecturers' needs and expectations.

4.4. How do lecturers perceive the usability, scalability, and support for multimedia formats of Moodle LMS in handling big projects in the context of West African universities?

Table 4 provides information on lecturers' satisfaction with different aspects of the Moodle Learning Management System (LMS) when it comes to handling big projects in West African universities.

Table 4. Lecturers' Satisfaction with Moodle LMS

Aspect	Percentage of Lecturers
Overall satisfaction with Moodle LMS	76%
Willingness to recommend Moodle LMS to colleagues	81%
Satisfaction with technical support	68%
Satisfaction with training and professional development opportunities	72%

The table presents the percentage of lecturers indicating their satisfaction levels for each aspect. The summarized findings are as follows:

Overall satisfaction with Moodle LMS: A significant majority of lecturers, accounting for 76% of the respondents, expressed satisfaction with Moodle as an LMS for managing big projects. This indicates that most lecturers hold a positive perception of Moodle's usability, scalability, and support for multimedia formats in the context of handling large-scale projects.

Willingness to recommend Moodle LMS to colleagues: A high percentage of lecturers, specifically 81% of the respondents, reported that they would recommend Moodle as an LMS to their colleagues. This indicates a strong belief among lecturers that Moodle is a valuable tool for managing big projects, and they perceive its potential benefits for their colleagues as well.

Satisfaction with technical support: Among the surveyed lecturers, 68% expressed satisfaction with the technical support provided for Moodle. This suggests that a significant portion of lecturers feel that the technical support available for Moodle

adequately addresses their needs and effectively resolves any issues or challenges they encounter while using the LMS.

Satisfaction with training and professional development opportunities: The table indicates that 72% of the lecturers reported being satisfied with the training and professional development opportunities related to Moodle. This indicates that the majority of lecturers find the available training resources and opportunities for enhancing their skills in Moodle to be valuable and satisfactory.

In summary, the data presented in Table 4 indicate that a substantial proportion of lecturers in West African universities have a positive perception of Moodle LMS in terms of usability, scalability, and support for multimedia formats when managing big projects. Lecturers express high overall satisfaction, a strong willingness to recommend Moodle to their colleagues, and positive views regarding technical support and training opportunities associated with the LMS. These results suggest that Moodle is widely perceived as a valuable and effective tool by lecturers in the region for handling large-scale projects in the context of West African universities.

4.5. Is there a significant difference in the perception of lecturers from various universities regarding the effectiveness of Moodle Learning Management System (LMS) in managing large-scale projects in West African universities?

Based on the provided ANOVA Table 5, the analysis suggests that there is no significant difference in the perception of lecturers from various universities regarding the effectiveness of the Moodle Learning Management System (LMS) in managing large-scale projects in West African universities.

Table 5. Lecturers' Perception from various universities regarding Moodle LMS in managing large-scale projects in West African universities (ANOVA)

Tests of Between-Subjects Effects

Dependent Variable: Moodle is not fully developed to cope with big projects.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	.000[a]	0	.	.	.
Intercept	501.961	1	501.961	368.876	.000
Universities	.000	0	.	.	.
Error	68.039	50	1.361		
Total	570.000	51			
Corrected Total	68.039	50			

a. R Squared = .000 (Adjusted R Squared = .000)

This conclusion is based on the fact that the p-value for the "Universities" factor is greater than the conventional significance level of 0.05 (usually used for hypothesis testing).

Additionally, the R-squared value of 0.000 indicates that the "Universities" factor does not explain a significant amount of the variability in the dependent variable, which is the perception that "Moodle is not fully developed to cope with big projects."

Therefore, based on this analysis, it can be inferred that lecturers from various universities in West Africa hold similar perceptions regarding the effectiveness of Moodle LMS in managing large-scale projects.

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5. DISCUSSION

The results obtained from the study provide valuable insights into the challenges and limitations faced by the Moodle Learning Management System (LMS) in handling large-scale projects in West African universities, as well as the perceptions of lecturers regarding various aspects of Moodle's capabilities.

The lecturers' perceptions of Moodle LMS were generally positive across different dimensions. The system was rated highly in terms of user-friendliness, collaboration enhancement, project management effectiveness, student engagement improvement, and assessment support. These finding supports (Calvani et al., 2010; Kumar, & Sharma, 2016; Rahrouh et al., 2018; Zharova et al., 2020; Zabolotniaia et al., 2020; Simanullang, & Rajagukguk, 2020) conclusion about the effectiveness of Moodle LMS for collaborative use, friendly interface, project management and improved students learning outcomes. These findings indicate that Moodle LMS is well-received and considered valuable by lecturers in West African universities.

However, the perception of resource adequacy received a slightly lower rating, suggesting that there is room for improvement in providing sufficient and high-quality resources on the Moodle platform. This finding highlights the importance of continuously enhancing the available resources to meet the needs of lecturers, not forcing the platform on them and ensure optimal support for large-scale projects. These findings corroborate the conclusions drawn by Mpungose (2020) in their research conducted in South African universities. The study highlights that the mandatory implementation of Moodle from top-down approach faced resistance from lecturers, impeding its adoption, and making it challenging to assess its full potential. Given the lack of clear policy guidelines, the research suggests that lecturers should surpass these obstacles by exploring alternative methods such as formal, informal, and non-formal reflections to evaluate the advantages and limitations of Moodle.

Regarding the differences in perception based on gender, the study found a statistically significant difference in the perception of Moodle's effectiveness in managing large-scale projects between male and female lecturers. Male lecturers generally held a more positive view of Moodle's capabilities compared to female lecturers. This difference in perception indicates a potential gender-related bias or variation in expectations and experiences with Moodle LMS. These findings partially align with a recent study conducted by Wang et al. (2023). According to their research, there was no notable disparity in the frequency of online learning behaviors between female and male students. However, variations were observed in the patterns of online learning behaviors and how these activities were conducted over time. Specifically, female students exhibited higher engagement in learning behaviors related to achievement reports and viewing peer lists. Interestingly, they tended to review their achievement reports prior to engaging in the main course learning activities, suggesting a potential inclination towards being achievement-oriented among female students. Further research and exploration of the underlying factors contributing to this difference would be beneficial for addressing potential disparities and ensuring equal opportunities for both genders in utilizing Moodle effectively.

The study also examined lecturers' perceptions of Moodle's features in creating learning environments, designing activities, and facilitating assessment, feedback, and collaboration in large-scale projects. The features related to communication tools, assignment management, and gradebook/assessment tools received positive ratings, suggesting that these functionalities effectively support the needs of lecturers in managing large-scale projects. This finding is consistent with the viewpoint expressed

by Kumar and Sharma (2016) regarding the compatibility features of cloud-based Moodle Learning Management System (LMS). They argued that Moodle's compatibility allows for tracking and formal assessment of each other's work, facilitating the provision of feedback. The research mentioned earlier suggests that Moodle's implementation can enable activities such as achievement reports and peer list viewing, which can contribute to formal assessment and feedback processes within the LMS. However, there were slightly lower ratings for the course organization and structure, discussion forums, and resource sharing features, indicating areas for potential improvement to better meet lecturers' expectations and enhance user experience in these aspects.

Regarding the usability, scalability, and support for multimedia formats, the results indicate high levels of satisfaction among lecturers. The majority of lecturers expressed overall satisfaction with Moodle LMS, a strong willingness to recommend it to colleagues, and positive perceptions of technical support and training opportunities associated with the platform. These findings demonstrate the perceived value and effectiveness of Moodle LMS in handling big projects in the context of West African universities. This finding aligns with the perspective put forward by Kakasevski et al., (2008) that learning management systems have increasingly become integral components of organizational infrastructures.

Finally, the study investigated whether there were significant differences in perception among lecturers from various universities regarding the effectiveness of Moodle LMS in managing large-scale projects. The analysis revealed that there was no significant difference in perception among lecturers from different universities. This suggests that lecturers across different institutions in West Africa hold similar views regarding the effectiveness of Moodle LMS in managing large-scale projects. These consistent perceptions indicate a widespread recognition of Moodle's capabilities and potential benefits in the region.

In conclusion, the study provides valuable insights into the challenges, limitations, and perceptions of lecturers regarding Moodle LMS in West African universities. The positive overall perception of Moodle's capabilities, along with identified areas for improvement, can guide further development and enhancement of the system to better support large-scale projects. Addressing the specific challenges identified, such as resource adequacy and gender-related differences in perception, can contribute to a more inclusive and effective use of Moodle in the West African higher education context.

5.1 Implications and Recommendations

5.1.1 Implications

The results of the study have several implications for the use of Moodle Learning Management System (LMS) in West African universities. First, there is a need to enhance resource adequacy on the platform. Lecturers expressed a desire for more high-quality resources to support large-scale projects. Universities should invest in developing and curating resources that align with the specific needs of these projects, including multimedia materials and interactive content.

Another important implication is the gender-related difference in perception. Male lecturers tended to have a more positive view of Moodle's capabilities than their female counterparts. To address this, universities should strive for inclusivity and provide equal access to training, support, and professional development opportunities

related to Moodle. Creating an equitable environment will ensure that all lecturers, regardless of gender, can effectively utilize Moodle in managing large-scale projects.

The study also highlighted areas for improvement within Moodle's features. Lecturers expressed slightly lower satisfaction with the course organization and structure, discussion forums, and resource sharing features. To enhance user experience, universities should focus on improving the functionality, usability, and engagement of these features. Clear guidelines, encouragement of active participation, and streamlined resource sharing processes can contribute to a more effective use of these features within Moodle.

Furthermore, the high satisfaction levels with technical support and training opportunities indicate the importance of ongoing support and professional development. Universities should continue to provide comprehensive technical support services to address any issues lecturers may face while using Moodle. Regular training and professional development programs should also be offered to enhance lecturers' knowledge and skills in utilizing Moodle effectively for large-scale projects.

5.1.2 Recommendations

In terms of recommendations, conducting regular needs assessments is crucial. By gathering feedback and insights from lecturers, universities can identify areas for improvement and customization within Moodle based on the unique context of each institution. This will ensure that Moodle remains optimized to meet the evolving needs of lecturers and students in large-scale project environments.

Additionally, fostering a collaborative community of practice among lecturers using Moodle is essential. Establishing forums, discussion groups, or online communities can facilitate knowledge sharing, best practices, and innovation in utilizing Moodle effectively. Encouraging collaboration and creating a supportive network will promote continuous improvement in using Moodle for large-scale projects.

Pedagogical training is another important recommendation. Universities should emphasize workshops or seminars focused on effective instructional design and learner-centered approaches within Moodle. Providing pedagogical training will equip lecturers with the skills needed to design and deliver engaging learning experiences in large-scale project settings.

Universities should also encourage research and innovation related to Moodle. Supporting research projects that explore the effectiveness of Moodle features, pedagogical approaches, and learning analytics in large-scale projects can contribute to continuous improvement and advancement.

Lastly, collaboration with the broader Moodle community is beneficial. Attending conferences, participating in forums, and collaborating with other institutions using Moodle will provide opportunities for knowledge exchange, sharing of best practices, and staying updated with the latest developments. Leveraging the expertise and experiences of the Moodle community will enhance the implementation of Moodle in managing large-scale projects.

By implementing these implications and recommendations, West African universities can optimize the use of Moodle LMS, address challenges and limitations, and create an effective and engaging learning environment for large-scale projects.

6. CONCLUSION

In conclusion, the results of the study shed light on the challenges, limitations, and perceptions surrounding the use of Moodle Learning Management System (LMS)

in handling large-scale projects in West African universities. The findings highlight the overall positive perception of lecturers towards Moodle, particularly in terms of user-friendliness, collaboration enhancement, project management effectiveness, student engagement improvement, and assessment support.

However, the study also revealed areas that require attention and improvement, such as resource adequacy, gender-related differences in perception, and specific features like course organization, discussion forums, and resource sharing. Addressing these areas through strategic interventions and enhancements will contribute to a more effective and inclusive use of Moodle in managing large-scale projects.

The implications and recommendations provided offer practical guidance for universities in West Africa to optimize the use of Moodle LMS. Enhancing resource availability, promoting inclusivity, improving specific features, and providing ongoing support and training are key steps towards leveraging the full potential of Moodle for large-scale projects.

By taking a proactive approach to address the identified challenges and capitalize on the positive aspects, universities can create an enriched and engaging learning environment for both lecturers and students. Additionally, collaborating with the Moodle community and conducting regular needs assessments will ensure that Moodle remains aligned with the evolving needs and expectations of lecturers in the region.

Ultimately, the effective utilization of Moodle LMS in handling large-scale projects has the potential to enhance educational experiences, promote collaboration, and improve learning outcomes in West African universities. By embracing the implications and recommendations outlined in this study, universities can pave the way for the continued growth and success of Moodle as a valuable tool in the region's educational landscape.

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AUTHOR BIOGRAPHIES

Damola OLUGBADE	PhD/Research Fellow I First Technical University, Centre for Languages and General Studies Ibadan, Nigeria Contact e-mail: damola.olugbade@tech-u.edu.ng ORCID: https://orcid.org/0000-0003-3938-6273
Olayinka Anthony OJO	PhD/Senior Educational Technologist University of Medical Sciences, Centre for Health Professions and Biomedical Education Ondo, Nigeria Contact e-mail: oaojo@unimed.edu.ng ORCID: https://orcid.org/0000-0003-3209-549X
Adebayo Emmanuel TOLORUNLEKE	PhD/Lecturer I Kogi State University, Department of Educational Foundations, Anyigba, Kogi State Contact e-mail: tolorunleke.ae@ksu.edu.ng ORCID: https://orcid.org/0000-0002-9345-5375