

## **Awareness and Utilisation of Artificial Intelligence Tools for Effective Administration in Public Secondary Schools in North-Central Nigeria**

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### ***Abstract***

*The study investigated the awareness and utilisation of artificial intelligence (AI) tools in the administration of secondary schools across North-Central Nigeria—a region marked by distinctive educational challenges and opportunities. The objectives were threefold: to assess the level of AI awareness among school administrators, evaluate the extent of AI tool utilisation, and identify barriers hindering their adoption for effective school management. To address these aims, three research questions were formulated. Using a multi-stage random sampling technique, 300 secondary school principals were selected as respondents. Data were collected through a researcher-developed instrument titled Principals' Awareness and Utilisation of AI Tools Questionnaire (PAUATQ). Descriptive statistics, specifically mean and standard deviation, were employed for data analysis. Findings indicated low levels of AI awareness ( $M = 1.79$ ,  $SD = \pm 1.04$ ) and utilisation ( $M = 1.68$ ,  $SD = \pm 1.29$ ), with prominent adoption barriers including inadequate infrastructure and high costs of acquisition and maintenance ( $M = 2.86$ ,  $SD = \pm 0.94$ ). Based on these results, the study*

*recommended that counselling psychologists and key educational stakeholders organise targeted workshops, seminars, and training programmes to enhance the technical competence and confidence of school administrators and teachers in implementing AI tools.*

**Keywords:** *Artificial intelligence, AI tools, awareness, utilisation, and effective administration*

## **Introduction**

Education, in all parts of the world, is known for the production of balanced citizens for individual and national development. It remains a sensitive instrument and a means to sustain the development of a nation. No matter the number of natural resources a nation might have, without the potential efforts of education, the abilities and potentials that are needed to harness the skills and values that are responsible for national development would be lacking. Therefore, the structure of such a nation is bound to have defects (Muraina, 2018). This makes education an indefatigable and indispensable venture for the overall development of the nation. For education to be successful, it requires due commitment to policy implementation, provision, and maintenance of infrastructure, capacity development, and adequate provision of funds, as well as coping with technological trends to achieve the desired goals. Hence, the administration of schools is central and vital to the overall success of education.

In education, the traditional administrative paradigm shows an inward direction to cut costs, uphold rules, and division of labour (Muraina, 2018). This paradigm, by nature, is hierarchical, with an emphasis on control, enforced standards, and a disciplinarian approach. The consequence is mechanical orientation design, a high level of specialisation, and rigid departmentalisation. The focus of traditional administration is directed toward the improvement of productivity and resource utilisation in a stable society or environment (Edward & Muraina, 2024). Meanwhile, both society and the environment are inherently dynamic concepts, where nothing is permanent except for the idea of change. This is because technological innovations cause changes in the environment.

Since the middle of the 19th century, technology and technological tools have been the source of innovation, influencing all aspects of human endeavours. Technological innovations change the human approach to all issues and set the difference between traditional and modern approaches (Edward & Muraina, 2024; Muhammad-Jamiu & Muraina, 2023). The world is globally

connected, and activities in it are powered mainly by technology and the use of its tools. The rapid growth of technologies and technological tools has been substantial, marking one of history's most rapid adoption rates of new technologies.

Artificial intelligence (AI) is revolutionising industries globally, including the field of education. By facilitating automation, predictive analytics, and data-driven decision-making, AI has the potential to enhance the efficiency and effectiveness of educational administration significantly (Miao et al., 2021). Despite these global advancements, secondary school administration in Nigeria still largely depends on traditional, manual approaches—methods that are often inefficient, labour-intensive, and susceptible to human error. Recognising this technological lag, the present study explores the extent to which AI tools are understood and utilised in Nigerian secondary schools. It investigates the barriers that hinder their broader adoption (Muhammad-Jamiu & Muraina, 2023). This inquiry lays the groundwork for a deeper investigation into how educational institutions in North-Central Nigeria can harness emerging technologies for transformative change.

Artificial intelligence (AI) has emerged as a transformative force in various sectors, including education. In school administration, AI tools offer solutions for automating processes, improving decision-making, and optimising resource allocation. Despite its global significance, the adoption and utilisation of AI in the education sector, particularly in Nigeria, remain underexplored (Muraina, 2018). This section reviews relevant literature on the awareness and utilisation of AI tools, focusing on their potential benefits that could revolutionise education in Nigeria, global trends, challenges in adoption, and the Nigerian context. AI in education encompasses technologies such as learning analytics, predictive modelling, chatbots, and automated grading systems, which streamline administrative tasks and improve decision-making (Luckin et al., 2016). In educational management, AI has transformed the management of student records, staff schedules, and resource allocation (Holmes et al., 2019; Muraina, 2021). However, its adoption in developing countries like Nigeria remains nascent. Several studies highlight the challenges of integrating AI into education in Africa, including inadequate infrastructure, limited technical expertise, and resistance to change (Olaniyi & Okereke, 2020; Muraina, 2021). These challenges underscore the urgent need for a comprehensive understanding of the current state of awareness and utilisation of AI tools in Nigerian schools.

Furthermore, the lack of government policies promoting AI use in schools exacerbates the problem (Afolabi, 2022). Despite these challenges, there is

growing recognition of AI's potential to address administrative inefficiencies in Nigerian schools. Research by Adebayo and Ojo (2021) suggests that AI-driven attendance systems and data analytics could significantly improve resource management and student outcomes. This hopeful prospect underscores the importance of a comprehensive understanding of the current state of awareness and utilisation of AI tools in Nigerian schools and the potential of AI to transform the educational landscape in Nigeria.

Awareness of AI tools is the first step toward their adoption and effective utilisation. Luckin et al. (2016) describe AI as a technology capable of enhancing educational administration by automating tasks and analysing large datasets. Awareness includes understanding AI's potential, its applications, and how it can improve administrative efficiency. Globally, school administrators in developed countries are increasingly aware of AI applications in attendance tracking, resource scheduling, and performance monitoring (Holmes et al., 2019; Muraina, 2018). In the Nigerian context, awareness levels vary significantly. Olaniyi and Okereke (2020) note that while private school administrators often have a basic understanding of AI, their counterparts in public schools, particularly in rural areas, have limited exposure to such technologies. Adebayo and Ojo (2021) further argue that this disparity stems from uneven access to information and training programs.

AI tools have proven their utility in school administration worldwide. Automated attendance systems, predictive analytics, chatbots for communication, and digital grading systems are among the most commonly used AI tools (Miao et al., 2021; Muraina & Oladimeji, 2022). These tools streamline routine administrative tasks, allowing school administrators to focus on strategic planning and resource allocation. For example, AI-powered predictive analytics can analyse student performance data to identify at-risk students, enabling timely interventions (Holmes et al., 2019). Chatbots are being used to improve communication with parents, students, and staff, reducing response times and administrative burdens (Luckin et al., 2016; Edward & Muraina, 2024). However, in Nigeria, the utilisation of these tools remains limited. Afolabi (2022) highlights that less than 20% of secondary schools in Nigeria use AI tools, primarily due to financial constraints and inadequate infrastructure. Public schools are particularly affected, with administrators relying heavily on manual processes. Despite these limitations, private schools, especially those in urban areas, are beginning to adopt AI solutions, albeit at a slow pace (Adebayo & Ojo, 2021; Muhammad-Jamiu & Muraina, 2023).

The potential benefits of AI in education are well-documented. According to Miao et al. (2021), AI tools can improve administrative efficiency by automating repetitive tasks, such as data entry and scheduling. Additionally, they provide data-driven insights for better decision-making. AI can also enhance student outcomes by enabling personalised learning plans and identifying academic trends. For administrators, tools like automated grading and attendance tracking systems reduce the burden of manual processes, allowing them to focus on strategic initiatives (Muraina et al., 2022). Adebayo and Ojo (2021) argue that adopting AI tools in Nigerian secondary schools could significantly improve resource management, accountability, and overall efficiency.

Despite its potential, several barriers hinder the awareness and utilisation of AI in Nigerian schools. Infrastructural challenges, such as unreliable electricity and limited internet access, are significant obstacles (Olaniyi & Okereke, 2020; Muraina, 2018). Moreover, the high cost of AI tools makes them inaccessible to most public schools (Afolabi, 2022). Another significant barrier is the lack of training and technical expertise. Most school administrators and teachers are unfamiliar with how to implement and manage AI tools effectively (Adebayo & Ojo, 2021). Resistance to change and fear of job displacement among administrative staff further exacerbate the problem (Muraina et al., 2022; Muraina & Oladimeji, 2022). Policy gaps also play a critical role. Unlike developed countries with clear strategies for integrating AI into education, Nigeria lacks a cohesive policy framework to promote AI adoption in schools (Muraina & Oladimeji, 2022).

Globally, countries like the United States, China, and the United Kingdom have integrated AI into educational administration, resulting in improved efficiency and outcomes (Holmes et al., 2019). These countries have invested heavily in training educators, developing affordable AI tools, and creating policies to support AI integration. For Nigeria, these examples highlight the importance of strategic investments in infrastructure, capacity building, and policy development. Public-private partnerships, as seen in other countries, could also help make AI tools more accessible and affordable for Nigerian schools (Miao et al., 2021; Muraina & Oladimeji, 2022).

### **Statement of the Problem**

Nigeria is often classified as a developing nation due in part to the limited influence of technological advancement in the management and administration of its education system. Research by Edward and Muraina (2024) confirms that effective educational administration plays a critical role

in achieving institutional goals. While school administrations across the globe share foundational values shaped by their cultural contexts, their primary mandate remains equipping learners with skills relevant to the demands of modern society. In Nigeria, however, many schools continue to struggle with bureaucracy, inefficiency, and low productivity—symptoms of an underleveraged technological ecosystem.

Despite growing global adoption of innovative tools, there is a noticeable research gap in Nigeria regarding school leaders' ability to integrate modern technologies for enhanced administrative outcomes. In particular, evidence remains scarce on the transformation of school management practices through the use of artificial intelligence. Against this backdrop, the present study investigates the level of awareness of AI tools, utilisation, and barriers towards their use for effective secondary school administration in North-Central Nigeria.

### **Objectives of the Study**

The study examines awareness and utilisation of artificial intelligence tools for the effective administration of secondary schools in North-Central Nigeria. Other objectives of the study include:

- i) Determine the level of awareness of AI tools for the effective administration of secondary schools
- ii) Examine the level of utilisation of AI tools for the effective administration of secondary schools
- iii) Assess the barriers to the adoption of AI tools for the effective administration of secondary schools

### **Research Questions**

- i) What is the level of awareness of AI tools for the effective administration of secondary schools?
- ii) What is the level of utilisation of AI tools for the effective administration of secondary schools?
- iii) What are the barriers to the adoption of AI tools for the effective administration of secondary schools?

### **Methodology**

This study employed a quantitative research approach, which accommodates both descriptive and inferential designs (Creswell & Creswell, 2018). Given the nature of the research objectives, a descriptive survey design was considered most appropriate, as it does not require the manipulation of variables. Instead, it aims to collect information on how people view and use

artificial intelligence tools for better management of secondary schools, using answers from a set questionnaire.

### **Population and Sample**

The population for the study was 4,135 public secondary school principals in 1,247 schools in North-Central Nigeria. The sample of this study consisted of 320 secondary school principals chosen through a multi-stage sampling procedure. The first stage involved the use of stratified random sampling techniques to select two states. The second stage involved the use of simple random sampling techniques to select five local government areas (LGAs) in each state. The third stage involved the use of simple random sampling techniques to select 16 public secondary schools in each LGA. The fourth stage involved the use of a simple random sampling technique to select two principals from each school. Out of 320 questionnaires distributed, only 300 were retrieved and used for data analysis.

### **Instrumentation**

The instrument used for the study was a structured, self-designed questionnaire. The instrument used was tagged "Principals' Awareness and Utilisation of AI Tools Questionnaire (PAUATQ)" with 24 items and consists of four (4) sections: A-D. Section A assesses the demographic data of the respondents; Section B measures the awareness of AI tools; Section C assesses the utilisation of AI tools, and Section D measures the barriers to the use of AI tools for effective administration in schools. In developing the tool, the researcher followed the following procedures: (1) defining constructs based on existing literature, (2) item generation aligned with the objectives of the study, (3) expert review for content clarity and relevance, and (4) a pilot test to ensure functional clarity and reliability. To validate the instrument, a thorough *content validation process* involving subject-matter experts in educational technology and psychometrics was consulted, and their remarks on the items confirmed the adequacy of the instrument. Reliability analysis produced a Cronbach's alpha coefficient of 0.85, indicating strong internal consistency.

### **Procedure and Data Analysis**

The researchers secured the necessary approvals from relevant school boards prior to conducting the study. The researchers personally distributed and collected the questionnaires on-site, assuring participants of the confidentiality and anonymity of their responses. This method yielded a remarkably high response rate. The data obtained were analysed using descriptive statistical methods, including frequency counts, percentages,

means, and standard deviations. The decision rule used to interpret the average (mean) scores from the Likert scale was as follows: If the calculated mean score ( $\bar{x}$ ) is below 2.5, it indicates a low level of agreement among respondents, suggesting general disagreement or a negative perception. Conversely, if the mean score is 2.5 or above (up to 4.0), it signifies a high level of agreement, indicating general agreement or a positive perception.

## Results

**Research Question One:** What is the level of awareness of AI tools for the effective administration of secondary schools?

**Table 1:** Level of awareness of AI tools for effective administration of secondary schools

S/N	Items	$\bar{x}$	SD	Remark
1.	I am familiar with the concept of Artificial Intelligence (AI) and its applications in various fields	1.41	1.17	Low
2.	I am aware of specific AI tools designed for use in school administration, such as automated grading systems or attendance trackers	2.31	0.85	Low
3.	I understand how AI can assist in streamlining administrative tasks, such as managing student records and scheduling resources	2.02	1.01	Low
4.	I have received training or attended seminars on the use of AI tools in educational administration	1.62	1.11	Low
5.	I am aware of how AI-powered predictive analytics can help improve decision-making in school administration	1.15	1.06	Low
6.	I know about AI systems that can automate repetitive tasks, such as tracking attendance or sending notifications to parents and staff	1.77	1.07	Low
7.	I am familiar with AI-driven tools that provide insights into student performance and help in academic planning	2.29	0.96	Low
8.	I believe AI tools can significantly enhance the efficiency and effectiveness of school administration	1.78	1.08	Low
<b>Overall Weighted average</b>		<b>1.79</b>	<b>1.04</b>	Low

**Source:** Research Field Work, 2024

Key: SD = 1; D = 2; A = 3; SA = 4

**Decision Rule for Mean Rating ( $\bar{x}$ ):**  $0 < \bar{x} < 2.5 = \text{Low}$ ;  $2.5 \leq \bar{x} \leq 4.0 = \text{High}$

Statistical analysis in Table 1 reveals that the respondents agreed that the level of awareness of AI tools for effective administration of secondary schools is low. The average response of the item was close to the weighted average ( $\bar{x} = 1.79$ ;  $SD = \pm 1.04$ ). Since the mean is less than 2.5, it implies that the level of awareness of AI tools for effective administration of secondary schools is low.

**Research Question Two:** What is the level of utilisation of AI tools for the effective administration of secondary schools?

**Table 2:** Level of utilisation of AI tools for effective administration of secondary schools

S/N	Items	$\bar{x}$	SD	Remark
1.	My school actively uses Artificial Intelligence (AI) tools to enhance administrative processes	2.29	0.81	Low
2.	AI-powered attendance systems are utilised in my school to track student and staff attendance efficiently	2.07	0.72	Low
3.	Automated grading systems are employed in my school to reduce the workload of teachers and improve grading accuracy	1.23	1.82	Low
4.	The use of AI tools has significantly improved the efficiency of administrative processes in my school	1.14	1.80	Low
5.	Chatbots or AI-enabled communication systems are used in my school to handle inquiries and improve communication with parents and staff	1.24	1.73	Low
6.	My school uses AI tools to optimise resource allocation, such as scheduling classes and managing facilities	1.91	0.96	Low
7.	AI-driven security systems, such as facial recognition or automated surveillance, are implemented in my school	1.17	1.52	Low
8.	Teachers and administrators in my school are trained to use AI tools effectively for administrative tasks	2.41	0.94	Low
<b>Weighted average <math>\bar{x} = \Sigma \bar{x}</math> (I, II, III...).</b>		<b>1.68</b>	<b>1.29</b>	<b>Agreed to low utilisation</b>

**Source:** Research Field Work, 2024

**Key:** SD = 1; D = 2; A = 3; SA = 4

**Decision Rule for Mean Rating ( $\bar{x}$ ):**  $0 < \bar{x} < 2.5 = \text{Low}$ ;  $2.5 \leq \bar{x} \leq 4.0 = \text{High}$   
 Analysis of data in Table 2 reveals that the average response regarding the level of utilisation of AI tools for effectively administering secondary schools indicates a low agreement on their usage. The average rating from the respondents, ranging from 1.14 to 2.41, indicates the level of utilisation of AI tools for the effective administration of secondary schools. The weighted average is very low ( $\bar{x} = 1.68 < 2.5$ ), which suggests that the utilisation of AI tools for effective administration of secondary schools is low.

**Research Question Three:** What are the barriers to the adoption of AI tools for the effective administration of secondary schools?

**Table 3:** Barriers to the adoption of AI tools for the effective administration of secondary schools

S/N	Items	$\bar{x}$	SD	Remark
1.	Inadequate infrastructure (e.g., unreliable electricity and internet) is a significant barrier to the adoption of AI tools in my school.	3.21	0.84	High
2.	High costs of purchasing and maintaining AI tools hinder their use in secondary school administration	3.14	0.90	High
3.	Lack of training opportunities for teachers and administrators prevents the effective utilisation of AI tools	2.98	0.83	High
4.	Limited awareness of AI tools and their potential benefits is a major challenge to their adoption in schools	3.21	0.79	High
5.	Resistance to change and preference for traditional administrative methods hinder the adoption of AI tools in my school	3.07	0.95	High
6.	There is insufficient government support or policy to encourage the integration of AI tools in secondary schools	3.14	1.08	High
7.	Fear of job displacement among administrative staff contributes to resistance to AI adoption in schools	2.00	1.04	Low
8.	The lack of technical support or expertise in managing AI tools is a significant barrier in my school	2.14	1.08	Low
	<b>Weighted average</b>	<b>2.86</b>	<b>0.94</b>	Agreed on the barriers to adopting AI

**Source:** Research Field Work, 2024

Key: SD = 1; D = 2; A = 3; SA = 4

**Decision Rule for Mean Rating ( $\bar{x}$ ):**  $0 < \bar{x} < 2.5 = Low$ ;  $2.5 \leq \bar{x} \leq 4.0 = High$   
 Analysis of data in Table 3 indicates that the mean and standard deviation of the respondents suggest several barriers to adopting AI tools. They include inadequate infrastructure, high costs for purchasing and maintaining these tools, a lack of training opportunities, limited awareness, resistance to change, and insufficient government support. This result implies that barriers to the adoption of AI tools for the effective administration of secondary schools are high and numerous. A weighted average of 2.86, greater than 2.5 of the decision criteria, supported this claim.

## Discussion

This study examined the level of awareness and utilisation of artificial intelligence (AI) tools in the administration of secondary schools within North-Central Nigeria. Findings from research question one indicated a generally low level of awareness regarding the application of AI tools for effective school administration. This outcome aligns with the observations of Olaniyi and Okereke (2020), who reported that while private school administrators tend to possess a basic understanding of AI, their public-

school counterparts—especially those in rural areas—demonstrate limited exposure to such technologies. Building on this, Adebayo and Ojo (2021) link the disparity to disparities in access to vital information and training resources. The observed low level of awareness could also be attributed to personal and sociocultural factors, including age differences, cultural norms, and limited AI literacy among public school administrators.

The result of research question two (2), again, revealed a generally low utilisation of AI tools for the effective administration of secondary schools. This conclusion is in collaboration with the findings of Afolabi (2022), who highlights that less than 20% of secondary schools in Nigeria use AI tools, primarily due to financial constraints and inadequate infrastructure. Public schools are particularly affected, with administrators relying heavily on manual processes. Despite these limitations, private schools, especially those in urban areas, are beginning to adopt AI solutions, albeit at a slow pace (Adebayo & Ojo, 2021; Muhammad-Jamiu & Muraina, 2023). Notably, public schools seem to be the most disadvantaged, frequently battling with outdated technology, limited funding, and inadequate ICT capabilities. Because of this, school administrators still make decisions using traditional techniques that restrict effectiveness, data accuracy, and responsiveness.

The findings from research question 3 indicate that, on average, the respondents believe there are several obstacles to using AI tools. They include poor infrastructure, high costs for buying and maintaining these tools, a lack of training options, limited knowledge about AI, resistance to change, and insufficient support from the government. This result is in line with the findings of Olaniyi and Okereke (2020) and Muraina (2018), who claimed that infrastructural challenges, such as unreliable electricity and limited internet access, are significant obstacles. Moreover, the high cost of AI tools makes them inaccessible to most public schools (Afolabi, 2022). Another significant barrier is the lack of training and technical expertise. Most school administrators and teachers are unfamiliar with how to implement and manage AI tools effectively.

## **Conclusion**

The study highlights a significant gap in both awareness and utilisation of Artificial Intelligence (AI) tools among secondary school administrators in Nigeria, despite a wealth of literature underscoring AI's potential to enhance administrative effectiveness. Key barriers—such as inadequate infrastructure, insufficient training, financial limitations, and resistance to change—continue to hinder the widespread adoption of these technologies. Overcoming these

challenges is critical for unlocking the transformative benefits of AI and achieving more efficient and responsive school administration across the country.

### **Recommendations**

The following recommendations were made based on the study's findings.

- i) Counselling psychologists and educational stakeholders should organise workshops, seminars, and training programs for school administrators and teachers to enhance their technical knowledge and confidence in using AI tools.
- ii) Introduce grants and subsidies for schools to purchase and maintain AI tools, especially in underprivileged and rural areas.
- iii) Develop national policies that encourage the integration of AI in school administration, with clear guidelines on its implementation and evaluation.
- iv) Ensure the provision of AI infrastructure to increase accessibility and effective use among school administrators.

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