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An Investigation of Technical and Pedagogical Dimensions of Learning Management System of Open and Distance Learning Institution

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Abstract

The purpose of this study was to analyze the technical and pedagogical dimensions of learning management systems (LMS) in one of the mainstream south western open and distance learning institution in Nigeria. In this study, descriptive survey design was adopted. The data was obtained from 356 participants using a structured, four-point scale self-administered questionnaire and analyzed using mean and standard deviation. The findings showed a dual narrative. The LMS platform significantly supported instructional activities through fostering accessibility and engagement in distance learning. However, technical challenges such as suboptimal user interfaces, slow loading speeds and compatibility issues hampered their effectiveness. Despite these limitations, the study confirms the significant technical and pedagogical influence of LMS on learners' experiences. Furthermore, the research study underscores the need for targeted improvements which include optimization of LMS functionalities and investments in robust technological infrastructure that will enhance both user satisfaction and learning outcomes. The study recommended a longitudinal research study to deepen understanding of evolving role of LMS and its impact on educational delivery in diverse contexts. Stakeholders can adopt the insights provided from this research study to advance the effectiveness of distance learning systems.

Keywords: *Instructional delivery, learners, learning management systems, pedagogical dimension of LMS, technical dimension of LMS*

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Introductıon

The Higher educational institutions, especially in developing countries like Nigeria have increasingly adopted Open and Distance Learning (ODL) in recent years to increase accessibility to higher education (Oguguo et. al., 2021). According to Mbati and Mphahlele, 2024, shaping effective ODL programme depends on understanding the needs of distance and online learners. As such, institutions require insights into learners' demographics and prior experiences with online learning to enhance decision making and improve learners' success.

A major component that drives ODL is the learning management system. It is an online platform designed to improve learning outcomes and facilitate instructional delivery. LMS technology has advanced significantly, offering features such as course customization, multimedia integration, leaning analytics and a wide plethora of others. The tools on the LMS enables educators to create interactive lessons, conduct assessments, and monitor student progress effectively (Phakathi, 2023). Furthermore, LMS supports innovative pedagogical approaches such as blended learning, promoting students' engagement and collaboration. Common features on LMS such as discussion board, real-time communication tools, and multimedia resources help create immersive learning experiences, fostering a sense of community among remote learners (Kinsella, Wyatt & Nestor, 2022). The asynchronous nature of LMS allows for flexible, personalised learning experiences that accommodate diverse learning styles (Chen & Liu, 2023). However, in the report of Trimarco, 2024, equitable access to LMS technology must be ensured to bridge the digital divide, particularly in underserved communities.

Open and Distance Learning faces a number of challenges despite its benefits. Prominent among this challenge is technical constraints which includes internet connectivity issues, system compatibility problems and data security concerns. These technical issues hinder its seamless integration (William, 2023). Moreover, the rapid pace of technological change necessitates continuous professional development for educators to effectively utilise LMS capabilities (Bates, 2020). Therefore, this study is aimed at investigating the technical and pedagogical effects of LMS in ODL using the Distance Learning Institute, University of Lagos as a study

Literature Review

This research work is aimed at studying the impact of accessibility, instructional quality and student engagement on LMS in ODL. It incorporates the perspectives of three theories which are (i) Technology

Acceptance Model (TAM) which is based on users' acceptance and use of technology, (ii) Constructivist Learning Theory where learners develop knowledge through their interaction and collaborative experiences with LMS and (iii) Digital Divide Theory what lays emphasis on the disparity in accessing LMS as there are geographical and socioeconomic divide among learners across Nigeria.

This framework acknowledges the main components that influence LMS adaptation in open and distance learning institutions to include institutional readiness, technological infrastructure, policy and quality assurance and learner's engagement. Addressing the relationship between these components will determine the effectiveness of LMS in enhancing accessibility, instructional delivery and learners' success in ODL institutions. Also, it will address technological and pedagogical barriers to improve LMS adoption, thus ensuring inclusive and sustainable distance education.

The adoption of LMS in Nigeria's ODL landscape offers both challenges and opportunities. The digital divide remains a significant issue due to disparities in technological access and digital literacy. Educators in Nigeria face difficulties in adapting their teaching methodologies to leverage LMS effectively. There is a need for capacity-building initiatives and professional development programs to enhance digital literacy and pedagogical competencies. Integrating culturally relevant teaching methods and incorporating local content into LMS-based courses can improve learner engagement and course relevance. Ensuring quality assurance and accreditation of online courses is crucial to maintaining educational standards. Sustainable funding models are also necessary for the long-term viability of LMS in ODL institutions, as limited financial resources and competing priorities pose significant challenges. Addressing these issues is critical to maximising the benefits of LMS in Nigeria's ODL sector.

Purpose of the Study

The purpose of this study was to analyze the technical and pedagogical dimensions of learning management systems (LMS) in one of the mainstream south-western open and distance learning institution in Nigeria. The study focused on the following research questions:

i) What are the learners' experiences in instructional delivery through Learning Management Systems (LMS)?
ii) What technological challenges do learners face during activities on LMS?

iii) What influence does LMS create on the learner's academic achievement?

iv) What are the possible ways to improve competence and utilisation of LMS in Open and Distance Learning (ODL)?

Methodology

A descriptive survey research design was adopted for this study. All undergraduate learners of the Distance Learning Institute in Southwest Nigeria during the 2023/2024 academic session constituted the population of the study. The population comprised 7,122 learners in 200–500 levels across all departments. A purposive stratified sampling technique was employed to ensure representation across the different levels and departments. The sample size of 356 learners was determined using a 95% confidence level and a 5% margin of error, which are widely accepted parameters for survey research. Thereafter, respondents were randomly selected from the identified strata to participate in the study.

Data Tool and Procedures for Data Collection

The instrument used for data collection was a structured questionnaire. This structured questionnaire was validated by experts in the field of research. A pre-test was carried out using 100 level learners across all departments who did not take part in the experiment. The questionnaire was designed using a four-point Likert scale comprising Strongly Agree (SA = 4), Agree (A = 3), Disagree (D = 2), and Strongly Disagree (SD = 1). Responses were analysed using arithmetic mean and standard deviation. The criterion mean was determined by summing the scale values (4 + 3 + 2 + 1 = 10) and dividing by the number of response categories (4), resulting in a cut-off mean of 2.50. Therefore, any item with a mean score of 2.50 and above was interpreted as "Agree", while items with a mean score below 2.50 were interpreted as "Disagree". Mean and standard deviation were used to answer the research questions, while the Pearson Product Moment Correlation was used to test the hypothesis at the 0.05 level of significance.

Three hundred questionnaires (300) were retrieved out of a total of three hundred and fifty-six (356) questionnaire questionnaires that were distributed and deemed usable for analysis. This analytical approach employed measures of central tendencies, such as mean and standard deviation, to determine the acceptance or rejection of specific study questions.

Findings

Table 01 shows the demographic representation of the respondents.

Table 01
Analysis of Demographic Characteristics of the Respondents

Variable	Category	Frequency	Percentage
Gender	Male	134	44.66
	Female	166	55.34
Age	18–23 years	96	32.00
	24–30 years	122	40.66
	31–35 years	42	14.00
	36 years and above	40	13.34
Class Level	200	78	26.00
	300	60	20.00
	400	30	10.00
	500	132	44.00

Source: Field Survey, 2026

Table 1 shows the demographic information of the survey. Results show that out of 300 respondents, 134 (44.66%) were male and 166 (55.34%) were female, indicating a higher representation of female learners in the study (Figure 1A). Regarding age distribution, respondents aged 24 -30 years constituted the largest group with 122 (40.66%), followed by those aged 18- 23 years with 96 individuals (32.00%) as shown in figure 1B. Also, respondents aged 31–35 years accounted for 42 (14.00%), while those aged 36 years and above constituted the smallest proportion with 40 (13.34%).

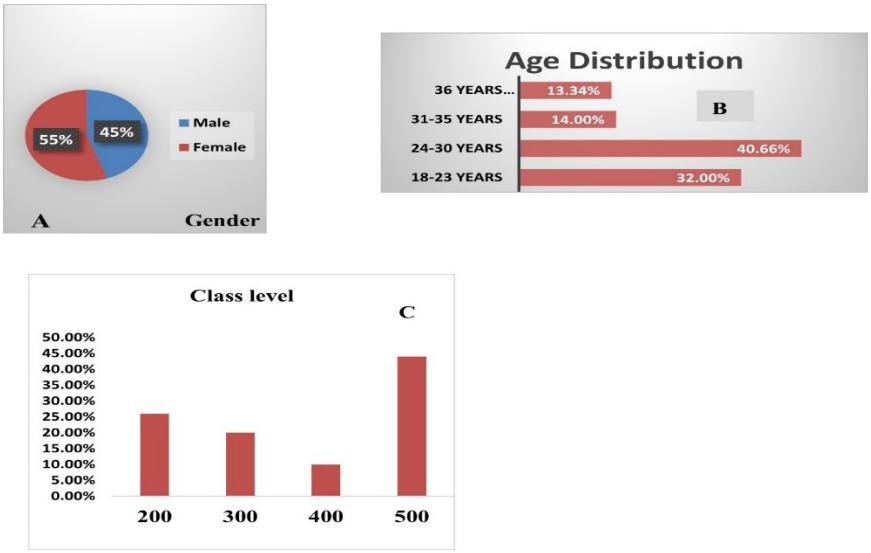

Figure 01. Gender, age and class level distribution of the respondents

RQ 1: What are the learners' experiences in instructional delivery through Learning Management Systems (LMS)?

Table 02
Learners' Experiences to Instructional Delivery

S#	Items	x̄	SD
1.	The instructional content on the LMS is engaging and interactive.	3.07	1.00
2.	The instructional design of the LMS ensures easy navigation and access to necessary resources.	2.84	0.63
3.	The satisfaction with the instructional delivery provided by the LMS is high.	2.71	1.01
4.	The LMS provides clear and accessible instructional materials for courses.	3.11	0.21
5.	The LMS effectively supports learning through timely feedback from instructors.	2.61	0.31
	Grand Mean	2.87	

Note: x̄ = Mean; SD = Standard Deviation

The data presented in Table 02 provide insights into learners' experiences with instructional delivery through the Learning Management System (LMS). The item "The instructional content on the LMS is engaging and interactive" received a mean score of 3.07 with a SD of 1.00, indicating that learners generally found the content to be engaging and interactive. The highest mean score of 3.11 with a SD of 0.21 was for the item which states that the LMS provides clear and accessible instructional materials for courses," suggesting that the learners found the instructional materials to be clear and accessible.

Research Question 2: What technological challenges do learners face during activities on LMS?

Table 03
Learners Perceptions on Technological Challenges

S#	Items	x̄	SD
6	Technical support for LMS-related issues is readily available and effective.	3.10	1.50

7	The LMS often has slow loading times that disrupt learning activities.	3.94	1.44
8	Navigating the LMS is difficult due to compatibility issues with various devices.	1.97	1.70
9	Frequent technical issues are experienced while accessing the LMS.	2.05	1.21
10	The LMS interface is user-friendly and easy to navigate despite occasional technical problems.	2.05	0.11
	Grand Mean	2.62	

Note: $\bar{x}$ = Mean; SD = Standard Deviation

Table 03 shows various technological challenges faced by learners during their use of the Learning Management System (LMS). Technical support for LMS-related issues is readily available and effective received a mean score of 3.10, indicating that learners generally find technical support to be available and somewhat effective. The respondents also had no issues the item that states that using the LMS is difficult due to compatibility issues with various devices with a mean score of 1.97 indicating that compatibility issues are not a major concern for most learners. The mean score of 2.05 for frequent technical issues are experienced while accessing the LMS shows that learners encounter occasional technical problems, but these issues are not as pronounced as loading times. Similarly, the LMS interface is user-friendly and easy to navigate despite occasional technical problems" had a mean score of 2.05 while the interface is generally user-friendly, occasional technical problems affect navigation.

RQ 3: What influence does LMS create on the learner's academic achievement?

Table 04

Influence of LMS on Academic Achievement of Learners

S/N	Items	$\bar{x}$	SD
11	Feedback received from facilitators help learners to achieve better grades.	1.40	0.20
12	Feedback from facilitators help in identifying and working on weak areas.	2.01	0.51

13	Learners are encouraged to interact more when they receive feedback from facilitators	3.07	1.02
14	Facilitators feedback directly improve learners' understanding of the course materials.	3.15	1.01
15	Learners' academic performances improved due to the feedback provided by facilitators.	3.00	0.21
	Grand Mean	2.53	

Note: $\bar{x}$ = Mean; SD = Standard Deviation

The investigation into the influence of the LMS on learners' academic achievement through feedback is presented in Table 4. The item feedback received from facilitators help learners to achieve better grades had a notably low mean score of 1.40 indicating that respondents do not perceive facilitators' feedback as significantly contributing to better grades. Respondents with a mean score of 2.01 also disagreed with the item that feedback from facilitators help in identifying and working on weak areas suggesting that while feedback may somewhat assist in identifying and addressing weaknesses, it is not viewed as highly effective in this regard.

In contrast, items on learners are encouraged to interact more when they receive feedback from facilitators and directly improve learners' understanding of the course materials had higher mean scores of 3.07 and 3.15, respectively. This can imply that learners generally find feedback beneficial for improving grades and understanding course materials.

Research Question 4: What are the possible ways to improve LMS in Open and Distance Learning?

Table 05

Improvement Strategies for LMS

S/N	ITEMS	$\bar{x}$	SD
16	Adding more real-time communication tools would enhance the LMS experience	3.40	1.32
17	Training and retraining of facilitators can enhance their competence on the LMS.	3.01	0.51
18	More frequent updates and maintenance would improve the LMS functionality.	3.07	1.02

19	Providing more detailed tutorials and guides would make the LMS easier to use	2.15	1.01
20	The LMS should be improved with more interactive and multimedia content.	3.19	1.43
	Grand Mean	2.96	

Note: $\bar{x}$ = Mean; SD = Standard Deviation

Table 05 presents possible strategies for improving the LMS. Analysis of data indicates that clarity of guidelines (mean = 3.40), training for facilitators (mean = 3.01), update and maintenance of the LMS platform (mean = 3.07), and more interactive and multimedia content (mean = 3.19) all have mean scores above the cut-off, suggesting that these factors can positively influence the effectiveness, quality, and timeliness of feedback and interaction on the LMS. Conversely, the technical functionality of the LMS (mean = 2.15) falls below the cut-off mark, indicating it is perceived as a hindrance to feedback quality.

Discussion

The results indicated that learners' overall perception of the Learning Management System (LMS) was generally positive for instructional delivery, specifically in terms of the provision of engaging content, clear instructional materials and easy access to the learning resources. The comparatively high mean scores on the instructional content and the accessibility aspects of the LMS indicate that the LMS is largely performing its basic pedagogical functions, as a means of supporting knowledge delivery in an ODL context. This result aligns with the research findings of Oladipo and Adebayo (2023) which showed that a good LMS platform creates engagement among learners and access to instructional materials. The measures of satisfactions with instructional delivery and timely feedback shows a relatively lower rating. This suggests that quality content delivery does not necessarily lead to learner satisfaction. This implies that learners appreciate interaction and responsiveness besides access to learning materials.

The study found that technological issues constitute major barriers to the effective use of the learning management system. More specifically are the items related to slow loading times which had the highest mean score of the technological challenge. The is in agreement with the work of Edomwande et al. (2022) who found that infrastrutural challenges still limit the effiency of the distance learning platforms in Nigeria. These

challenges are associated with other ploblems like low internet bandwidth, unreliable internet and access to digital infrastructure.

Interestingly, the respondents did not think that device compatibility was a great challenge, which shows that the LMS has been technologically adapted to a reasonable extent across different devices. This is somewhat contrary to previous research, which found device compatibility to be an important issue. The discrepancy could be due to recent advancements in LMS design and the growing proportion of smartphone users in the university community. However, the identification of technical issues supports the Digital Divide Theory that suggests that technological access and infrastructure still influence educational participation and outcomes.

Academic outcomes showed a complex relationship between facilitator feedback and learner outcomes. Learners were largely satisfied with the facilitation feedback and were able to interact more with the facilitator and understood the content of the course better. They did not agree, however, that feedback directly translated into higher grades or that it was a good way for them to see and understand their weaknesses. This discovery has offered a more complex view than previous research. Although Bartel et al. (2017) highlighted the importance of feedback for learning, the current study indicates that feedback can be of different types and not all of them are equally effective. This difference might be accounted for by the quality, timing, specificity and personalisation of feedback. Feedback is best if it is timely, constructive and individualised (Kutasi, 2023). It is likely that feedback was delivered to learners that supported their understanding and engagement but was not detailed enough to have a direct impact on the outcomes of their learning. This result is consistent with Constructivist Learning Theory, which states that learning is achieved through active engagement in learning, reflection and relationships. Feedback can thus be more effective in promoting cognitive engagement and understanding than in leading to short-term gains in grades.

The results on the strategies to enhance the effectiveness of LMS show that learners are keen on integration of more real-time communication tools, frequent updates to the system, training for facilitators, and more interactive multimedia. The results indicate that students want to learn more than just to be given a place to store learning content; they want to learn in a more interactive and collaborative way. This is in line with the current literature on online learning in which learner engagement, social presence and interactive learning are identified as critical factors in successful online learning. The improved communication functions can

facilitate learner–facilitator interaction to increase satisfaction and learning results.

The hypothesis test showed a positive relationship that was statistically significant between LMS utilisation and technical and pedagogical experiences of learners. The result agrees with the result obtained by Adesina and Ojo (2022) and Ruga et al. (2024) who found that LMS positively influenced learning experiences in distance education. The importance of this relationship indicates that there is a possibility that the improvements of functionality, accessibility, and instructional design of the LMS will lead to better learning experiences for learners. The result also validates the theoretical framework of the study. The fact that positive learning experiences are linked to greater acceptance suggests that improving LMS features will further enhance learning outcomes. In a similar fashion, Constructivist Learning Theory argues that LMS can be used to create collaborative and interactive learning environments, and the Digital Divide Theory emphases the need to overcome technological obstacles to leverage the LMS' potential.

Conclusion

The present study focused on the pedagogical and technical impacts of Learning Management System (LMS) on students at the Distance Learning Institute (DLI) of the University of Lagos. The results indicated that the LMS is a key enabler that helps increase the quality of teaching/learning processes through the accessibility of learning materials, it facilitates learner involvement and learner-facilitator interaction. However, there were some technology-related problems that were a hindrance to the learning process such as slow loading times, and in some cases, technical problems. The study also found that the feedback made by the facilitator was positive in terms of improving learners' understanding of course content and increasing interaction, but significantly less so in terms of influencing learning weaknesses and academic performance. Learners also cited the following as effective practices to improve the effectiveness of LMS: real-time communication tools, regular system updates, facilitator training, and better multimedia. The hypothesis was accepted because the result of the test showed that there was a significant positive relationship between LMS utilisation and the technical and pedagogical experiences of learners. Based on the study, it can be concluded that LMS is still a useful tool in the Open and Distance Learning environments in the teaching and learning process.

Based on the study results, some recommendations are provided for the improvement of the technical and pedagogical effectiveness of the

Learning Management System (LMS) of the Distance Learning Institute, and other Open and Distance Learning (ODL) institutions in Nigeria. The institution should get good server infrastructure, enhance the bandwidth size and optimize the LMS platform for low bandwidth environment. The system is also recommended to be monitored regularly and its performance audited to ensure that there are minimum interruptions in learning activities. The distance learning institutes should add real-time communication tools which enable immediate interaction between the learner and the facilitator, improve social presence, and make learning more collaborative, to overcome the current weaknesses of learning through asynchronicity. The institutes should conduct regular and mandatory training workshops for facilitators on effective feedback strategies with a focus on being timely, specific, personal and constructive. It is also important to train staff how to use LMS tools pedagogically, such as analytics for observing learners' progress. The institutes should encourage faculty members and instructional designers to create or select videos, simulations, quizzes and interactive learning modules that are tailored to various learning styles. This would complement the available resources that are text-based and enhance learner engagement. In Distance Education Institutes, the LMS must be maintained and updated to the latest version to resolve bugs, improve security and add features requested by the users. The institution should inform learners in advance of any planned downtime so that they are not frustrated

References

Adesina, S., & Ojo, A. (2022). Impact of learning management systems on the technical and pedagogical experiences of distance learners in Nigeria. *Nigerian Journal of Educational Technology*, *16*(3), 67-82.

Bartel, P., Bartel, A. & Hagel, G. (2017). Feedback-based learning through online feedback systems in Higher Education. In Proceedings of the 3rd International Conference on Higher Education Advances (HEAd'17) (pp. 734–742). Editorial Universitat Politècnica de València. https://doi.org/10.4995/HEAD17.2017.5388

Bates, A. W. (2020). *Teaching in a digital age: Guidelines for designing teaching and learning (2nd ed.). BCcampus. https://opentextbc.ca/teachinginadigitalage/*

Chen, B. & Liu, Z. (2023). A personalised learning approach using learning management systems (LMS) and learning analytics to support student self-directed learning. *Journal of Computers in Education, 8*(2), 187-207.

Edomwande, C. I., Adebanjo-Adenugba, O. A. & Omwanghe, F. (2022). Impact of Open and Distance Learning on Nigeria education system. *African Journal of Educational Management*, *23*(2), 241–251. Retrieved from https://journals.ui.edu.ng/index.php/ajem/article/view/896

Kinsella, M., Wyatt, J. & Nestor, N. (2022). Facilitating students' transition to higher education: Interlinking engagement analytics and digital mediation. In The *IAFOR Conference on Educational Research & Innovation 2022: Official Conference Proceedings* (pp. 81–98). The International Academic Forum (IAFOR). https://doi.org/10.22492/issn.2435-1202.2022.8

Kutasi, R. (2023). Feedback: Unveiling its impact and enhancing its effectiveness in education. *Journal of Pedagogy, 71*(2), 7-32. DOI:10.26755/RevPed/2023.2/7.

Mbati, L., & Mphahlele, R. (2024). Innovative multimodal Open Distance e-Learning (ODeL) supervision practices for master's and doctoral candidates. *Journal of Learning Development in Higher Education*, *30*, 1-31. https://doi.org/10.47408/jldhe.vi30.1057

Oladipo, A., & Adebayo, T. (2023). Enhancing LMS functionalities for better learner engagement and outcomes in Nigerian universities. *Nigerian Journal of Educational Innovations, 13*(2), 89-101.

Oguguo, B.C.E., Ocheni, C.A. & Adebayo, F.K. (2021). Students' Achievement in online test and measurement course in synchronous and asynchronous e-learning platform. *European Journal of Open Education and E-learning Studies, 6*(2), 137-151 doi:http://dx.doi.org/10.46827/ejoe.v6i2.3966

Phakathi, L. (2023). Technology-Based support of final year Bachelor of Education students in a South African Open Distance e-Learning Institution. *International Journal on Open and Distance E-Learning*, *9*(1), 15-35. https://doi.org/10.58887/ijodel.v9i1.104

Ruga, S.N., Gikonyo, N.W. & Kyalo, D.N. (2024). Impact of learning management systems on distance learners' academic progress in Kenya public universities: A descriptive survey. *International Journal of Research and Innovation in Social Science (IJRISS), 8*(IIIS), 2040-2052, DOI: https://dx.doi.org/10.47772/IJRISS.2024.803147S

Trimarco, P. (2024). Books on capacity building in open and distance learning: Open learning. *The Journal of Open, Distance and e-Learning, 39*(2), 188-189. https://doi.org/10.1080/02680513.2024.2319800

William, J. (2023). *The missing link: Applying embodied cognition to professional learning* [Doctoral dissertation, Western University]. https://uwo.scholaris.ca/server/api/core/bitstreams/b780e0be-c999-4bcf-97de- 1723934ce1da/content

Ebabhi, A. M., Adewoyin, A. D. & Ume, E. C. (2025). An investigation of technical and pedagogical dimensions of learning management system of open and distance learning institution. *Pakistan Journal of Distance and Online Learning, 11*(2), 1-14.