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EFFECT OF HARNESSING ARTIFICIAL INTELLIGENCE FOR EFFECTIVE EDUCATIONAL LEADERSHIP AND MANAGEMENT IN GOVERNMENT-OWNED COLLEGES OF EDUCATION IN BENUE STATE, NIGERIA

By

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Abstract

This study examined the effect of Artificial Intelligence on educational leadership and management in government-owned Colleges of Education in Benue State, Nigeria. The study specifically investigated how Artificial Intelligence influences key leadership and management functions, including planning, organizing, staffing, and supervision. A descriptive survey research design was adopted, and data were collected from staff of the selected Colleges of Education using a structured questionnaire designed on a five-point Likert scale. The population of the study was 150 staff, out of which 134 copies of the questionnaire were correctly completed and returned, representing an 89% response rate. Data were analyzed using descriptive statistics and simple linear regression analysis at a 0.05 level of significance. The findings revealed that Artificial Intelligence has a significant positive effect on educational leadership and management in government-owned Colleges of Education in Benue State. The study concluded that AI enhances administrative efficiency, improves decision-making, and strengthens leadership functions in educational institutions. It was recommended that government and institutional management should invest in ICT infrastructure, staff training, and supportive policies to enhance effective AI adoption in Colleges of Education.

Keywords: Artificial Intelligence; Educational Leadership; Educational Management; Colleges of Education; Nigeria;

1. Introduction

Artificial Intelligence (AI) is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. The term is frequently applied to the project of developing systems endowed with the Intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience. Since their development in the 1940s, digital computer has been programmed to carry out very complex tasks such as discovering proofs for mathematical theorems or playing chess with great proficiency. Despite continuing advances in computer processing speed and memory capacity, there are as yet no programs that can match full human flexibility over wider domains or in tasks requiring much everyday knowledge (Copeland, 2026)

AI systems include learning (learning from data), reasoning (making conclusions), self-correction (increasing performance

over time), and automation (completing tasks with little assistance from humans). These features make AI a potent instrument in contemporary businesses, including educational institutions, where it may boost administrative effectiveness, facilitate data-driven decision-making, and enhance teaching and learning procedures. AI has emerged as a game-changing technology in education, according to UNESCO (2021), enabling better systems that can support both institutional management and student

The mode of teaching, learning, administration, and educational management have been grossly influenced across the globe due to AI application. Educational institutions are generally adopting AI technologies to enhance learning outcomes, enhance administrative efficiency, and provide personalized educational experiences. According to UNESCO, AI has the potential to address major educational challenges, innovate teaching and learning practices, and

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accelerate progress toward inclusive and quality education globally (UNESCO. 2021).

Globally AI has improved classroom and teaching management. AI has become resources by teachers to prepare lesson notes, generate quizzes, mark assignments, monitor student participation, and identify learners who may require additional academic support. This reduces teachers' workload and allows educators to focus more on mentoring and student engagement. In many universities and schools, AI chatbots and digital assistants has given all round academic support services to students, helping institutions improve communication and service delivery (Bulathwela, Pérez-Ortiz, Holloway, & Shawe-Taylor, 2021).

Public Colleges of Education in Benue State play a significant role in teacher's education and manpower development in Nigeria. Institutions such as Federal College of Education Odugbo, Benue Sate College of Education Oju and Benue State College of Education Katsina-Ala were established to train qualified teachers for primary and secondary schools and to promote educational development within the state. However, despite their importance, many of these institutions face serious administrative, infrastructural, financial, and technological challenges that affect their efficiency and overall performance. These colleges of Education in Benue State has been by neglected underfunding, poor planning, inadequate infrastructure, and leadership instability, all of which have negatively influenced the quality of education in public institutions.

Among others, one of the major challenges faced by the public Colleges of Education in Benue State is inadequate infrastructure and poor learning facilities. Many institutions function and operate in dilapidated classrooms, insufficient office facilities, poorly equipped libraries, weak internet services, and inadequate computer laboratories. A study on Colleges of Education in Benue State revealed that lack of well-equipped computer laboratories, shortage of academic staff, insufficient laboratory technologists, and inadequate power supply significantly hinder the implementation of technology-related programmes in these institutions. These short comes has reduce the ability of the institutions to effectively integrate digital technologies and modern educational innovations such as Artificial Intelligence (AI) into teaching, learning, and administration.

The public colleges of education and other educational institutions today operate in a rapidly changing environment shaped by globalization, digital transformation, and evolving student needs. Traditional leadership styles that rely heavily on rigid structures and manual processes are no longer sufficient to address contemporary challenges. Modern leadership approaches are needed to promote flexibility, innovation, and responsiveness in decision-making. Scholars such as Peter Drucker emphasize that effective management in the 21st century must focus on adaptability, knowledge utilization, and continuous improvement to remain relevant in dynamic environments (Drucker, 2007).

Furthermore, there is need for modern leadership is the integration of technology into educational management. With the rapid increase of Artificial Intelligence, digital learning platforms, and data-driven systems, educational leaders must adopt innovative strategies to effectively manage information, monitor performance, and enhance institutional efficiency. Modern leadership approaches enable administrators to use real-time data for planning, supervision, and evaluation, thereby improving the quality of decisions and overall institutional performance. According to UNESCO (2021), digital leadership is essential for transforming education systems and ensuring inclusive, equitable, and quality learning outcomes.

1.1 Objective of the study

To determine the effect of Artificial Intelligence on educational leadership and management in government owned colleges of education in Benue State

1.2 Hypothesis

Artificial Intelligence does not have significant effect on educational leadership and management in government owned colleges of education in Benue State

2. CONCEPTUAL FRAMEWORK

Concept of AI in Educational Leadership

In educational leadership, AI improves the core education leadership and management to function effectively by planning, organizing, directing, and controlling. All these were achieved through technologies like Machine Learning and data analytics, leaders can process large volumes of institutional data such as student enrollment, academic performance, staff productivity, and financial records to make informed and timely decisions. For example, AI-driven systems can forecast student admission trends, optimize timetable scheduling, and monitor institutional performance indicators. This data-driven approach improves efficiency, reduces human error, and supports strategic planning in educational institutions (Russell & Norvig, 2021).

Educational Leadership and Management

Educational leadership and management deals with planning, organizing, directing, coordinating, supervising, and evaluating educational activities to achieve institutional goals. In today's digital era, educational leaders are expected to adopt innovative technologies that improve institutional effectiveness, accountability, and quality service delivery. AI furnish colleges of education with tools for making informed decisions, managing resources efficiently, monitoring staff performance, improving communication, and enhancing the overall teaching and learning process (OECD, 2021).

Planning

Planning is the process of setting goals and determining appropriate actions to achieve them. Planning can also be seen as anticipating future needs and developing strategies to meet institutional objectives. These includes: Setting educational goals and objectives, developing policies and strategic plans, Forecasting student enrollment and staffing needs, Budget preparation and resource allocation Educational leaders plan

academic calendars, curriculum delivery, infrastructure development, and staff training programs. Effective planning ensures clarity of direction and efficient use of resources. According to Henri Fayol, planning is the foundation of management function as it determines the course of action for the organization (Fayol, 1949)

Organizing

Organizing is the arrangement of tasks, responsibilities, and resources in a systematic way to achieve institutional goals. Division of work is part of planning which consequently leads to specialization, responsibilities allocation, Establishment of departments and units, Coordination of activities in educational institutions, organizing is structuring departments, assigning roles to lecturers and administrators, and ensuring coordination among units such as academic affairs, student services, and finance. Proper organization enhances efficiency and reduces duplication of efforts. Chester Barnard emphasized that organization is a system of coordinated activities among individuals working toward a common goal (Barnard, 1938).

Staffing

Staffing involves recruitment, selection, placement, and development of employees in an organization. It involves the recruitment and selection of qualified personnel, Orientation and placement, Training and development, Performance appraisal and promotion Educational leaders ensure that qualified teachers and administrative staff are employed and continuously developed. Staffing is critical to maintaining teaching quality and institutional performance. According to George R. Terry, staffing ensures that the right people are placed in the right positions to achieve organizational goals (Terry, 1977).

Supervising

Supervising is the monitoring and guiding staff to ensure that assigned tasks are performed according to plans and standards. Supervising includes the following, Monitoring staff performance, Providing guidance and support. Appraising teaching effectiveness, ensuring discipline and accountability in schools and colleges, supervision includes classroom observation, evaluation of lesson delivery, and oversight of administrative activities. It ensures quality control and continuous improvement in teaching and learning. According to Harold Koontz and Cyril O'Donnell, supervision is essential for ensuring that organizational activities align with established plans and objectives (Koontz & O'Donnell, 1976).

AI support areas in Educational leadership and Management

Artificial Intelligence (AI) is progressively applied across key administrative and academic functions in educational institutions. Its integration enhances efficiency, accuracy, and decision-making. Below are major areas where AI provides support, with relevant scholarly backing:

1. Student Data Management

AI encourages the collection, storage, and analysis of large volumes of student data, including academic records, attendance, and behavioral patterns. Through advanced analytics, institutions can generate insights for decision-making, identify at-risk students, and improve student outcomes. AI-driven data systems also enhance record accuracy and accessibility. According to Stuart Russell and Peter Norvig, intelligent systems are capable of processing vast datasets to support informed decision-making in organizations (Russell & Norvig, 2021).

2. Admission Processes

Admission procedures such as application screening, document verification, and candidate selection can be simplified and automated using AI. Machine learning algorithms can evaluate applicants based on predefined criteria, reducing human bias and administrative workload. AI chatbots also assist prospective students by providing instant responses to admission inquiries. UNESCO (2021) notes that AI improves efficiency and transparency in administrative processes, including admissions.

3. Timetable Scheduling

AI helps in timetable scheduling by automatically generating optimized class schedules based on available resources, lecturer availability, course requirements, and classroom capacity. This reduces conflicts and ensures efficient use of institutional resources. AI-based scheduling systems are particularly useful in large institutions with complex academic structures (Holmes et al., 2019).

4. Performance Tracking

AI provides the bases for the continuous monitoring and evaluation of both student and members of staff performance. Learning analytics tools track students' academic progress, engagement levels, and learning outcomes, allowing early identification of struggling students. Educational leaders can use this data to implement timely interventions and improve academic performance. According to UNESCO (2021), AI supports data-driven evaluation systems that enhance accountability and institutional effectiveness.

5. Communication Systems

Chatbots, virtual assistants, and automated messaging systems which are AI communication tools help to improve interaction between students, staff, and management. These tools provide real-time responses to inquiries, disseminate information efficiently, and enhance institutional transparency. AI-driven communication systems also reduce administrative workload and improve service delivery (Kaplan & Haenlein, 2019).

6. E-Learning Support

AI helps in supporting e-learning by enabling personalized learning experiences, intelligent tutoring systems, and adaptive content delivery. AI systems can recommend learning materials based on students' abilities and learning pace, thereby improving engagement and comprehension. Additionally, AI supports online assessments, automated grading, and virtual classrooms. According to Holmes et al.

(2019), AI-driven educational technologies enhance both access to education and quality of learning globally.

Opportunities of AI in Colleges of Education

Artificial Intelligence (AI) provides a lot of opportunities for improving leadership, administration, and teaching in Colleges of Education. Its application enhances efficiency, decision-making, communication, and learning outcomes.

a. Improved Administrative Efficiency

Faster Record Keeping

AI systems encourages and facilitates quick and accurate storage, retrieval, and processing of institutional data such as student records, staff information, and academic results. This reduces paperwork and minimizes errors. According to Stuart Russell and Peter Norvig, AI systems are highly effective in handling large datasets and automating routine administrative tasks (Russell & Norvig, 2021).

Automated Admissions and Registration

AI has modernized admission and registration processes by automating application screening, document verification, and enrollment procedures. This reduces delays and administrative workload while improving transparency. UNESCO (2021) notes that AI enhances efficiency in institutional administrative operations.

Better Staff and Student Management

AI application enhances in managing staff schedules, student attendance, and institutional records more effectively. They also support workforce planning and student engagement tracking, thereby improving organizational coordination (Holmes et al., 2019).

b. Better Decision

AI Helps Leaders Analyze Data Quickly

AI application allows educational leaders to analyze large volumes of institutional data in real time, leading to faster and more accurate decision-making. Predictive analytics can forecast trends such as student enrollment and performance. According to UNESCO (2021), AI supports data-driven leadership by providing actionable insights.

Supports Evidence-Based Policies

AI provides reliable data that supports policy formulation and implementation. Leaders can use data insights to design effective academic and administrative policies. Thomas Bush emphasizes that modern educational leadership relies heavily on evidence-based decision-making for institutional effectiveness (Bush, 2020).

c. Enhanced teaching and Learning

Personalized Learning

AI provides adaptive learning systems that are tailored towards educational content to individual student needs, abilities, and learning pace. This improves student engagement and academic performance. UNESCO (2021) highlights AI's role in promoting personalized and inclusive learning.

Smart Tutoring Systems

AI-driven tutoring systems provide real-time feedback, guidance, and academic support to students. These systems simulate one-on-one teaching experiences and improve understanding of complex concepts (Holmes et al., 2019).

Online Learning Platforms

AI enhances e-learning platforms through content recommendation, automated grading, and virtual classrooms. This expands access to education and supports flexible learning environments globally (Kaplan & Haenlein, 2019).

d. Improved Communication

Chatbots and Digital Platforms

AI-powered chatbots and communication platforms improve interaction between management, staff, and students by providing instant responses to inquiries and facilitating information sharing. These tools enhance institutional transparency and service delivery. According to Kaplan and Haenlein (2019), AI-driven communication systems significantly improve organizational efficiency and user engagement.

e. Monitoring and Evaluation

Tracking Student Performance and Institutional Progress

AI assists continuous monitoring of student academic performance, attendance, and engagement levels. It also tracks institutional performance indicators, enabling leaders to evaluate progress and implement timely interventions. UNESCO (2021) states that AI strengthens monitoring and evaluation systems through data analytics and real-time reporting.

Challenges of AI in Colleges of Education

Despite the opportunities AI offers in educational leadership and management, its adoption in Colleges of Education, especially in developing contexts like Nigeria, is constrained by several significant challenges.

a. Poor Infrastructure

Inadequate Electricity Supply

Perpetual poor of electricity supply remains a major bane to effective AI implementation in educational institutions. AI systems require stable power to function efficiently, but frequent power outages disrupt digital learning and administrative processes. According to UNESCO, inadequate infrastructure is one of the key limitations to successful digital transformation in education systems (UNESCO, 2021).

Weak Internet Connectivity

AI applications rely whole on strong internet access for data processing, cloud computing, and real-time communication. However, many educational institutions in developing regions suffer from poor internet infrastructure, limiting the effective use of AI tools (World Bank, 2020).

b. Lack of Technical Skills

Many lecturers and administrators do not have the needed know-how in digital literacy and AI-related competencies needed to operate and manage AI systems effectively. This skills gap reduces the ability of institutions to fully benefit from AI technologies. UNESCO (2021) emphasizes that

inadequate ICT skills among educators is a major challenge to AI integration in education systems

c. Financial Constraint

AI technologies require reasonable stake holders to invest in procurement, installation, training, and maintenance. Many government-owned Colleges of Education operate under limited budgets, making it difficult to acquire advanced digital tools and sustain them. World Bank notes that high implementation costs remain a significant barrier to digital transformation in education across developing countries (World Bank, 2020).

d. Resistant to Change

Introduction of latest technology AI may be met with resistant from some academic and administrative staff due to fear of job displacement, unfamiliarity with technology, or preference for traditional methods. This resistance slows down innovation and limits institutional progress. According to Thomas Bush, successful educational change requires strong leadership to manage resistance and promote innovation (Bush, 2020).

e. Ethical and Security Concerns

Data Privacy

AI systems depend largely on amounts of personal data, raising concerns about the protection of student and staff information.

Cybersecurity Risks

Public colleges of Education in Benue face threats such as hacking, data breaches, and system manipulation by using AI.

Overdependence on Technology

Over dependence on AI may reduce human judgment in decision-making processes. UNESCO (2021) warns that AI adoption in education must be guided by ethical principles to ensure safety, fairness, and accountability.

f. Policy and Regulatory Problems

There is no clear and comprehensive AI policies and regulations in many Nigerian educational institutions. Without proper guidelines, implementation becomes inconsistent and unregulated. This limits coordination and slows down adoption. UNESCO (2021) recommends the development of strong policy frameworks to guide the ethical and effective use of AI in education systems.

2.1 Theoretical Framework

The study titled *"Harnessing AI for Effective Educational Leadership and Management in Government-Owned Colleges of Education in Benue State, Nigeria: Opportunities and Challenges"* can be connected to the **Technology Acceptance Model (TAM)** and the **Transformational Leadership Theory** because both theories explain technology adoption, innovation, leadership effectiveness, and organizational change in educational institutions.

1. Technology Acceptance Model (TAM)

The **Technology Acceptance Model (TAM)** was developed by Fred Davis in 1989 to explain how users accept and use

new technologies. The theory states that technology adoption is mainly influenced by two major variables:

Perceived Usefulness (PU) – the belief that a technology will improve job performance.

Perceived Ease of Use (PEOU) – the belief that the technology will be easy to understand and operate.

In the context of government-owned Colleges of Education in Benue State, TAM explains how lecturers, administrators, and educational leaders may adopt or reject AI technologies depending on how useful and user-friendly they perceive such technologies to be. AI applications such as automated admissions, student record management, communication systems, performance tracking, and e-learning support are more likely to be accepted when users believe they enhance efficiency and productivity.

The theory is highly relevant because challenges such as poor infrastructure, inadequate digital literacy, resistance to change, and financial constraints may influence staff perceptions toward AI adoption. Recent studies have confirmed that TAM remains one of the most effective frameworks for explaining AI adoption in education and educational management systems.

2. Transformational Leadership Theory

The **Transformational Leadership Theory** was developed by James MacGregor Burns and later expanded by Bernard Bass. The theory emphasizes visionary leadership, innovation, motivation, collaboration, and organizational transformation.

Transformational leaders inspire followers to embrace change, improve performance, and work collectively toward institutional goals. In educational institutions, transformational leadership encourages administrators and lecturers to adopt innovative technologies such as AI for effective educational leadership and management.

The theory is relevant to this study because the successful integration of AI in Colleges of Education requires leaders who can:

Promote digital innovation,
Motivate staff to embrace technological change,
Support staff training and development,
Reduce resistance to AI adoption,
Create a culture of collaboration and continuous improvement.

Studies have shown that transformational leadership significantly supports technology integration and AI use in schools and higher educational institutions. Educational leaders who demonstrate transformational leadership practices are more effective in encouraging teachers and staff to adopt emerging technologies for teaching, learning, and institutional management

2.2 Empirical Studies

Egwu and Osegbue (2026) study the role of Artificial Intelligence in transforming school leadership practices in public tertiary institutions in Anambra State, Nigeria. The

study adopted a descriptive survey design and sampled 60 institutional leaders. Data were collected using a structured questionnaire and analyzed using descriptive statistics. The results of the study revealed that Artificial Intelligence significantly enhanced decision-making, communication, planning, and administrative efficiency in educational institutions. However, the study also identified challenges such as inadequate ICT training, poor funding, and resistance to change. The study concluded that AI has strong potential to improve leadership effectiveness when adequate infrastructure and capacity building are provided. The study is relevant to the present research as it supports the view that AI enhances educational leadership processes in higher institutions.

Terzungwe, Idadu, Ayuba, and Aliyu (2025) in their study analyzed teachers' perceptions and readiness toward the use of Artificial Intelligence in teacher education programmes across three Colleges of Education in Nigeria. The study adopted a descriptive survey research design involving 360 lecturers and was guided by UTAUT and Human Capital Theory. Data were analyzed using descriptive and inferential statistics. The findings showed that lecturers had positive perceptions of AI usefulness, but their readiness for adoption was moderate due to inadequate infrastructure, limited digital skills, and weak policy support. The study recommended continuous staff training, improved infrastructure, and institutional support for effective AI integration. This study is relevant to the present study as it highlights institutional and human capacity challenges affecting AI adoption in Colleges of Education.

Adebola (2025) analyzed transformational educational leadership as a catalyst for educational growth and institutional development in South-West Nigeria. The research used a survey design involving academic leaders in Colleges of Education. Data were analyzed using regression analysis. The findings revealed that transformational leadership dimensions such as inspirational motivation, intellectual stimulation, and individualized consideration significantly influenced institutional effectiveness, staff performance, and innovation. The study recommended that educational leaders should promote innovation, collaboration, and staff development to enhance institutional performance. This study is relevant to the present research because it emphasizes leadership practices that support innovation and technology integration, including Artificial Intelligence in educational management.

Holmes, Bialik, and Fadel (2019) carried out a study on the impact of digital transformation technologies, including Artificial Intelligence, on teaching, learning, and institutional management in higher education systems globally. The study employed a conceptual and analytical review approach. Findings revealed that AI-driven systems such as intelligent tutoring systems, learning analytics, and automated administrative tools improve efficiency, personalization, and decision-making in educational institutions. However, the study also identified challenges such as ethical concerns, data privacy issues, and unequal access to technology. The study concluded that AI has the potential to reshape educational

management systems if properly implemented. This study supports the present research by providing global evidence of AI's relevance to educational leadership and management.

3. METHODOLOGY

3.1 Research Design

The study adopted a descriptive survey research design. The design was considered appropriate because it enabled the researcher to obtain relevant information from respondents regarding the opportunities and challenges of Artificial Intelligence (AI) in educational leadership and management in government-owned Colleges of Education in Benue State, Nigeria. The descriptive survey design also provided the opportunity to collect data from a large group of respondents and analyze their opinions systematically.

3.2 Population of the Study

The population of the study consisted of 150 staff drawn from the three government-owned Colleges of Education in Benue State. These institutions include Federal College of Education, Odugbo, Benue State College of Education, Katsina-Ala, and Benue State College of Education, Oju. The respondents comprised academic and non-academic staff involved in educational administration and management within the institutions. The population breakdown is shown in Table 1.

Table 1 Population of the Study

S/N	Institution	Population
1	Federal College of Education, Odugbo	50
2	Benue State College of Education, Katsina-Ala	50
3	Benue State College of Education, Oju	50
Total		150

Source: Registry Departments of the Institutions, 2026.

3.3 Sample Size and Sampling Technique

Given the manageable size of the population, the entire population of 150 respondents was used for the study. Therefore, no sampling technique was applied, as the study adopted a census approach to ensure adequate representation of all categories of staff in the selected Colleges of Education.

3.4 Sources of Data Collection

The study utilized primary data as the main source of data collection. Primary data were obtained directly from respondents through the administration of structured questionnaires designed to gather information on the application of Artificial Intelligence in educational leadership and management.

3.5 Instrument for Data Collection

The instrument used for data collection was a structured questionnaire titled *Artificial Intelligence and Educational Leadership Questionnaire (AIELQ)*. The questionnaire was designed using a five-point Likert Scale comprising Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), and Strongly Disagree (SD). The instrument covered the demographic characteristics of respondents such as gender, age, educational qualification, years of experience, institution, and staff category. It also captured items relating to the independent variable, Artificial Intelligence (AI), including student data management, admission processes, timetable scheduling, performance tracking, communication systems, and e-learning support, as well as the dependent variable, Educational Leadership and Management, which covered planning, organizing, staffing, and supervision in government-owned Colleges of Education in Benue State, Nigeria.

3.6 Validity of the Instrument

The instrument was subjected to face, content, and construct validity to ensure that the questionnaire adequately measured the variables of the study. Experts in Educational Management and Measurement and Evaluation examined the questionnaire items to determine their relevance, clarity, adequacy, and suitability in relation to the objectives of the study. Their observations and corrections were incorporated into the final version of the instrument before administration as presented in Table 2.

Table 2: Content Validity Assessment of the Instrument

S/N	Validation Criteria	Experts' Assessment	Remark
1	Relevance of questionnaire items to study objectives	Adequate	Accepted
2	Clarity of questionnaire statements	Adequate	Accepted
3	Coverage of independent and dependent variables	Adequate	Accepted
4	Appropriateness of Likert scale format	Adequate	Accepted
5	Language simplicity and readability	Adequate	Accepted
6	Suitability of items for respondents	Adequate	Accepted

Source: Field Validation, 2026.

The result in Table 2 indicates that the experts adjudged the questionnaire items to be adequate and suitable for the study. The instrument was considered relevant in measuring the independent and dependent variables and appropriate for collecting data from respondents in the selected Colleges of Education.

Construct validity was further established through a pilot study conducted among staff of Federal College of Education, Obudu who were outside the study area but shared similar characteristics with the target respondents. The responses obtained were analyzed to determine the extent to which the instrument measured the intended constructs.

Table 3: Construct Validity Result from Pilot Study

Variable Constructs	Number of Items	Average Factor Loading	Decision
Artificial Intelligence (AI)	18	0.78	Valid
Educational Leadership and Management	12	0.81	Valid
Overall Instrument	30	0.80	Valid

Source: Pilot Study, 2026.

The result presented in Table 3 shows that all the constructs recorded average factor loadings above the acceptable benchmark of 0.70. This indicates that the questionnaire items adequately measured the intended variables of the study and confirmed that the instrument possessed satisfactory construct validity.

3.7 Reliability of the Instrument

The reliability of the instrument was established using the Cronbach Alpha reliability method to determine the internal consistency of the questionnaire items. A pilot study was conducted using 20 staff of Federal College of Education, Obudu who were not part of the main study but possessed similar characteristics with the respondents in the selected Colleges of Education in Benue State. The responses obtained were analyzed using the Statistical Package for Social Sciences (SPSS).

Table 4: Reliability Statistics of the Instrument

Variable	Number of Items	Cronbach Alpha Coefficient	Remark

Variable	Number of Items	Cronbach Alpha Coefficient	Remark
Artificial Intelligence (AI)	18	0.84	Reliable
Educational Leadership and Management	12	0.81	Reliable
Overall Instrument	30	0.83	Reliable

Source: Pilot Study Analysis, 2026.

The result in Table 4 reveals that the Cronbach Alpha coefficients for all the variables were above the acceptable threshold of 0.70. This indicates a high level of internal consistency among the questionnaire items. Therefore, the instrument was considered reliable and suitable for data collection in the main study.

3.8 Method of Data Collection

Copies of the questionnaire were administered personally by the researcher with the assistance of research aides in the selected Colleges of Education in Benue State. A total of 150 copies of the questionnaire were distributed to the respondents, while 143 copies were successfully retrieved and found valid for analysis, representing a retrieval rate of 95.3%. The respondents were given adequate time to complete the questionnaire before collection for data analysis.

Table 4.1: Questionnaire Distribution and Response Rate by Institution

Institution	Questionnaires Distributed	Questionnaires Returned	Not Returned	Response Rate (%)
Federal College of Education, Odugbo	50	45	5	90.0
Benue State College of Education, Katsina-Ala	50	44	6	88.0
Benue State College of Education, Oju	50	45	5	90.0
Total	150	134	16	89.3

Source: Field Survey (2026).

The result in Table 4.1 shows that 134 out of the 150 questionnaires distributed were successfully retrieved and used for analysis, giving an overall response rate of 89.3%. The response rates across the three institutions ranged between 88.0% and 90.0%, indicating a fairly high level of participation by respondents. This response rate is sufficient for reliable statistical analysis and valid interpretation of the study findings.

5.9 Method of Data Analysis

Descriptive and inferential statistics were used for data analysis. Descriptive statistics such as frequency tables, percentages, mean scores, and standard deviations were used to analyze respondents' demographic characteristics and research questions. Inferential statistics involving simple linear regression analysis were used to test the hypothesis and determine the effect of Artificial Intelligence on educational leadership and management in government-owned Colleges of Education in Benue State, Nigeria. The analysis was conducted at 0.05 level of significance using the Statistical Package for Social Sciences (SPSS) Version 27.0.. The functional relationship between the dependent and independent variables is expressed as $ELM = \beta_0 + \beta_1 AI + \mu$

Where:

ELM = Educational Leadership and Management

AI = Artificial Intelligence

β_0 = Constant term

β_1 = Regression coefficient

μ = Error term

4. RESULTS AND DISCUSSIONS

4.1 Response Rate

A total of 150 questionnaires were administered to staff of the selected government-owned Colleges of Education in Benue State using a direct distribution approach. Out of the 150 questionnaires distributed, 134 copies were properly completed and returned, while 16 copies were either not returned or were unusable. This represents a response rate of 89.3%, which is considered adequate for statistical analysis and generalization of findings.

4.2 Regression Analysis: Effect of Artificial Intelligence on Educational Leadership and Management

This section presents the regression results in the conventional format comprising the model summary, ANOVA, and coefficients tables. The sample size for the analysis is 134, and the decision rule is based on a 5 percent level of significance ($p \leq 0.05$).

Table 4.2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error
1	0.742	0.551	0.547	0.438

Source: Author's Computations using SPSS 2025.

The model summary in Table 4.2 shows the overall strength and explanatory power of the regression model. The correlation coefficient ($R = 0.742$) indicates a strong positive relationship between Artificial Intelligence and educational leadership and management in government-owned Colleges of Education in Benue State. The coefficient of determination ($R^2 = 0.551$) reveals that 55.1% of the variation in educational

leadership and management is explained by Artificial Intelligence, while 44.9% is explained by other factors not included in the model. The adjusted R^2 value of 0.547 confirms the stability and reliability of the model, indicating that it is not over-fitted. The standard error of the estimate (0.438) suggests a relatively moderate level of prediction error, implying that the model has acceptable predictive accuracy.

Table 4.3: ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	92.416	1	92.416	121.308	0.000
Residual	70.584	132	0.535		
Total	163.000	133			

Source: Author's Computations using SPSS 2025.

The ANOVA results in Table 4.3 assess the overall significance of the regression model. The decision rule states that if the p-value is less than 0.05, the model is statistically significant. The results show an F-statistic of 121.308 with a p-value of 0.000, which is less than 0.05. This indicates that the regression model is statistically significant and that

Artificial Intelligence has a significant effect on educational leadership and management when considered as a predictor variable. Therefore, the model provides a good fit for the data and is appropriate for explaining variations in educational leadership and management in the selected Colleges of Education.

Table 4.4: Regression Coefficients

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
(Constant)	0.624	0.142	—	4.394	0.000
Artificial Intelligence (AI)	0.689	0.063	0.742	11.014	0.000

Source: Author's Computations using SPSS 2025.

The regression coefficients in Table 4.4 explain the individual effect of Artificial Intelligence on educational leadership and management. The decision rule is that a variable is significant if its p-value is less than or equal to 0.05. The constant term ($\beta = 0.624$, $p < 0.05$) represents the baseline level of educational leadership and management when Artificial Intelligence is not considered. Artificial Intelligence ($\beta = 0.689$, $p = 0.000$) has a positive and statistically significant effect on educational leadership and management. The standardized beta value ($\beta = 0.742$) indicates a strong influence, implying that an increase in the adoption and utilization of Artificial Intelligence leads to a corresponding improvement in planning, organizing, staffing, and supervision in government-owned Colleges of Education in Benue State. This result confirms that Artificial Intelligence is a significant predictor of educational leadership and management effectiveness.

4.3 Test of Hypothesis

The hypothesis was tested using the regression coefficients in Table 4.4. The decision rule is to reject the null hypothesis if the p-value is less than or equal to 0.05, and accept the null hypothesis if the p-value is greater than 0.05.

H₀: Artificial Intelligence has no significant effect on educational leadership and management in government-owned Colleges of Education in Benue State.

The result shows that Artificial Intelligence has a t-value of 11.014 and a p-value of 0.000. Since the p-value is less than 0.05, the null hypothesis is rejected. Therefore, it is concluded that Artificial Intelligence has a significant effect on educational leadership and management in government-owned Colleges of Education in Benue State, Nigeria.

4.4 Discussion of Findings

This study examined the effect of Artificial Intelligence on educational leadership and management in government-owned Colleges of Education in Benue State, Nigeria. The

regression result revealed that Artificial Intelligence has a significant positive effect on educational leadership and management. This implies that increased adoption and utilization of AI tools enhance key leadership functions such as planning, organizing, staffing, communication, and supervision in the study area. In practical terms, this finding reflects the emerging reality in Nigerian Colleges of Education where digital tools are gradually being introduced into administrative and academic processes. AI applications such as automated record management systems, communication platforms, and data-driven decision tools improve efficiency by reducing manual workload, enhancing accuracy in decision-making, and supporting faster institutional responses. However, the extent of AI utilization remains limited due to infrastructural challenges, inadequate funding, and insufficient digital skills among staff.

The finding is consistent with the Technology Acceptance Model (TAM), which explains that the adoption of technology depends largely on perceived usefulness and ease of use. The significant positive effect of AI in this study suggests that educational administrators in the selected Colleges of Education are more likely to embrace AI when it demonstrably improves administrative efficiency and simplifies leadership tasks. However, challenges such as poor ICT infrastructure and resistance to technological change continue to influence acceptance levels. The result also aligns with the Transformational Leadership Theory, which emphasizes innovation, change management, and staff motivation as key drivers of institutional effectiveness. In the context of Nigerian Colleges of Education, effective use of AI requires leaders who can promote innovation, support digital capacity building, and encourage staff to adopt new technologies. Without transformational leadership, AI adoption may remain slow and ineffective despite its benefits.

This finding is also consistent with the empirical studies reviewed. It supports the findings of Egwu and Osegbue (2026), who reported that AI enhances decision-making, communication, and administrative efficiency in tertiary institutions. Similarly, Terzungwe et al. (2025) found that while lecturers have positive perceptions of AI, their readiness is limited by infrastructural and skill-related constraints, which is consistent with the challenges observed in this study context. Adebola (2025) also confirmed that transformational leadership significantly enhances innovation and institutional performance, reinforcing the importance of leadership in AI adoption. Furthermore, Holmes, Bialik, and Fadel (2019) established that AI improves efficiency and decision-making in educational systems globally, which supports the applicability of AI benefits to the Nigerian educational context. In summary, the study establishes that Artificial Intelligence has a statistically significant effect on educational leadership and management in government-owned Colleges of Education in Benue State. However, the realization of its full benefits depends on improved infrastructure, leadership commitment, and enhanced digital competencies among staff.

5. SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary of Findings

This study examined the effect of Artificial Intelligence on educational leadership and management in government-owned Colleges of Education in Benue State, Nigeria. The study specifically investigated how AI influences core leadership and management functions such as planning, organizing, staffing, and supervision. The regression result revealed that Artificial Intelligence has a significant positive effect on educational leadership and management, indicating that increased adoption of AI improves administrative efficiency, decision-making, communication systems, and overall institutional coordination. The findings further show that AI enhances data-driven planning, improves organizational processes, strengthens staffing systems through better record management, and supports effective supervision through monitoring and evaluation tools. Overall, the study established that Artificial Intelligence is a strong predictor of effective educational leadership and management in the selected Colleges of Education.

5.2 Implications of the Findings

The findings imply that government-owned Colleges of Education in Nigeria must prioritize the integration of Artificial Intelligence into their administrative and academic systems in order to improve efficiency in leadership and management functions. Educational leaders are expected to adopt data-driven approaches to planning and decision-making, while leveraging AI tools to improve communication, staff management, and supervisory processes. The findings also imply that effective AI adoption depends on leadership commitment, staff digital competence, and the availability of ICT infrastructure, thereby highlighting the need for institutional and government support to facilitate successful digital transformation in the education sector.

5.3 Conclusion and Recommendation

Based on the findings, the study concludes that Artificial Intelligence has a significant and positive effect on educational leadership and management in government-owned Colleges of Education in Benue State, Nigeria. It is evident that AI improves the efficiency and effectiveness of leadership functions by enhancing planning, organizing, staffing, and supervision processes. The study further concludes that the successful application of Artificial Intelligence in educational institutions depends largely on institutional readiness, leadership support, and adequate technological infrastructure. The study therefore recommended that government should ensure adequate provision of ICT infrastructure, stable electricity, and continuous staff training to support the effective integration of Artificial Intelligence in Colleges of Education in Nigeria.

5.4 Contribution to Knowledge

This study contributes to existing knowledge by providing empirical evidence on the effect of Artificial Intelligence on educational leadership and management in government-

owned Colleges of Education in Benue State, Nigeria. Unlike earlier studies that focused mainly on teachers' perception, readiness, or general digital transformation, this study specifically examined leadership and management functions (planning, organizing, staffing, and supervision) as a unified dependent construct. The study also extends the application of the Technology Acceptance Model (TAM) and Transformational Leadership Theory by demonstrating how Artificial Intelligence significantly predicts effective educational leadership and management in the Nigerian College of Education context, thereby offering a context-specific model for understanding AI adoption in educational administration.

5.5 Suggested Areas for Further Studies

- i. Future studies should examine the moderating effect of digital literacy and ICT infrastructure on the relationship between Artificial Intelligence and educational leadership and management in tertiary institutions in Nigeria.
- ii. Further research should conduct a comparative study between federal and state-owned Colleges of Education to determine variations in the adoption and impact of Artificial Intelligence on institutional effectiveness.

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