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Artificial Intelligence and the Management of Teaching and Learning in Universities in North-Central, Nigeria

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Abstract

The study examined the relationship between selected Artificial Intelligence (AI) tools and the management of teaching and learning in Universities in the North-Central States of Nigeria. Specifically, the study focused on the use of chatbots and automated grading systems. A correlational design was adopted, and a sample of 386 university staff was drawn using stratified random sampling from a population of 10,787 staff from nine (9) Universities in North-central Nigeria, determined by the Taro Yamane calculator. Data was collected using a 16-item questionnaire titled Artificial Intelligence and the management of teaching and learning in Universities in the North-Central States of Nigeria (AIMTLUNCN). The instrument was validated by experts, yielding a validity index of 0.79, while the reliability coefficient of 0.71 was obtained through pilot testing. Pearson's Product-Moment Correlation was used to answer the research questions, while Regression analysis was used to test the hypotheses of the study at a 0.05 level of significance. Findings reveal a very weak and non-significant relationship between Chatbots and the management of teaching and learning ($r = 0.062$, $p > 0.05$) as well as between automated grading systems and the management of teaching and learning ($r = 0.026$, $p > 0.05$). The study concludes that there is no significant relationship between the selected AI tools and the management of teaching and learning, indicating limited adoption and ineffective integration of AI in university teaching and learning management systems.

Keywords: Artificial Intelligence, Management, Teaching, Learning and Universities.

Introduction

Education is considered one of the most important sectors of human society, supporting the development of human resources needed to advance and meet societal goals. Globally, university Education is seen as a means for a society to achieve its educational objectives. In Nigeria, university Education, also known as Post-secondary Education, provides advanced training aimed at producing professionals with skills relevant to society, thereby contributing to the country's growth and development, as outlined in the National Policy on Education (Federal Republic of Nigeria, 2014). According to Edwurugwu and Onyeukwu (2023), Universities serve several functions, including acting as centres of technical and scientific advancement, supporting the acquisition of skills, producing graduates of high calibre with an entrepreneurial mindset, and conducting strategic research and development activities.

University management fosters social cohesion, reduces inequalities, and raises the level of knowledge, skills, and competencies in society (Edwurugwu and Onyeukwu, 2023).

The management of teaching and learning in universities is a key factor that affects the quality of Education, student engagement, and overall effectiveness of a university. Management, as defined by Daft (2021), is the systematic use of both people and material resources within an organisation to achieve predefined objectives effectively. Effective management is essential for achieving educational goals efficiently. The improvement of students' performance is hinged on how effectively the university is being managed; management is a key aspect of any system; the success of any system depends largely on the management of such a system. The management of teaching and learning in universities encompasses curriculum development and implementation, efficient coordination and utilisation of resources, proper design and development of academic activities, professional development of staff, instructional methods, assessment strategies, student support systems, and the integration of emerging technologies into pedagogical processes (Bates, 2019). Good management of the university system lays a solid bedrock for effective learning, which largely impacts the quality of manpower produced, because university Education is an important cornerstone of societal development and progress (Feng & Li, 2024), Iyala et al (2019), opined that the aim of managing Universities in Nigeria is to facilitate effective teaching and learning to prepare students to contribute meaningfully towards the achievement of sustainable development.

Teaching and learning in the past relied heavily on traditional classrooms, which depended on conventional teaching methods, constant instructor supervision, textbooks, manual testing and grading, face-to-face lectures, and the mechanical handling of administrative tasks. Educators often rely on questioning techniques, collaborative activities, and assignments to enhance students' ability to evaluate information and develop independent perspectives (Facione, 2015). Meeting each student's individual learning needs was more challenging due to the requirement for students to be present simultaneously, and students tended to be more passive rather than active in the learning process. Nowadays, Universities in north-central Nigeria still struggle to provide high-quality teaching and learning experiences despite technological advancements; they continue to face unique challenges in managing Education effectively, given the diverse needs of the population, limited resources, inadequate infrastructure, and rapid technological growth. In response to these challenges, AI has emerged as a transformative tool capable of enhancing teaching, learning and administrative efficiency in university education globally.

AI Chatbots are designed to mimic human conversation using text or voice interaction, conversationally providing information, and can be integrated into the university system to perform various functions, including teaching and learning, managing students' records, registration and attendance, scheduling, processing data, resource allocation, and management of finances (Labadze et al, 2023). In a university context, Chatbots can provide students with immediate support by answering questions, offering explanations, and providing additional resources. Chatbots are also designed to act as virtual teaching assistants, supporting educators through various means. Chatbots use Natural Language Processing (NLP) to understand human language as it is naturally spoken or written, and it uses machine learning algorithms to learn from the user's past experiences. To corroborate this, Singh & Singh and Singh (2021) asserted that AI systems can also offer students round-the-clock assistance, advice, and answers to their questions. The application of chatbots and other AI tools in Education offers benefits such as immediate assistance, quick access to information, enhanced learning outcomes, and improved Educational experiences.

AI-powered automated grading systems can be used in university Education to grade students and reduce the workload for teachers. These are systems which use AI machine learning and predefined rules to evaluate students' submissions, ranging from multiple-choice tests to essays without human intervention. It analyses content against certain rubrics and allows for detailed feedback to be provided to the students. According to Igbokwe (2023), AI can grade assignments and exams, saving educators time and providing more consistent grading. Artificial intelligence (AI) may be used to automate assessment and grading more effectively and produce an objective evaluation. Additionally, Oztok & Zingaro (2019) opined that automated graders can mark, grade, and record students' assessments, freeing up teachers' time for more important, impactful work like lesson planning and student engagement. The use of AI might improve the automation of curriculum creation, teaching, evaluation, administrative tasks, and even the granting of degrees and transcripts (Hannan and Liu, 2021). It is against this backdrop that this study will examine how AI tools such as Chatbots and automated grading systems can be employed to enhance the management of teaching and learning in universities in North-Central Nigeria.

Statement of the Problem

In recent times, the management of teaching and learning in North-Central universities has been flawed, hindered by over-reliance on traditional and mechanical methods despite the rapid integration of technology in education. These challenges have been attributed to inefficient management, limited access to quality education and technology, a shortage of

trained personnel, outdated pedagogical methods, among others. There are growing concerns that continued reliance on traditional methods alone will perpetuate inefficiencies, scalability issues, and limited adaptability within universities in North-Central Nigeria. Although Artificial Intelligence has demonstrated significant potential to improve teaching, learning, and administrative efficiency in universities globally, its application in Nigerian universities, particularly in the North-Central region, remains largely limited and under-researched. Previous studies have focused on availability and perception, but there is limited empirical evidence on the relationship between AI tools and the management outcomes in North-central Nigeria. The absence of sufficient empirical evidence on the use of AI in managing teaching and learning in North-Central universities constitutes a significant gap that the present study seeks to fill. Therefore, this study will examine the role of AI in promoting effective administration, providing personalised learning, improving teaching effectiveness and learning outcomes, as well as the challenges affecting its implementation in universities in the North-Central zone of Nigeria. By providing empirical data and insights, the study will contribute to improving the management of teaching and learning through effective AI integration in the region.

Research Questions

This study sets out to answer the following research questions.

1. How is Chatbot related to the management of teaching and learning in Universities in the North-central zone of Nigeria?
2. What relationship do automated grading systems have with the management of teaching and learning in Universities in the North-central zone of Nigeria?

Hypotheses

The following null hypotheses were tested at a 0.05 significance level.

H_{01}. Chatbots are not significantly related to the management of teaching and learning in Universities in the North-central zone of Nigeria

H_{02}. There is no significant relationship between automated grading systems and the management of teaching and learning in Universities in the North-central zone of Nigeria

Literature Review

The university system is composed of the students, administrative staff, academic staff, and the school management as the human resources component of the institution. The management of universities entails the harmonious coordination of various daily and periodic activities by the

personnel in whose hands such institutions have been placed to accomplish stated educational aims and objectives (Kajo et al., 2024).

Afonughe et al (2021) conducted a study on the Integration of Artificial Intelligence Tool (AI-Chatbot) into Teaching and Learning: A Panacea for Improving Universities` Educational and Administrative Duties in South-South, Nigeria. The study aimed to investigate the integration of AI-chatbot into teaching and learning: A panacea for improving Educational and administrative duties among Universities in the South-South geopolitical zone, Nigeria. The study had three (3) objectives with corresponding research questions that guided the study. Three hypotheses were also tested at a 0.05 alpha significance level. The study adopted a descriptive survey research design; the study population comprised 252,000 public university students in the South-South (Delta State, Edo State, and Bayelsa). The sample size used was 399 respondents (274 students, 67 lecturers, and 58 admin staff) in the state and federal Universities in the state. The instrument used for data collection was AICHATBOTSQ (AI-chatbot structured questionnaire), consisting of 20 items. The data gathered were analysed using mean, standard deviation, and analysis of variance (ANOVA). Findings from the study reveal that there is no significant difference in the mean rating of respondents on the need for AI-chatbot in teaching and learning as well as performing administrative tasks among Universities in South-South; there is little availability of AI-chatbot technology in handling Universities` administrative duties; additionally, the findings show that poor internet facilities, instabilities in governance, inadequate funding, poor electricity supply among others are factors inhibiting implementation of AI-chatbot to execute administrative duties in Universities of South-South states, Nigeria. The study concludes that there is a need for Universities in the South-South states of Nigeria to deviate from traditional methods of performing administrative tasks and content delivery and embrace AI chatbots. Thus, this study recommends full integration of artificial intelligence tools (AI-chatbot) into teaching and learning as a means for improving Universities` Educational and administrative duties in South-South, Nigeria.

The study of Afonughe et al (2021) did not consider the integration of AI chatbots on teaching and learning in North-central universities; the instrument for data collection was a questionnaire, and mean, standard deviation, and analysis of variance (ANOVA) were used for data analysis, which makes it different from this work. This highlights the need for a correlational approach to examine the relationship between AI tools and the management of teaching and learning in North-central Nigeria.

Aubin (2022), in "An Empirical Investigation into the Impact of Automated Grading, sought to determine the impact of automated grading compared to manual grading on students'

performance, to establish if there is a significant impact on the grades of students who receive automated feedback as opposed to traditional feedback from human graders. The study focuses on a single objective, a research question, and tests a single hypothesis. The targeted population of the study was college computer science students from the University of Nevada who were enrolled in CS135 Introduction to Programming. The study sample consisted of 171 students, and a counterbalanced subject design was employed to facilitate the evaluation of repeated measures throughout the fall of 2021. Data for the study were collected using programming tests that were administered weekly and surveys administered via Canvas. Data was analysed using a repeated-measure ANOVA to compare the means of two grading types over time. The findings from the study indicated that automated grading had no detrimental effects on students' scores, and there was a slight statistical increase in the grades of students whose work was assessed automatically, largely attributed to the immediate feedback they got. Finally, the study concluded that automated grading can play a supporting role in an educational environment, significantly elevating the burden of grading and students' learning. The study recommends further research and for educators to integrate automated grading where appropriate.

The study of Aubin (2022) was conducted at the University of Nevada; the population was computer science students, data for the study was collected by administering a programming test, and ANOVA was used to analyse data. This makes the work of Aubin (2022) different from this study, which will use a correlational research design, with a population composed of staff and students in all the Universities in the North central states of Nigeria, a modified questionnaire and descriptive statistics of mean, standard deviation, and Pearson's product-moment to analyse data.

Theoretical Framework

The study is anchored on Systems theory, originally founded by Ludwig von Bertalanffy (1920s). Systems theory provides a holistic framework for understanding organisations as complex systems composed of interrelated and interdependent parts. Rather than analysing the individual parts in isolation, the theory emphasises the interactions among components and how they influence overall system performance. In the context of this study, the university is conceptualised as an open system composed of many interrelated subsystems (the administration, faculty, students, curriculum, infrastructure, and the external environment). The interrelationships and interconnectedness of these diverse components impact the entire system. This theory provides a framework for understanding how the interactions between the

subsystems in the university influence the management of universities, teaching, and learning. The theory is particularly relevant to this study because it provides a basis for understanding how AI tools such as chatbots and automated grading systems function as inputs within the university system. These inputs undergo transformation processes through instructional delivery methods and administrative coordination, ultimately producing outputs in the form of improved teaching and learning management outcomes. Furthermore, the theory explains how using different AI tools can overhaul various aspects of management, instructional strategies, infrastructure, and assessment methods. It serves as a robust framework for explaining the complex interaction involved in the integration of AI into university management systems and underscores the need for a coordinated approach towards technology adoption in universities.

Methodology

This study employed a quantitative research approach using a correlational research design to examine the relationship between selected AI tools and the management of teaching and learning in universities in North-central Nigeria. The population of the study comprised 10787 staff drawn from nine (9) universities within the North-central geopolitical zone of Nigeria. A sample size of 386 respondents was determined using the Taro Yamane Formula. Stratified random sampling was employed to ensure that all categories of universities- federal, state and private were adequately represented. Data was collected using a questionnaire titled Artificial Intelligence and the management of teaching and learning in Universities in the North-Central States of Nigeria (AIMTLUNCN). The instrument consisted of 16 items (8 items per variable) structured on a 4-point Likert scale. To ensure the validity of the instrument, it was subjected to face and content validity by experts in Educational Research and Measurement and Evaluation. Based on their assessments, the instrument got a validity index of 0.79. The instrument was later pilot tested on 30 university staff within the population but outside the sample area, and it yielded a Cronbach's alpha coefficient of 0.79. Pearson's Product-Moment Correlation was used to answer the research questions, while Regression analysis was used to test the hypotheses of the study at a 0.05 level of significance. Ethical considerations were strictly observed. Participation was voluntary, and respondents were assured of the confidentiality and anonymity of their responses.

Results

The research questions were answered using Pearson's Product-Moment Correlation was used to answer the research questions, while Regression analysis was used to test the hypotheses of the study at a 0.05 level of significance.

Research question one: How is Chatbot related to the management of teaching and learning in Universities in the North-central zone of Nigeria?

Table 1: Pearson's Product-moment Correlation on the Strength of Relationship between Chatbots and the management of teaching and learning in Universities in the North-central zone of Nigeria

Variables	N	$\bar{X}$	Std.Dev.	r
Chatbots	386	22.67	3.76	0.062
Management of Teaching and Learning	386	26.98	3.59	

Table 1 shows the strength of the relationship between chatbots and the management of teaching and learning in Universities in the North-central zone of Nigeria. The result reveals that the calculated value of Pearson's product-moment correlation (r) is given as 0.062. This value is below the benchmark correlation value of 0.50. This implies that there is a weak positive relationship between Chatbots and the management of teaching and learning in Universities in the North-central zone of Nigeria.

The statistical data presented in Table 1 regarding the relationship between chatbots and the management of teaching and learning in universities in the North-Central zone of Nigeria reveals a worrying trend. With a calculated Pearson's product-moment correlation coefficient (r) of 0.062 drastically lower than the 0.50 benchmark. The study establishes a negligible, almost non-existent, positive relationship. This finding implies that the deployment of chatbots in these institutions has had virtually no meaningful impact on how teaching and learning are managed. This result is particularly significant because chatbots are designed to act as "always-on" digital assistants, streamlining communication and administrative processes. The weak correlation suggests that this potential is being wasted, with profound implications for institutional efficiency and student support.

The primary implication of this weak relationship is that chatbots are failing to reduce the administrative burden on university staff. One of the main promises of introducing chatbots into an educational ecosystem is the automation of routine inquiries such as questions about course registration, semester calendars, fee payments, and library hours, thereby freeing up academic and administrative staff to focus on higher-level management tasks. The correlation of 0.062 indicates that this automation is not happening effectively. It suggests that staff are still heavily involved in these routine processes, likely because the chatbots are unable to handle the volume or complexity of student queries. Consequently, the "management of

teaching and learning" remains as labor-intensive and manual as it was before the technology's introduction, rendering the chatbot a redundant layer in the administrative workflow.

Furthermore, this finding points to a significant failure in student support and engagement. Chatbots are intended to provide students with instant, 24/7 access to information, thereby enhancing their learning experience by resolving academic hurdles quickly. The negligible correlation implies that students do not view these systems as valuable management tools. This could be due to several factors: the chatbots may lack the natural language processing capabilities to understand local dialects or the specific context of Nigerian university queries, or they may simply be "dumb" rule-based bots that frustrate users with repetitive, irrelevant answers. When a chatbot cannot effectively answer a student's question about their timetable or lecture venue, it ceases to be a tool for learning management and becomes an obstacle. The weak relationship suggests that students are bypassing these systems and resorting to traditional channels by visiting faculty offices or posting on social media to get the help they need.

Additionally, this result highlights a disconnect between technology adoption and problem-solving. The introduction of a chatbot is often a high-profile technological upgrade intended to signal a university's modernity. However, an r-value of 0.062 suggests that this is a classic case of "solutionism" adopting a technology without a clear problem-solving strategy. The chatbots appear to have been implemented as a novelty rather than a strategic component of the university's management information system. If the technology is not integrated with the university's central database in real-time, it cannot provide accurate information. Thus, the weak correlation likely reflects a lack of backend integration; the chatbot is "walled off" from the actual data required to manage teaching and learning effectively.

The findings suggest a misallocation of resources. Developing, licensing, and maintaining a chatbot requires financial and human capital. A correlation this low indicates a poor return on investment. It implies that funds that could have been used to improve internet connectivity, upgrade physical classrooms, or train staff are being funneled into a digital tool that is functionally inert. The study essentially reveals that these chatbots are currently functioning as "decorative" features on university websites rather than as functional management aids.

In conclusion, the negligible positive relationship (r=0.062) between chatbots and the management of teaching and learning in North-Central Nigerian universities serves as a critical diagnostic indicator. It demonstrates that the current generation of chatbots is not adding value to the educational management process. To bridge this gap, university management must move

beyond simply deploying chatbots. They must focus on developing robust, intelligent systems that are context-aware, integrated with real-time university data, and capable of truly understanding student needs. Without these improvements, chatbots will remain on the periphery of university management, unable to support the complex task of teaching and learning.

Research Question 2: What relationship do automated grading systems have with the management of teaching and learning in Universities in the North-central zone of Nigeria?

Table 2: Pearson's Product-moment Correlation on the Strength of Relationship between Automated Grading and the Management of teaching and learning in Universities in the North-central zone of Nigeria

Variables	**N**	$\overline{X}$	**Std.Dev.**	**r**
Automated Grading Systems	386	25.54	3.84	0.026
Management of Teaching and Learning	386	22.67	3.76	

Table 2 shows the strength of the relationship between automated grading and the management of teaching and learning in Universities in the North-central zone of Nigeria. The result reveals that the calculated value of Pearson's product-moment correlation (r) is given as 0.026. This value is below the benchmark correlation value of 0.50. This implies that there is a weak positive relationship between automated grading systems and the management of teaching and learning in Universities in the North-central zone of Nigeria.

The statistical analysis presented in Table 4.2 regarding the relationship between automated grading systems and the management of teaching and learning in universities within the North-Central zone of Nigeria reveals a stark and concerning reality. With a calculated Pearson's product-moment correlation coefficient (r) of 0.026 far below the 0.50 benchmark. The study establishes that there is a negligible, practically non-existent positive relationship. This finding implies that the implementation of automated grading technology has not translated into improved management of teaching and learning. An r-value this low suggests that the presence of these systems is statistically irrelevant to the educational management processes in the region. This essay explores the critical implications of this finding, arguing that it points to a failure of integration, a persistence of manual inefficiencies, and a wasted opportunity for data-driven decision-making.

The most immediate implication of this weak relationship is that automated grading systems are failing to alleviate the administrative burden on educators. In the context of North-Central Nigeria, where universities often grapple with large class sizes and high student-to-lecturer ratios, automated grading is theoretically essential. It promises to drastically reduce the time spent on marking objective assessments, thereby freeing up lecturers to focus on the "management" of teaching such as curriculum planning, mentorship, and instructional design. However, an r-value of 0.026 indicates that this shift is not happening. It suggests that despite the availability of the technology, lecturers remain heavily encumbered by manual grading processes. Consequently, the efficiency gains anticipated from technology adoption are not being realized, and the management of teaching remains as labor-intensive and administratively bogged down as it was in the pre-digital era.

Furthermore, this finding highlights a critical limitation in the scope of application. A correlation this low suggests that automated grading is not being utilized for the core, high-stakes assessments that drive the learning process. It is highly likely that the technology is restricted to low-value tasks, such as class quizzes or multiple-choice tests, while the management of significant learning outcomes, projects, and fieldwork remains entirely manual. Because the "management of teaching and learning" is predominantly driven by these complex assessments, a system that only automates the periphery will show no statistical relationship to overall educational management. The system is effectively an add-on rather than a central pillar of the academic workflow.

Additionally, this result implies a lack of trust and pedagogical resistance among faculty. The absence of a significant relationship may stem from a refusal by university management and faculty to rely on algorithmic scoring. In many academic cultures, there is a deep-seated skepticism regarding the ability of automated systems to accurately evaluate student understanding. If lecturers are compelled to manually re-grade or extensively review the system's output to verify its accuracy, the "automation" benefit is nullified. The weak correlation suggests that human intervention is still the dominant mode of evaluation, rendering the technology a redundant step in the chain rather than a transformative tool.

Moreover, the finding signifies a missed opportunity for data-driven decision-making. One of the most powerful aspects of automated grading is the analytics it generates immediate insights into student performance, common misconceptions, and learning gaps. These analytics are crucial for the effective management of teaching, allowing instructors to adjust their pedagogy in real-time. The negligible correlation implies that this data is not being utilized. If the grading system were integrated into the management of learning, we would expect a stronger

correlation as managers reacted to this new stream of information. The fact that there is not suggests that the data is being ignored or is inaccessible to decision-makers, representing a significant loss in the potential for evidence-based educational management.

This finding serves as an indicator of resource misallocation and technical disconnection. Implementing automated grading systems requires substantial financial investment in software licenses, scanners, and infrastructure. An r-value of 0.026 suggests a poor return on investment. It implies that the technological infrastructure is likely fragmented, perhaps standing alone rather than being integrated into a central Learning Management System (LMS). When technology exists in a vacuum, it cannot influence the broader system.

In conclusion, the negligible positive relationship (r=0.026) between automated grading systems and the management of teaching and learning in North-Central Nigerian universities is a clear signal of stagnation. It reveals that the potential of automation remains largely untapped. To move from statistical irrelevance to significance, university administrators must move beyond simply acquiring software. They must address the human and structural barriers such as training faculty, integrating systems, and fostering trust in algorithmic assessment that prevent these tools from playing a meaningful role in the educational management process. Without this holistic integration, automated grading will remain a background feature, failing to enhance the quality or efficiency of university education.

Test of Hypotheses

Two null hypotheses formulated for the study were tested at a 0.05 level of significance using Regression Analysis, and the results are presented below:

Hypothesis one: Chatbots are not significantly related to the management of teaching and learning in universities in the North-central zone of Nigeria

Table 3: Regression Analysis on the relationship between Chatbots and the Management of Teaching and Learning in Universities in the North-central zone of Nigeria

Model	Sum of Squares	df	Mean Square	F	P-value.	Decision
Regression	168.509	1	168.509	1.907	0.163	Accepted
Residual	33937.155	384	88.378			
Total	34105.664	385				

Dependent Variable: MANAGEMENT OF TEACHING AND LEARNING

Predictors: (Constant), CHAT BOTS

Table 3 indicates the relationship between chatbots and the management of teaching and learning in Universities in the North-central zone of Nigeria. Results indicate that the F calculated value is 1.907 at the p-value 0.163, which is higher than the 0.05 level of significance at degrees of freedom of 1 and 384. Hence, hypothesis 1 is accepted, meaning there is no significant relationship between chatbots and the management of teaching and learning in Universities in the North-central zone of Nigeria.

The statistical analysis presented in Table 3, with an F-calculated value of 1.907 and a p-value of 0.163 well above the 0.05 level of significance. The study accepts the null hypothesis (Hypothesis 1). This statistical conclusion indicates that there is no significant relationship between chatbots and the management of teaching and learning. This finding moves beyond suggesting a "weak" link to asserting that, statistically, the presence of chatbots has no discernible impact on educational management processes. The implications of this lack of significance are profound, pointing to a fundamental disconnect between the technological tools being adopted and the actual academic needs of the institutions.

The primary implication of this finding is that chatbots are currently operating on the periphery of academic management**.** In theory, chatbots should be integral to the "management of teaching and learning" by streamlining communication between students and institutions, providing 24/7 academic advising, and resolving administrative bottlenecks. However, the acceptance of the null hypothesis suggests that these systems are not integrated into the core academic workflow. They are likely functioning as isolated "add-ons" perhaps limited to basic website FAQs, rather than being embedded into the Learning Management Systems (LMS) or student information portals. Because they are not central to the delivery or monitoring of education, their influence on management metrics is statistically non-existent.

Furthermore, this result implies a failure to address the specific administrative context of North-Central Nigerian universities**.** The lack of a significant relationship (p=0.163) suggests that the chatbots deployed may not be contextually intelligent. A chatbot that cannot understand local nuances, specific institutional regulations, or the dialects of the student population will fail to provide useful support. If students cannot get accurate answers regarding course registration, hostel allocation, or specific faculty protocols through the chatbot, they will inevitably revert to manual, labour-intensive methods of seeking information. Consequently, the chatbot fails to reduce the administrative burden on staff, meaning the "management" of the institution remains as heavy and inefficient as before.

Additionally, the findings highlight a gap between technological novelty and practical utility. The adoption of chatbots is often driven by the desire to appear innovative and modern, a

phenomenon known as "innovation theater." However, the statistical evidence indicates that this innovation has not translated into functional value. If chatbots were effectively managing teaching and learning, we would expect to see a measurable reduction in response times to student queries, a decrease in administrative traffic, and improved student satisfaction scores. The lack of a significant relationship suggests that these improvements are not happening. The chatbots are likely "dumb" scripts that offer generic responses, failing to alleviate the complex administrative challenges faced by university management.

Moreover, the result suggests a resistance to or lack of reliance on digital support systems by the academic community. It is possible that both faculty and students simply do not trust the chatbot system enough to incorporate it into their daily routines. In an academic environment where human interaction and authority are paramount, an automated interface may be viewed as inadequate for handling serious academic inquiries. If educators do not use the data from chatbot interactions to inform their teaching management strategies, and if students do not use them to support their learning, the technology becomes redundant. The statistical insignificance confirms that this tool is currently an ornamental feature of the university landscape rather than a functional engine of management.

Besides, this finding serves as a crucial economic and strategic indicator. Implementing and maintaining chatbots requires financial investment. An F-value of 1.907 ($p=0.163$) indicates that the variance in management effectiveness is *not* explained by the use of these systems. This effectively signals a poor return on investment. It implies that resources allocated to these chatbots are not yielding dividends in terms of administrative efficiency or educational quality.

In conclusion, the acceptance of Hypothesis 1 confirms that chatbots have yet to make their mark on the management of teaching and learning in North-Central Nigerian universities. The technology, as currently deployed, is statistically irrelevant to the core operations of the institutions. To bridge this gap and achieve a significant relationship, university leaders must move beyond superficial implementation. Future strategies must focus on developing highly integrated, context-aware, and reliable conversational agents that are capable of handling complex academic tasks. Until then, chatbots will remain a technological vanity project with no real impact on the educational management ecosystem.

Hypothesis two: There is no significant relationship between automated grading systems and the management of teaching and learning in Universities in the North-central zone of Nigeria.

Table 4: Regression Analysis on the relationship between Automated Grading Systems and the Management of Teaching and Learning in Universities in the North-central zone of Nigeria

Model	Sum of Squares	df	Mean Square	F	P-value.	Decision
Regression	21.963	1	21.863	0.263	0.604	Accepted
Residual	31918.346	384	83.121			
Total	31940.210	385				

Dependent Variable: MANAGEMENT OF TEACHING AND LEARNING

Predictors: (Constant), AUTOMATED GRADING SYSTEMS

Table 4 indicates the relationship between automated grading systems and the management of teaching and learning in Universities in the North-central zone of Nigeria. Results indicate that the F calculated value is 0.263 at the p-value of 0.604, which is higher than the 0.05 level of significance at degrees of freedom of 1 and 384. Hence, hypothesis 2 is accepted, meaning there is no significant relationship between the automated grading system and the management of teaching and Learning in Universities in the North-central zone of Nigeria.

The statistical analysis presented in Table 4, with an F-calculated value of 0.263 and a p-value of 0.604 well above the 0.05 level of significance. The study accepts the null hypothesis (Hypothesis 2). This statistical conclusion indicates that there is no significant relationship between automated grading systems and the management of teaching and learning. An F-value this low (close to zero) combined with a high p-value suggests that the presence of automated grading technology has absolutely no statistical bearing on how universities in this region manage their educational processes. This finding exposes a critical failure in the integration of educational technology, with wide-ranging implications for administrative efficiency and pedagogical strategy.

The primary implication of this finding is that automated grading systems are failing to alleviate the administrative burden on educators. In an educational landscape often characterized by high student-to-lecturer ratios, the "management of teaching" is frequently overwhelmed by the mechanical task of grading. Automated systems are theoretically deployed to resolve this by instantaneously assessing objective tests, thereby freeing lecturers to focus on curriculum delivery and student mentorship.

However, the lack of a significant relationship (p=0.604) implies that this relief is not occurring. It suggests that despite the existence of these systems, the management of teaching remains as labor-intensive and manual as ever. The technology is evidently not serving its core purpose of streamlining academic workflows, indicating that the potential for operational efficiency remains untapped.

Furthermore, this result points to a severe limitation in the scope of application. The statistical insignificance likely stems from the fact that automated grading is being confined to the periphery of academic assessment, perhaps limited to low-stakes quizzes or practice tests while the core management of learning relies entirely on manual grading of essays, projects, and end-of-semester examinations. If the technology is not trusted or utilized for the summative assessments that determine student progression, then it cannot significantly influence the overall management of the teaching and learning process. The system acts as a supplementary add-on rather than a transformative engine, rendering it statistically irrelevant to the broader academic management structure.

Additionally, this finding implies a wasted opportunity for data-driven decision-making. One of the most powerful aspects of automated grading is the generation of real-time analytics. These systems can instantly identify learning gaps, common misconceptions, and at-risk students, providing managers with the data needed to make informed pedagogical adjustments. The acceptance of the null hypothesis suggests that this feedback loop is non-existent. If the automated grading system were effectively integrated into the management of learning, we would expect a measurable correlation between its use and improved learning outcomes or management efficiency. The lack of a relationship indicates that the data generated by these systems is likely ignored, inaccessible, or not utilized by decision-makers, representing a significant loss of strategic value.

Moreover, the results suggest a deep-seated resistance or lack of technical capability among faculty. A p-value of 0.604 implies that the variance in management effectiveness is not explained by the use of these systems. This could be due to faculty skepticism regarding the accuracy of algorithmic grading or a lack of training on how to implement it. If educators do not trust the technology, they will continue to grade manually, rendering the automated system obsolete. This resistance acts as a barrier to change, ensuring that the management of teaching remains tethered to traditional, inefficient methods despite the availability of technological solutions.

Besides, this finding serves as a critical indicator of resource misallocation. Implementing automated grading systems requires significant capital expenditure. An F-value of 0.263 indicates a negligible return on this investment. It implies that universities in the North-Central zone are investing in "white elephant" projects technologies that consume resources without delivering value. The statistical evidence confirms that these systems are currently dormant components of the educational infrastructure.

In conclusion, the acceptance of Hypothesis 2 confirms that automated grading systems are currently failing to play a meaningful role in the management of teaching and learning in North-Central Nigerian universities. The technology, as currently deployed, is statistically insignificant. To bridge this gap, university administrators must move beyond procurement to active integration. This involves investing in faculty training, fostering trust in automated assessments, and ensuring that these systems are utilized for core, high-stakes evaluations. Without these structural changes, automated grading will remain a tool without impact, unable to support the complex management of education.

Discussion of results

Findings from hypothesis 1 showed that chatbots are not significantly related to the management of teaching and learning in Universities in the North-central zone of Nigeria. Although a positive relationship was observed (r = 0.062), the strength of this relationship is very weak and not statistically significant. This aligns with Afonughe et al (2021), who reported poor internet facilities, instabilities in governance, inadequate funding, poor electricity supply, and little availability of AI-chatbot technology in handling Universities` administrative duties as factors inhibiting the implementation of AI-chatbot to execute administrative duties in Universities of South-South states, Nigeria. However, Patchara (2022), in a study titled Impact of Chatbots on Students' Learning and Satisfaction in Entrepreneurship Education Program in Higher Education Context revealed that chatbot technology improved student satisfaction and learning, and the majority of students learned how to solve problems and make decisions. This disparity may be explained by contextual differences, particularly in terms of technological readiness, institutional support and digital literacy levels. Similarly, Labbaf et al. (2024) in The Future of Educational Management with AI Chatbots explored the potential of AI chatbots in educational management. The findings of the study conclude by asserting that AI Chatbots hold a significant promise for transforming educational management by streamlining administrative processes, enhancing communication, and providing personalised support.

From the perspective of the system theory, the weak relationship observed indicates that chatbots have not been effectively integrated as functional inputs within the university system in North-central. As such, they have not significantly influenced the transformation processes (instructional delivery and administrative coordination) required to produce improved teaching and learning.

Similarly, Findings on hypothesis 2 showed there is no significant relationship between automated grading systems and the management of teaching and learning in Universities in the North-central zone of Nigeria ($r = 0.026$, $p > 0.05$). This indicates that automated grading systems have not been widely implemented. This finding contradicts Aubin's (2022), which found that automated grading had no detrimental effects on students' scores, and there was a slight statistical increase in the grades of students whose work was assessed automatically, largely attributed to the immediate feedback they got. The disparity in the findings may be attributed to differences in context, as Aubin's study was conducted in a technologically advanced environment with great access to digital tools and infrastructure. In contrast, universities in North-central Nigeria may lack the necessary systems, training and institutional framework to support effective implementation of automated grading technologies. In support of the potential benefits of an automated grading system, Figueras et al (2024) found that AGS is valued for workload management and improved assessment practices.

In alignment with the systems theory, the findings imply that automated grading systems as technological inputs have not been sufficiently integrated into broader university systems in North-central Nigeria to influence teaching and learning. This underscores the need for a more coordinated and systemic approach to the adoption and utilisation of AI tools.

Conclusion

This study investigated artificial intelligence (Chatbots and automated grading systems) and the management of teaching and learning in Universities in the North Central states of Nigeria. The study revealed that neither chatbots nor automated grading systems had a significant impact on the management of teaching and learning. The findings portray that despite the global potential of AI in improving educational outcomes, the benefits have not yet been realised in universities. Therefore, the study underscores the need to address challenges that may be inhibiting universities from leveraging AI tools to modernise the management of educational systems, improve instructional delivery and students' learning experiences.

Recommendations

Based on the findings, the following recommendations were made:

1. The management of Universities in the North Central Zone of Nigeria should pilot AI tools before scaling to facilitate the effective management of teaching and learning in Universities in the North-central zone of Nigeria
2. The implementation of automated grading systems should be re-evaluated to find out if it aligns with the teaching and learning objectives of the Universities in the North-central zone of Nigeria.
3. University administrators must move beyond superficial technology adoption to prioritize the deep integration of adaptive learning systems into curriculum planning and instructional delivery.
4. Institutions should provide intensive, ongoing digital literacy training for lecturers to equip them with the necessary skills to effectively manage and utilize intelligent tutoring and automated grading tools.
5. University management must urgently upgrade infrastructure, particularly power supply and internet connectivity, to ensure the reliability and effectiveness of chatbots and automated platforms.
6. Developers and policymakers should collaborate to localize educational technologies and align automated grading algorithms with the specific cultural and academic context of North-Central Nigerian universities.

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