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Influence Of AI And Emerging Technologies On LMS Effectiveness In Lagos State Universities: Implications For Distance Learning

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Abstract
The adoption of Learning Management Systems (LMS) has redefined how educational content is delivered and accessed in universities, significantly enhancing instructional goals and student learning experiences. In the 21st century, the integration of artificial intelligence (AI) and emerging technologies into educational platforms presents opportunities to further optimize LMS effectiveness. This study investigated influence of AI and emerging technologies on the effectiveness of LMS in Lagos State universities; and its implications for distance learning. The research was guided by two research questions and two hypotheses. The study population comprised all students in Lagos State universities, while a sample of 273 students was randomly selected from three Lagos State universities. Data were collected using a 20-item instrument titled "Artificial Intelligence and LMS Effectiveness Questionnaire" (AILMSEQ), which had a reliability coefficient of 0.92. A descriptive survey design was employed, and data analysis was conducted using simple percentages, ANOVA, and T-test. The first hypothesis, which posited that AI and emerging technologies have no significant effect on LMS effectiveness, was rejected. Conversely, the second hypothesis—that gender does not significantly influence LMS effectiveness—was not rejected. Findings revealed that students taught using AI-enhanced tools performed better academically compared to those taught with traditional methods. Additionally, LMS effectiveness was found to be independent of gender. The study recommends that university authorities develop policies, provide adequate funding, and promote LMS. Also, lecturers, staff, and students should be encouraged to adopt AI technologies in all academic activities in order to enhanceacademic activities delivered via distance learning.
Keywords*: Artificial Intelligence, Distance Learning, Emerging Technologies, Learning Management Systems and Students in Universities.*

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I. Introduction

As institutions of higher learning strive to make education relevance and accessible to all in this 21st century, distance learning education comes in handy. Distance learning is either based on the real time interactions such as attending live online lectures (Hwang et al., 2023); or interactions between the teacher and the learner at different times, such as learning from paper instructions, listening to recorded lectures, or watching pre-recorded visual tutorials (Garlinska et al., 2023). In situations where access to education is limited, distance learning provides a worthwhile alternative.Pointedly, personalized adaptation and facilitation of distance education could be facilitated using AI-powered Learning Management Systems (Cabrera et al. 2025).

Learning management system (LMS) could be described as online platform designed specifically for teaching, training, delivery of educational materials, administration, and reporting of educational activities. It is an essential tool for modern education (Garlinska et al., 2023).Learning Management Systems was designed to identify training and learning gaps, using analytical data and reporting. LMSs are platforms that focused on online learning delivery and support a range of uses. It uses intelligent algorithms to make automated recommendations for courses based on a user's skill profile, thus making education more effective (Turnbull et al., 2020).

LMS platforms provide a centralized location for course materials, assignments, assessments, and communication between students and teachers. LMS have become increasingly popular in recent years due to the rise of e-learning and the increasing demand for flexible, accessible, and cost-effective education (Alfalah, 2023).LMS can be used to enhance all three modes of teaching: face-to-face, online, and blended learning. LMS provide a large number of functionalities that support educational activity by increasing the engagement of learners and optimizing their learning outcomes. LMS have become a major element of the technological

transformation of education, providing educators and learners with a versatile and efficient environment for managing educational resources (Kasabova et al., 2023).

Studyby (Cavus et al., 2021) revealed that global educational system has witnessed a tremendous increase on acceptance and usage of different Learning Management Systems (LMS) in tertiary institutions in advanced and few developing nations. They have successfully deployed various online education platforms, that allow students to take their lectures online, collaborate with one another, and have access to learning materials using any device, anywhere, and anytime via the Internet. These systems are usually integrated with other multimedia tools such as video, text, and audio, and communication tools, e.g., email, chat and discussions forums, and assessment tools.

LMS has a lot of benefits and advantages. It is specifically designed to manage online courses, distribute learning materials, and enable collaboration between learners and instructors (Tadlaoui&Khaldi, 2020). It is a multi-user platform, that provides educators with a centralized and efficient platform where they can organize and deliver learning materials to learners in an interactive manner. LMS platforms offer a wide range of functionality, including content management, course development, visual representation of learner progress, communication tools, and assessment methods. There are basically three types of users who work with LMS - teachers, learners, and administrators (Öztürk&Gürler, 2020).

Though, there is rapid increased on the adoption and usage of LMS across the globe, the story is different in Nigeria, and other African nations as adoption and usage of various technology-based education systems in the region continued to fail (Yakubu et al., 2020). For instance, in Nigerian colleges and universities were completely closed for over six months due to COVID-19 pandemic. Just like several developing nations, the take up of LMS in Nigeria has been very slow as only few colleges and universities have incorporated LMS for academic purposes (Abugre, 2018).

Examples of LMS

Some examples of LMS being used in higher education include:

Sakai: It is an LMS that contains standard online learning, teaching, and collaboration tools as well as community-based contributions. Its open-source flexibility allows for customization and configuration of the software to meet the needs of the users (Sakai, 2020).

Google Classroom: It was designed for course creation, virtual classroom and connecting to students in real-time. With Google Classroom students can use Google's collaborative tools and other Google apps like Google Drive for storage and Google Docs to do and submit assignments.

Moodle: It is a remote learning environment via ICT networks, available through a web browser. Moodle provides a reliable, fast, stable, and accessible learning management system. Moodle uses predictive analytics to monitor the learning process of the students. It also offers collaboration tools like a messaging feature which makes communication easier (Pérez-Pérez et al. 2019).

Canvas: Canvas is an open-source LMS software that allows user to create graphic designs. The system offers feedback in the form of audio or video, and can integrate with university information systems and data sources, as well as with third-party applications It is better suited for academic learning management (Instructure, 2023).

Blackboard Learn: The Blackboard Learn is the easiest and most effective way to connect learners with their teachers. It enables course management, integrated with authentication protocols, enhance transparent and reliable grading system. Itinclude gamification, and allows students to interact, schedule meetings and discussions (Anthology, 2023). Others are Quizlet, Mindflash, etc**.**

Integration of AI and Emerging Technologies for LMS Effectiveness

In order to enhance the effectiveness of LMS tools, there is the need to augment it with AI and other emerging educational technological tools.According to Takyar (2024), AI connotes evolving technologies with capacities to perform tasks typically requiring human intelligence. The integration of artificial intelligence (AI) to learning management systems (LMS) is revolutionising higher education, offering unprecedented opportunities for personalised learning, and paving the way for the creation of intelligent tutoring systems, and chatbots (Alshahrani, 2023). In addition, AI has enhanced administrative processes in higher education, resulting in improved efficiency and cost-effectiveness.With AI, there has been a growing emphasis on leveraging technology to enhance various aspects of the educational process, especially, the LMS (Mohammed et al., 2025).

Yakubu et al. (2020) opine that LMS effectiveness lies in its ability to engage learners, support instructors, facilitate student learning, and streamline administrative functions. This effectiveness could be enhanced by AI and emerging technologies with features such as predictive analytics, intelligent tutoring systems, natural language processing, and adaptive content delivery.The integration of AI and LMS has the potential to transform the landscape of education. AI-powered LMSs have capacity to enable the adaptation of

educational content in a personalized way, offering students more dynamic and relevant learning experiences (Cabrera et al., 2025).

Some examples of AI and emerging educational technological tools that can influence effectiveness of LMS in higher institutions include: intelligent content, virtual assistants, automated transcription, computerized testing, gamification, VR, formative assessment, online polling, interactive whiteboards, video conferencing, digital portfolios, data visualization, social networking platforms, and digital assessment tools. Teachers can better assess their students' needs, intervene with targeted interventions, raise their language and writing skills, and monitor their progress using these technological tools (Owan et al., 2023). Data analytics, machine learning, and natural language processing are all parts of AI, characterized as the mechanical reproduction of cognitive abilities once associated with humans (Russell &Norvig, 2021).

According to Kasneci et al. (2023),Integrated AI and emerging technologies to LMS can perform several functions, such as:

Large Language Models (LLM): AI that can comprehend and alter human language
DreamBoxand **Smart Sparrow:** can analyze student responses in real time;
Gradescope: provide consistent and objective grading of assignments;
Kahoot!: can create interactive quizzes and simulations,
Notta: can transcribe spoken words into text;
Knewton Alta: can be used to track student performance across various metrics,
Classcraft : AI to gamify classroom management,
Turnitin: plagiarism detection tool to check for originality in student submissions
Edthena: provide tailored learning paths based on educators' career goals.

In addition, AI-powered assessment systems can sift through mountains of data in search of trends and patterns in student performance, which may then guide improvements in the classroom and other forms of intervention (Siau&Shen, 2019).

Benefits of Integrating of AI and Emerging Technologies in LMS

Personalised Learning

The incorporation of AI into LMS have the potential to transform LMS and e-learning, offering more personalized and effective learning experiences (Ahmed &Ganapathy, 2021). By combining AI and LMS, educators can create adaptive personalization of educational content and a more dynamic interaction between students and learning platforms (Cabrera et al., 2025).

Fosters Innovation

According to Islam et al. (2022), the integration of AI in LMSs fosters innovation, enhances the learning experience and encourage progress in teaching and learning. Ahmed and Ganapathy (2021) discovered that the use of virtual assistants, automated content creation, and the adoption of AI in education, demonstrates the breadth of application and the transformative potential of AI in various educational contexts.

Enhances Student Engagement

Integrating AI-based educational tools into LMS enhances student engagement, saves educators from administrative tasks, allowing them to focus on more meaningful teaching activities. Integrating Educational tools such MOOCs, games, LMS,AR/VR, etc, can facilitate learners engagement, yielding positive outcomes in different learning settings (Santoso&Sari, 2018).

Personalised Students Assessment

Shukla and Verma (2019) opine that the implementation of AI and emerging technological tools, such as chatbots, further enriches the LMS experience by providing instant and personalized responses to student queries.

Learning Effectiveness and Skills Developments

LMS reinforced by AI can enhance the teaching and learning of important skills like citizenship competencies in an engaging way (Lim et al, 2017)

Acquiring Critical Thinking and Problem Solving Skills

AI-enhanced LMS could assist learners in acquiring critical thinking and problem solving skills. AI applications in LMS helped provide focused curriculum and learning paths for students to develop into independent learners with strong thinking and problem-solving abilities.

Though, integration of AI-powered LMS in higher education offers promising advancements, notable challenges and ethical considerations must be addressed. Some of the challenges include issues data privacy and

security, algorithmic bias, ethical concerns, student consent, digital gap accessibility issues, and inexperienced faculty (Qushem et al., 2021). All these concerns need to be carefully navigated to ensure the responsible implementation of AI in educational contexts. According to Adewale et al. (2024), understanding gender on AI's educational impact on LMS effectiveness in higher education is very germane. AI can enrich teaching and learning methodologies in higher institutions by offering personalised, adaptive learning experiences irrespective of gender or age of users. Notably, the flexibility, and accessibility of the LMS have fostered increased participation of male and female students in AI technologies. Specifically, AI integration to LMS is not gender specifics (Ogunsola-Bandele, &Kennepohl, 2022).

Theoretical Framework

The theory that underpin this study is known as Technology Acceptance Model (TAM). The theory was developed by Davis in 1989. Technology Acceptance Model (TAM), in the context of web-based learning and LMS is used by researchers to offer judgement on users' perception, acceptance, and attitudes towards technologies. Technology Acceptance Model (TAM), focus on ease of use and usefulness of technology (Rachmi et al., 2023). Invariably, perceived ease of use is the degree to which an individual accepts that employing a specific system would be free from effort. It is conceivable that instructive innovation through a high degree of perceived usefulness is expected to initiate positive states of mind (Davis, 1989). With respect to this study, the theory revealed perceived usefulness and perceived ease of use determines whether a user will be ready to integrate AI into various LMS platforms.Studies by Denaputri& Usman (2019) and Wicaksono& Maharani (2020) showed the relationship of perceived usefulness and perceived ease of use as factors in predicting user's purpose to utilize computer and technological innovation.

Statement of the Problem

AI and emerging technologies are having a significant impact on the LMS, bringing a fresh wave of customisation, automation, and data-driven analysis. The impressive capabilities of AI, such as curating personalised learning paths, suggesting relevant materials based on individual progress and offering immediate feedback through automated grading and analysis could ultimately enhance educational activities(Ouyang et al, 2020). AI-powered conversational agents and recommendation systems in LMS have significantly enhanced student engagement and offered personalised support. OptimisingLMS effectiveness involve ability to engage learners, support instructors, support instructional goals, facilitate student learning, and streamline administrative functions, which AI and other educational technologies offer (Yakubu et al. 2020). Again , it has been discovered that adoption and usage of LMS in Nigeria has been very slow as only few colleges and universities have incorporated LMS for academic purposes (Abugre, 2018). Hence, the thrust of this study is to fill all the identified gaps, and to examine influence of AI and Emerging Technologies on LMS effectiveness in Lagos State Universities , and its implications for distance learning.

Two research questions and two null hypotheses were raised and tested in this study at 0.05 level of significance.

Research Questions

1. What are the levels of students' acceptance of AI and Emerging Technologiesin Lagos State Universities?
2. Does LMS effectiveness in Lagos State Universities depend on students' gender?

Hypotheses

1. AI and emerging technologies have no significant effect on LMS effectiveness in Lagos State Universities
2. Gender does not significantly influence LMS effectiveness in Lagos State Universities

II. Method

Research Design

A descriptive survey was adopted for the study as it aimed at examining influence of AI and Emerging Technologies on LMS effectiveness in Lagos State Universities, and its implications for distance learning.

Population

The study population comprised all students in Lagos State universities.

Sample and Sampling Techniques

A sample of 273 students was randomly selected from different departments from three Lagos State universities. The Institutions are: Lagos State University (LASU), Ojo; Lagos State University of Education (LASUED), Oto-Ijanikin; and Lagos State University of Science and Technology(LASUSTECH), Ikorodu, Lagos.

Instrument

Data were collected using a 20-item instrument titled "Artificial Intelligence and LMS Effectiveness Questionnaire" (AILMSEQ). The instrument consisted of 3 sections.

Section A of the instrument comprised items that measure socio-demographic characteristics of the participants such Name of School, Department, Age and Gender

Section B of the scale comprised of items on students' acceptance of Artificial Intelligence and Emerging Technologies.

Section C of the scale comprised of items on LMS Effectiveness. The scale is of Likert-4 type (4=strongly agree, 3=agree, 2=disagree 1= strongly disagree). The reliability coefficient of the instrument using Cronbach Alpha reliability index, r is 0.92.

Statistical Analysis

Data obtained was analysed using descriptive statistics of mean, percentages, and inferential statistics of ANOVA, and T-test

III. Result

Research Question 1. What are the levels of students' acceptance of AI and Emerging Technologiesin Lagos State Universities?

Table 1: Level of students' acceptance of AI and Emerging Technologies

		Frequency	Percent	Cumulative Percent
Valid	Low	143	52.4	52.4
	Average	82	30.0	82.4
	High	48	17.6	100.0
	Total	273	100.0	

From Table 1, levels of students' acceptance of AI and Emerging Technologiesin Lagos State Universitiesare as follows: out of total 273 respondents, 52.4% which correspond to 143 students have low level of acceptance, 30.0 % which correspond to 82 students have average level of acceptance, while, 17.6 % which correspond to 48 students have high level of acceptance. This result showed that more than half of respondents have low level of acceptance of AI and emerging technologies.

Research Question 2. Does LMS effectiveness in Lagos State Universities depend on students' gender?

Table 2: Group Statistics of gender on LMS Effectiveness

	Gender	N	Mean	Std. Deviation	Std. Error Mean
LMS Effect	Male	156	22.62	6.704	.537
	Female	117	21.78	6.297	.582

Table 2 showed that the mean and standard deviation of students' gender on LMS effectiveness is as follows: male respondents' mean = 22.62 & S D= 6.74, while female respondents' mean = 21.78 & S D= 6.297. This result shows that there is no difference in their means. This implies that gender could not influenceLMS effectiveness in Lagos State Universities.

Hypothesis 1. AI and emerging technologies have no significant effect on LMS effectiveness in Lagos State Universities

Table 3: ANOVA of influence of AI and emerging technologies onLMSEffectiveness

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9780.834	2	4890.417	720.081	.000
Within Groups	1833.701	270	6.791		
Total	11614.535	272			

Table 3 revealed that F (2, 270) = 720.081, and that p = 0.000. Since the p-value of the F-ratio is less than 0.05, this then showed that there is statistically significant difference between the variables. Hence, the null hypothesis was rejected. That is,AI and technologies have significant effect on LMS effectiveness in Lagos State UniversitiesTable 4 shows where the effect lie:

Table 4: Tukey HSD of influence of AI and emerging technologies on LMS Effectiveness

Level of AI &Tech	N	Subset for alpha = 0.05		
		1	2	3
Low	143	16.81		

Average	82		26.28	
High	48			31.63

From Table 4, it was observed that on the measure of LMS effectiveness in Lagos State Universities, respondents with low acceptance of AI and emerging technologies had mean of 16.81, those with average level had mean of 26.28, while those with high level had mean of 31.63. This therefore shows thatLMS was very effective among students with high level of acceptance of AI and emerging technologies, , while it was not effective among others students.

Hypothesis 2. Gender does not significantly influence LMS effectiveness in Lagos State Universities

Table 5: Independent Samples Test of influence of gender onLMS effectiveness

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Diff	Std. Error Diffe
LMS Effect	Equal variances assumed	4.573	.033	1.056	271	.292	.844	.799
	Equal variances not assumed			1.066	257.682	.287	.844	.792

Table 5 presents the results of an independent samples t-test examining the influence of gender on LMS effectiveness in Lagos State Universities. The t-test showed no statistically significant difference in LMS effectiveness between male and female students, t (271) = 1.056, p = 0.292. The mean difference of 0.844 suggests that, on average, male and female students performed similarly.Therefore, the null hypothesis stating thatgender does not significantly influence LMS effectiveness in Lagos State Universitiesis retained. In other words, LMS effectiveness does not significantly differ based on gender among students in Lagos State Universities.

IV. Discussion

This study investigated influence of AI and emerging technologies on LMS Effectiveness in Lagos State Universities, and its implications for distance learning. Result obtained showed that more than half of respondents have low acceptance of AI and emerging technologies. This is in agreement withAlshahrani (2023), who discovered that the integration of AI and emerging technologies to learning management systems (LMS) is revolutionising higher education, its integration, adoption and acceptance in higher institutions is at lowest ebb.

Thefirst hypothesis which stated thatAI and emerging technologies have no significant effect on LMS effectiveness in Lagos State Universities was rejected. That is, students' acceptance of AI and emerging technologieshave potentials for influencing LMS effectiveness in Lagos State Universities. This finding is in agreement with the position of Mohammed et al. (2025) who stated that AI has enhanced administrative processes in higher education, in the area of admission processes, student advising, and resource allocation, resulting in improved efficiency and cost-effectiveness.With the proliferation of digital learning environments, there has been a growing emphasis on leveraging technology to enhance various aspects of the LMS.

The second hypothesis which stated that gender does not significantly influence LMS effectiveness in Lagos State Universitieswas not rejected. In other words, students' gender has nothing to do with LMS effectiveness. This finding is in agreement with Adewale et al. (2024), who discovered that AI can enrich teaching and learning methodologies, especially LMS effectiveness in higher institutions by offering personalised, adaptive learning experiences irrespective of gender or age of users.

V. Recommendations

The following recommendations were made, based on the findings of this study:

1. Heads of tertiary institutions should adopt LMS that are tailored to suit their respective institutions and are culturally relevant to them.
2. There is need for adequate funding for acquiring, maintaining, and upgrading advanced technologies such as IoT devices, AR/VR systems, and robotics in various institutions.
3. Provision of required infrastructure such as internet connectivity, power supply, and technological resources are very germane
4. Staff in tertiary institutions should be trained and retrained regularly to meet up with the needs of the 21st century education
5. There is need to maintain data privacy, security, protect students' personal information and ensuring cyber-security.

6 There is need for curriculum integration that will align with technological tools with existing educational curricula and ensuring that they contribute meaningfully to learning objectives.
7. Students seeking distance learning education should be encouraged to be technologically inclined.

VI. Conclusion

This study carefully examined influence of AI and emerging technologies on LMS Effectiveness in Lagos State Universities, and its implications for distance learning. From the study, it was discovered thata lot of students in tertiary education had low acceptance of AI and emerging technologies, thereby limiting the usefulness and effectiveness of LMS. Therefore, there is the need for collaborative efforts in promoting AI and emerging technologies so that LMS could be effective. These efforts will surely enhance operations and delivery of distance learningeducation.

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