ARTIFICIAL INTELLIGENCE (AI) AND ITS APPLICATION IN EDUCATIONAL MANAGEMENT FOR SUSTAINABLE EDUCATIONAL DEVELOPMENT OF TERTIARY EDUCATION IN KEBBI STATE NIGERIA

[1]Mathew, Isaac Rikoto, Ph.D
School of Undergraduate Studies
Dept. of General Education
Adamu Augie College of Education, Argungu
E-mail: martinsrikoto@gmail.com
Telephone Number: 0706 772 8608

&

[2]Umaru, Danasabe Ph.D
School of Education
Dept of Educational Foundations
Adamu Augie College of Education, Argungu
E-mail: danasabeumaru@gmail.com
Telephone Number: 0803 631 5869

&

[3]Aliyu, Lauwali Ph.D
School of Languages
Department of Hausa
Adamu Augie College of Education, Argungu
E-mail: lauwalialiyu77@gmail.com
Telephone Number: 0806 787 3270

Abstract
The study was on Artificial Intelligence (AI) and the role played in educational management for sustainable educational development of tertiary educational institution in Kebbi State Nigeria. The study employed TAM theory, descriptive survey research design was employed for the study, where a total of 260 lecturers and management staffs were selected to participate in the study. Because the sample size was relatively small (i.e., only 260 respondents) therefore 60 was taken as the sample size for the study, out of the 60, 41 and 19 were male and female respectively. The researcher relied on random sampling procedure for this study. The study adopted the instrument: Artificial intelligence (AI) application in educational management for sustainable educational development Questionnaire (AIAEMSEDQ) for data collection purposes. The instrument was pilot tested using test-retest approach and a very good reliability index of 0.96 was recorded from the study, the reliability was determined by using Pearson Product Moment Correlation (PPMC). Data collected were analyzed by frequencies, percentages, means and PPMC was used to answer the research questions and tested the hypotheses. The study concluded that through targeted interventions, regulation and retraining, the use of Artificial Intelligence (AI) has played a great role in enhancing educational management and thus leading to more equitable and effective sustainable educational development. The study recommended further collaboration between tertiary institutions education sector and the developers of artificial intelligence to develop specific needs based educational management system in Kebbi State Nigeria.

Keywords: Artificial Intelligence, Educational management, Sustainable development, Tertiary Institution.

Introduction

The adoption of artificial intelligence (AI) in education management and planning is transforming education management and administration. Artificial intelligence (AI) facilitates management and planning, and provides solutions for effective educational management Ajuwon, Animashaun & Chiekezie, (2024). Artificial intelligence (AI) plays a role in management and planning since it offers solutions in form of reports and information to support management decision-making process Hwang & Chen, (2020). Tertiary educational institutions in Nigeria are not performing due to

inadequate management and planning in terms of administration processes, student performance records tracking, and resource management Adelana & Akinyemi, (2021). In addition, education management is performed in an ineffective way due to slow processes, lack of proper monitoring of data, and inadequate response to emerging challenges resulting in poor academic performance of students and poor performance of education in Nigeria in general. Effective education management is vital to ensure that education in Nigeria is fit to serve its purpose. Planning in education management is the general application of logical and systematic analysis to the educational development process in order to improve education's ability to respond efficiently and effectively to the needs and aspirations of individuals and the community Chakma (2019). Educational management and development is a deliberate, rational, and systematic process consisting of educational program and institutional planning, management and implementation functions as well as monitoring and evaluation activities for the achievement of identified educational goals and objectives. Apart from the role of Artificial Intelligence (AI) in management processes, Artificial Intelligence plays a role in individual student learning. The use of Artificial Intelligence (AI) powered smart tutoring systems can offer recommendations and learning paths to individual students based on their performance while providing an interactive learning experience to students Olatunde-Aiyedun, (2024).

The adoption of Artificial Intelligence (AI) in education management and planning in several developed countries is playing a significant role in improving the quality and performance of education. Nigeria is facing numerous challenges in education management planning such as huge number of students enrolling for secondary education and lack of adequate staff to teach them and lack of adequate resource management Fullan, (2023). Artificial Intelligence (AI) can play a pivotal role in bridging the gap in education management and planning to ensure that Nigerian secondary education is reformed and improved. However, there is a need for policies to be put in place to promote and support the adoption of Artificial Intelligence (AI) in the

management and planning of education in Nigeria. According to Ogunode and Gregory (2023), as programs designed with human like intelligence and structured in forms of computer, robot, or any other machine to play a role in aiding any given society to perform any type of service or task in order to promote social economic and political development. Artificial Intelligence (AI) covers a wide range of technologies or models, for instance, machine learning, deep learning, natural language processing, computer vision, and robotics Ogunode and Gregory (2023) and also Fullan, Azorín, Harris, & Jones, (2023) explained that Artificial Intelligence (AI) can be employed in different fields, for instance, in health care, finance, customer service, transportation and education. Moreover, as explained by Bali, B et al (2024) Artificial Intelligence (AI) is being described as the ability of a computer or machine to perform like the human brain in terms of reasoning, thinking, learning perceiving objects, understanding and speaking languages, making decisions, solving problems and combining all these skills to carry out other tasks like welcoming guests in hotels and driving cars. Artificial Intelligence (AI) driven bots can help track prospective students and help institutions to communicate with them, assist the students in choosing a course and guide them throughout the enrolment process Sanusi, (2022). According to Tatbotndip (2020) management is as the crucial aspect for improving educational quality, increasing efficiency, enhancing accountability, and supporting educational reform as it optimizes the use of educational resources, reduces waste, and increases productivity. Nanbak, (2020) argued that educational management and planning leading the school towards development through optimum use of human and material resources, physical sources and principles necessary in achieving all the objectives of the school. Moreover, as opined by (Olatunde-Aiyedun, 2024).

Theoretical Framework

Technology Acceptance Model (TAM), proposed by Davis (1989), is among the famous frameworks used to examine the acceptance of new technology innovations in various fields, including education.

This essay discusses TAM theory, its elements, and its applicability to the research question on the use of Artificial Intelligence (AI) in educational management. Specifically, TAM states that perceived usefulness (PU) and perceived ease of use (PEOU) are critical determinants of users' inclination to adopt and use a particular technology innovation (Davis, 1989). In other words, for any given technology to be well adopted and used in an institution, it must first be perceived as useful and easy to use. Thus, TAM is an appropriate theoretical model to use in this study because it is concerned with explaining how people form their perceptions regarding the usefulness and ease of use of new technology, such as Artificial Intelligence (AI). The theory's elements – perceived usefulness and ease of use – provide a solid understanding of how educational administrators make their technology adoption and use decisions, which is vital in developing strategies for improving the adoption and use of AI among educational administrators. Since educational management processes are increasingly relying on AI innovations, and by tying TAM theory to this study, it will be possible to uncover the factors influencing the adoption and use of AI in the educational field and come up with recommendations to policymakers and administrators on how to improve the situation. It will also help them promote effective administrative practices in Kebbi State tertiary institutions.

Review of Related Empirical Studies

The study reviewed related empirical studies from different scholars globally and within Nigeria. For example, Nengi & Sabastine (2025) conducted a research on Artificial Intelligence in Educational management for Enhanced Administrative Effectiveness in Rivers State Universities. The study by Nengi & Sabastine (2025) adopted the descriptive survey design. It had a sample size of 48 educational management administrators selected from Rivers State University (RSU) and Ignatius Ajuru University of Education, IAUE. The research findings on "Artificial Intelligence in Educational management for Enhanced Administrative Effectiveness in Rivers

State Universities" showed that to a great extent, machine learning improves administrative effectiveness. The conclusion was that administrative tasks such as analyzing data, making decisions, and managing resources could be done efficiently by using machine learning technology. The review study differs from the present study because it uses a descriptive survey design, and it had a sample size of 48 educational management administrators from Rivers State owned by two universities. The present study is conducted in the North-Western part of Nigeria, while the reviewed study was conducted in the South of Nigeria. Wong and Li (2020) carried out research on artificial intelligence (AI) tools, one of which is Machine Learning (ML). Algorithms of Machine Learning can analyze students' data to predict their performance, which assists administrators in intervening to improve the performance of those at risk of failure (Johnson & Lee, 2019). Predictive analytics, which is used in ML, helps allocate resources appropriately by analyzing students' data to forecast enrollment (Wong & Li, 2020). ML, as a branch of AI, has transformed many industries, including education, through its abilities to perform repetitive tasks, free humans from mundane tasks, and offer insights into data analysis. ML has been applied in educational management to improve administrative efficiency by predicting students' performance based on attendance, interaction, and past results. Interventions can then be developed to improve the performance of those at risk. The reviewed article differs from the current study because the study area is different; moreover, the reviewed study does not provide the study population and research design, unlike the present study, which specifies the population and design used in the research.

Statement of Problem

Despite the increasing use of artificial intelligence in different fields, the educational system in Nigeria lacks the utilization of this new creation in managing the system efficiently. Although the benefits of Artificial Intelligence (AI) in achieving effective management and increased productivity include; better operations, proper information

management and control, and improved resource management, the Nigerian education system still uses manual or semi-automated methods which lead to challenges in management. Additionally, there is a lack of information on the extent to which Artificial Intelligence (AI) is used in educational tertiary institutions in Nigeria, its perception among administration managers, and its effectiveness in promoting decision support systems. There is also a need to establish evidence on whether Artificial Intelligence (AI) has improved decision-making processes and resource management in institutions that have implemented it to enhance their operational activities. This constitutes the main research problem because of the lack of information in understanding the factors that influence the adoption of Artificial Intelligence (AI) in tertiary institutions in Kebbi State Nigeria, which hinder sustainable educational development.

Purpose of the Study

The general objective of the study was to explore the position of artificial intelligence (AI) as it is applied in educational management for sustainable educational development of tertiary institutions while the specific objective of the study is:

1. to examine the extent to which artificial intelligence (AI) is applied in educational management for sustainable educational development of tertiary institution in Kebbi State.
2. to ascertain the extent to which application of artificial intelligence (AI) improves educational management effectiveness for sustainable educational development of tertiary institutions in Kebbi State

The following research questions were formulated to guide the study:

1. what is the extent to which artificial intelligence (AI) is applied in educational management for sustainable educational development of tertiary institution in Kebbi State?

2. what is the extent to which application of artificial intelligence (AI) improves educational management effectiveness for sustainable educational development of tertiary institution in Kebbi State? The following null hypotheses was tested at the 0.05 level of significance:

H_o1: There is no significant impact to which artificial intelligence (AI) is applied in educational management for sustainable educational development of tertiary institution in Kebbi State

H_o2: There is no significant impact to which the application of artificial intelligence (AI) improves Educational management effectiveness for sustainable educational development of tertiary institution in Kebbi State?

Methodology

The design of the study was descriptive survey design. The population of the study was 260 of Lecturers and management staff of Adamu Augie College of Education Argungu. The population included the Head of Department, College Academic Secretary and the establishment division staff and School exams and record officers from both the Department of General Education and Registry department of the College. The sample size of the study was 60 respondents which comprised 41 male and 19 female respondents. The random sampling technique was adopted for the study. The instrument for data collection was an adapted questionnaire titled: Artificial intelligence (AI) application in educational management for sustainable educational development Questionnaire (AIAEMSEDQ) The instrument was scored on a 5-point rating scale of Very High Extent, High Extent, Low Extent, Moderate Extent and Very Low Extent. The internal consistency of the instrument was established through test re-test after which the reliability coefficient showed a of 0.96. The researcher administered the instrument with the help of a research assistant, where 60 questionnaires were retrieved representing 100% return rate. The research question was answered using mean (X) and standard deviation (SD) statistics, while the hypothesis was tested at 0.05 level of significance using the

Pearson Product Moment Correlation (PPMC) statistics, A criterion mean of 3.00 was used to determine the decision on the study. The hypotheses were tested at 0.05 level of significance with a critical value of ±1.96.

Results

Research Question 1: What is the extent to which artificial intelligence (AI) is applied in educational management for sustainable educational development of tertiary institution in Kebbi State? This research question was answered and presented in table 1

Table 1: Mean Responses of Male and female response on theextent to which artificial intelligence (AI) is applied in educational management for sustainable educational development of tertiary institution in Kebbi State

S/N	Extent of Artificial Intelligence application Items	Male respondent N=41- x̄	std	Female respondent N=19 x̄	Std	Mean set	Remarks
1	Application of artificial intelligence (AI) can analyze historical data to predict student enrollment trends, enabling educational managers to allocate resources more effectively and ensure optimal class sizes	3.13	0.80	3.28	0.75	3.20	ME
2	The Application of Artificial Intelligence (AI) can assess individual student performance and learning styles, allowing educators to tailor instructional strategies and materials, thereby improving student outcomes and administrative efficiency	3.16	0.82	3.14	0.79	3.15	ME
3	Artificial Intelligence (AI) can automate administrative tasks such as grading and feedback, reducing the workload on educators and allowing them to focus more on strategic initiatives that enhance the educational experience	3.21	0.69	3.22	0.76	3.23	ME
4	By analyzing data on resource utilization, Artificial Intelligence (AI) can help educational institutions optimize their budgets and resource allocation, resulting in significant cost savings and improved operational effectiveness	3.34	0.59	3.18	0.77	3.26	ME
	Aggregate mean score	**3.20**	**0.73**	**3.22**	**0.76**	**3.21**	

Source: Researcher Field Report, (2026)
N=333, Cut off Mean=3.00

KEY
5.0 =VHE = Very High Extent 70-100%
4.0 =HE = High Extent 60-69%
3.0=ME = Moderate Extent 50-59%
2.0=LE = Low Extent 40-49%
1.0=VLE = Very Low Extent 0-39%

The results of table 1 shows that all the items on the table indicate a positive response as they are above (3.00), the cut-off point. It is generally concluded that the application of artificial intelligence has great influence in tertiary institutions in Kebbi State with the average mean score of (X= 3.21).

Research Question 2: What is the extent to which application of artificial intelligence (AI) improves educational management effectiveness for sustainable educational development of tertiary institution in Kebbi State This research question was answered and presented in table 2

Table 2: Mean Responses of Male and female responses on What is the extent to which application of artificial intelligence (AI) improves educational management effectiveness for sustainable educational development of tertiary institution in Kebbi State

S/N	Improving Administrative Effectiveness Items	Mean Male respondent n-41- x	std	Female respondent n-19 x	Std	Mean set	Remarks
1	Artificial Intelligence (AI) can optimize and improve the use of classrooms, faculty, and other resources by analyzing various constraints and preferences, ensuring that resources are allocated efficiently	3.25	0.76	3.24	0.73	3.24	ME
2	Artificial Intelligence (AI) can improve identify and resolve scheduling conflicts in real time, reducing administrative overhead and improving the overall organization of academic activities	3.11	0.71	3.14	0.76	3.12	ME
3	Artificial Intelligence (AI) enhances administrators with valuable insights into utilization patterns and bottlenecks, enabling them to make informed decisions about future scheduling and resource management	3.90	0.67	3.20	0.76	3.07	ME
4	Artificial Intelligence (AI) also enhances and accommodate changes in staffing, student enrollment, and course offerings quickly, providing the flexibility needed to adapt to dynamic educational environments	3.09	0.77	3.18	0.77	3.13	ME
	Aggregate mean score	**3.25**	**0.76**	**3.25**	**0.74**	**3.22**	

Source: Researcher Field Report, (2026)
N=333, Cut off Mean=3.00

KEY
5.0 =VHE = Very High Extent 70-100%
4.0 =HE = High Extent 60-69%
3.0=ME = Moderate Extent 50-59%

2.0=LE = Low Extent 40-49%
1.0=VLE = Very Low Extent 0-39%

The results of table 2 shows that all the items on the table indicate a positive response as they are above (3.00), the cut-off point. artificial intelligence (AI) improves educational management effectiveness for sustainable educational development of tertiary institution in Kebbi State.

The following hypotheses were tested at 0.05 level of significance.
H_o1: There is no significant impact to which artificial intelligence (AI) is applied in educational management for sustainable educational development of tertiary institution in Kebbi State

Table 3: t-test Analysis on the difference in the mean ratings of Male and female administrators on the extent to which artificial intelligence (AI) is applied in educational management for sustainable educational development of tertiary institution in Kebbi State?

Respondents	N	X	Sd	Df	T-cal	t-crit	s/level	Decision
Male Respondents	41	3.22	0.76					
				58	0.28	±1.96	0.05	Accepted
Female respondent	19	3.19	0.70					

Source: Researcher Field Report, (2026)

Table 3 showed the result for the t-Test Analysis on the difference in the mean ratings of Male and female administrators on the extent to which artificial intelligence (AI) is applied in educational management for sustainable educational development of tertiary institution? The result showed that the t-cal. value was 0.28, while the t-crit. was ±1.96 at 0.05 level of significance. The result showed that z-calc. was less than t-crit. which means that the null hypothesis was

accepted. Thus, the findings indicated that there is no significant difference in the mean ratings of Male and female administrators on the extent to which artificial intelligence (AI) is applied in educational management for sustainable educational development of tertiary institution in Kebbi State

H_{02}: There is no significant impact to which the application of artificial intelligence (AI) improves Educational management effectiveness for sustainable educational development of tertiary institution in Kebbi State?

Table 4: t-Test Analysis on the Difference in the Mean Ratings of Male and female respondents on the impact to which artificial intelligence (AI) improves educational management effectiveness for sustainable educational development of tertiary institution?

Respondents	N	X	Sd	Df	T-cal	t-crit	s/level	Decision
Male Respondents	41	3.25	0.74					
				58	0.07	±1.96	0.05	Accept
Female respondent	19	3.25	0.76					

Source: Researcher Field Report, (2026)

Table 4 showed the result for the t-Test analysis on the difference in the mean ratings of Male and female administrators on the on the impact to which artificial intelligence (AI) improves educational management effectiveness for sustainable educational development of tertiary institution The result showed that the t-cal. value was 0.07, while the t-crit. was ±1.96 at 0.05 level of significance. The result showed that z-calc. was less than t-crit. which means that the null hypothesis was accepted. Thus, the findings indicated that there is no significant difference in the mean ratings of Male and female administrators on the impact to which artificial intelligence (AI) improves educational management effectiveness for sustainable educational development of tertiary institution

Summary of Findings

The following are the major findings of the study;

1. It was found that, to a moderate extent the application of artificial intelligence in educational management for sustainable educational development in Kebbi State has great influence in tertiary institution.
2. It is generally concluded and found out that all the items on the table 2 indicate a positive response as they are above (3.00), the cut-off point. artificial intelligence (AI) therefore improves educational management effectiveness for sustainable educational development of tertiary institution

Discussion of Findings

The first finding indicated that, to a large extent the use of artificial intelligence in educational management for sustainable educational development has great influence on tertiary institution Kebbi State. This finding contrasts with that of Nengi & Sabastine (2025); Artificial Intelligence in Educational management for Enhanced Administrative Effectiveness in Rivers State Universities, who conducted a study on Artificial Intelligence in Educational management for Enhanced Administrative Effectiveness in Rivers State Universities and arrived at the conclusion that, Machine Learning and Administrative Effectiveness: It was found that, to a large extent machine learning increases administrative effectiveness in the university. This implies that, decision making, management, and other processes are efficiently handled by machine learning.

The second finding revealed that, all items in table 2 indicate positive responses as items scores are above (3.00), the cut off point. This implies that artificial intelligence (AI) enhances educational management effectiveness for sustainable educational development of tertiary institution. This finding coincides with that of Wong & Li (2020); Predicting Student Performance Using ML Models who conducted a study on Predicting Student Performance Using ML Models and concluded that, ML models can be used to predict student

performance by considering factors such as attendance, participation, and previous grades. By analyzing these factors, administrators can identify at-risk students and intervene to improve their performance.

Conclusion

The study was undertaken to examines artificial intelligence (AI) and its applications in educational management for sustainable educational development of the tertiary educational institutions in Kebbi State, Nigeria The study findings indicate that applications of artificial intelligence (AI) in educational management have significant effect on improving educational management effectiveness of Tertiary Institution in Kebbi State Nigeria This is so because the use of Artificial Intelligence (AI) in tertiary institution Educational management improves process , it enhances decision making and it also promotes good resource management of the institution which ultimately leads to improved organizational performance. Both female and male respondents have similar views regarding the extent to which AI influences educational management effectiveness.

Recommendations

1. It is recommended that continuous training of male and female managers/administrators should be emphasized on a regular basis. The training should be aimed at up-skilling them on the use of Artificial Intelligence (AI) in order to guarantee effective utilization of such technology.

2. It is recommended that Tertiary Institutions should collaborate with developers of artificial intelligence software to make adjustments to the machine learning system that would be more appropriate for the administrative needs of the educational institutions in Kebbi State.

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