Journal of Contemporary Research in Educational Administration & Management

Volume 3, Issue 1, 2026, 17-24

ISSN: 0795-951

www.edufdns.ng/jcream/index

Research Article

Efficiency of Artificial Intelligence (AI) - Enhanced Systems in Secondary Schools Administration in North-East Nigeria

[1]Koku Agbu Koku [2]Saleh Saad

Email: [1]kokuagbu@gmail.com

Department of Educational Foundations, Taraba State University, Jalingo

Abstract

This study evaluated the efficiency of AI-enhanced systems in school administration and their impact on decision-making in secondary schools in North-East Nigeria. A descriptive survey design was employed, with 180 administrators sampled from schools in Adamawa, Borno, and Taraba States. Data were collected via structured questionnaires assessing AI adoption, administrative efficiency, and decision-making effectiveness. Descriptive and inferential analyses, including Pearson correlation and regression, were performed. Results revealed that AI systems significantly improved administrative efficiency, with 81% of respondents using automated attendance tracking and 77% employing digital recordkeeping. Other AI applications included automated reporting (67%) and workflow optimization (57%). Correlation (r = 0.61) and regression analysis (β = 0.58) confirmed that AI adoption positively influences administrative efficiency and data-driven decision-making. Challenges included infrastructure deficits, limited staff training, and resistance to technological adoption. The study concludes that AI-enhanced systems can transform school administration by streamlining processes, reducing errors, and supporting timely decisions. Recommendations emphasize the need for investment in ICT infrastructure, continuous staff training, and organizational support to ensure effective and sustainable AI integration in secondary school administration.

Keywords: Efficiency, AI-enhanced Systems, Automated Management, Data-Driven Decision-Making, Secondary Schools Administration

Introduction

Artificial intelligence (AI) is increasingly reshaping administrative functions across educational systems globally, offering schools innovative ways to enhance accuracy, reduce manual workload, and support timely decision-making. As educational institutions strive to improve service delivery in a rapidly digitizing world, AI-driven tools have become essential for managing complex administrative operations with greater precision and efficiency (Chukwu and Adeyemi, 2023). In secondary schools, administrators handle multiple responsibilities such as maintaining student records, monitoring attendance, allocating instructional resources, tracking teacher performance, and communicating with parents and stakeholders. These tasks are often time-consuming and subject to human limitations, which can result in delays, inconsistencies, and reduced overall productivity.

AI-enhanced administrative systems such as intelligent data management platforms, automated reporting dashboards, biometric attendance systems, and predictive analytics modules now provide opportunities to transform how school operations are managed. These systems not only minimize human error but also enable administrators to make informed decisions based on real-time data insights, ultimately improving organizational coordination and workflow efficiency (Olaniyan and Musa, 2024). By automating repetitive tasks, AI allows school leaders and teachers to focus more on instructional and supervisory roles rather than clerical responsibilities, thereby improving overall school functioning.

The relevance of AI in school administration becomes even more pronounced when considered within the context of North-East Nigeria, a region affected by prolonged insecurity, infrastructural challenges, and persistent shortages of qualified administrative personnel. Many secondary schools in the region operate under strained conditions, with inadequate access to digital tools, insufficient funding, and frequent disruptions that affect the consistency of management processes (Ibrahim and Yusuf, 2025). These realities often lead to delays in compiling student records, inefficient monitoring of school activities, difficulties in coordinating resources, and lapses in data storage and retrieval. Such challenges may have long-term consequences for planning, accountability, and student outcomes.

AI-driven administrative solutions have the potential to mitigate several of these issues by ensuring that critical tasks—such as data storage, attendance monitoring, and communication—are automated, secure, and accessible even in environments with limited human resources. For example, predictive analytics can help school administrators identify patterns in student attendance or resource utilization, enabling them to plan more effectively. Likewise, automated communication systems can help schools remain connected to parents and community stakeholders, even during periods of infrastructural or security-related disruptions (Abdullahi and Bello, 2023). These technological affordances provide opportunities for greater stability, continuity, and efficiency in school management.

However, despite the potential benefits, the adoption of AI in school administration is constrained by several critical barriers. Limited access to functional ICT infrastructure, including unreliable electricity and poor internet connectivity, poses a significant challenge for schools attempting to deploy AI technologies. Additionally, many school administrators and teachers in

the region have limited digital literacy, making it difficult for them to operate or maintain AI-based systems effectively (Okonkwo, 2024). Resistance to technological change further complicates adoption efforts, as some staff members perceive AI tools as complex or fear that automation may render certain administrative roles redundant. These human and infrastructural challenges must be addressed to ensure successful implementation and sustainability of AI innovations.

Security and privacy concerns also present significant obstacles. AI systems often require access to sensitive data—including student records, biometric information, and staff performance metrics—which raises questions about data protection and ethical use. In regions already grappling with security threats, ensuring that digital systems remain safe from unauthorized access is essential for maintaining trust in AI-enhanced administrative processes (Usman and Gambo, 2023). Thus, careful evaluation of AI's efficiency, reliability, and security is necessary before large-scale deployment.

Despite these challenges, evaluating how AI improves school administration remains critical, as such evidence can help policymakers, education planners, and school leaders identify effective strategies for integrating technology into administrative structures. A systematic assessment of AI's impact can reveal the extent to which automation reduces administrative burdens, enhances decision-making, and contributes to better management outcomes. Such insights are essential for developing implementation frameworks that are context-appropriate, cost-effective, and sustainable in the long term (Danladi and Hassan, 2024). Moreover, understanding the benefits and limitations of AI in the regional context can support the development of policies that ensure equitable access to technological innovations across all schools.

Ultimately, this study aims to deepen understanding of how AI-enhanced systems influence administrative efficiency within North-East Nigerian secondary schools. By examining the nature of AI adoption, the extent of its usage, and the perceived outcomes for school management, the findings are expected to provide evidence-based guidance that can support the scaling of AI tools across the region. Such guidance is essential for ensuring that technological advancements translate into meaningful improvements in school governance, resource management, and educational quality (Eze and Ibrahim, 2024).

Statement of the Problem

Administrative processes in secondary schools in North-East Nigeria are often inefficient, error-prone, and further disrupted by persistent insecurity, which affects timely decision-making and resource management. Many schools still rely on manual systems that slow down operations and limit access to reliable data. While artificial intelligence promises improved efficiency, transparency, and predictive planning, there is limited empirical research on its practical effectiveness in this fragile context. Consequently, gaps remain in understanding how AI-enhanced systems can strengthen school administration, support informed decision-making, and improve overall management performance in the region.

Objectives of the Study

1. To evaluate the efficiency of AI-enhanced systems in the administration of selected secondary schools in North-East Nigeria.
2. To assess the impact of automated systems on administrative decision-making and operational effectiveness.

Research Questions

1. How efficient are AI-enhanced systems in the administration of secondary schools in North-East Nigeria?
2. What impact do automated systems have on decision-making and operational effectiveness in these schools?

Hypotheses

H01: AI-enhanced systems have no significant effect on the efficiency of school administration in selected secondary schools in North-East Nigeria.

H02: Automated systems do not significantly influence administrative decision-making and operational effectiveness in these schools.

Theoretical Framework

Socio-Technical Systems Theory (STS)

This study is anchored on the Socio-Technical Systems Theory (STS), propounded by Trist and Bamforth in 1951. STS emphasizes the interdependence between social and technical components of an organization, asserting that organizational effectiveness depends on both human and technological factors. A strength of the theory is its holistic approach, integrating human behavior, technology, and organizational processes. Its limitation is that it may not fully address external contextual challenges such as insecurity or infrastructural deficits.

In this study, STS guides the examination of AI-enhanced school administration by highlighting how automated systems interact with human administrators to influence efficiency and decision-making. It underscores that while technology can optimize processes, successful adoption depends on human skills, attitudes, and organizational support, providing a framework for assessing the effectiveness of AI systems in North-East Nigerian secondary schools (Ibrahim & Yusuf, 2025; Abdullahi & Bello, 2023).

Methodology

A descriptive survey design was used. The population comprised 650 administrators, including principals, vice-principals, and heads of departments in secondary schools across Adamawa, Borno, and Taraba States. Using stratified random sampling, 180 respondents were selected proportionally from each state. Data were collected via a structured questionnaire measuring AI system adoption, administrative efficiency, and decision-making effectiveness. The instrument was validated by ICT and education management experts and yielded a Cronbach's alpha of 0.85.

Descriptive statistics (frequency, percentage, mean) summarized the level of AI integration and efficiency, while Pearson correlation and regression analyses tested the hypotheses, examining the relationship between AI adoption and administrative performance in selected secondary schools under North-East Nigeria's operational conditions.

Results and Discussions

Table 1: Efficiency of AI-Enhanced Systems (n = 180)

Indicator	Frequency	Percentage (%)
Automated attendance tracking	145	81
Digital recordkeeping	138	77
Automated reporting and analytics	120	67
Task scheduling and reminders	110	61
Workflow optimization	102	57

Source: *Field survey 2025.*

Table 1 illustrates the extent to which AI-enhanced systems contribute to administrative efficiency in secondary schools. Automated attendance tracking has the highest adoption rate at 81 percent, suggesting that schools increasingly rely on technology to reduce manual errors and save time. Digital recordkeeping follows at 77 percent, reflecting a shift toward more organized and accessible data systems. Automated reporting and analytics (67 percent) indicate notable progress in data-driven administrative tasks. Task scheduling and reminders (61 percent) and workflow optimization (57 percent) show moderate adoption, implying that while efficiency gains are evident, some schools are still transitioning toward fully automated management processes.

Table 2: Impact on Administrative Decision-Making (n = 180)

Indicator	Frequency	Percentage (%)
Faster decision-making	135	75
Improved resource allocation	120	67
Enhanced monitoring of staff performance	115	64
Data-driven planning	108	60

Source: *Field survey 2025.*

Table 2 highlights the influence of AI systems on administrative decision-making in secondary schools. The findings show that faster decision-making has the highest response rate at 75 percent, indicating that AI tools help school leaders respond more quickly to administrative needs and emerging issues. Improved resource allocation, reported by 67 percent of respondents, suggests that AI applications support more efficient and equitable distribution of

school resources. Enhanced monitoring of staff performance (64 percent) reflects the growing role of digital systems in promoting accountability and supervision. Finally, data-driven planning at 60 percent demonstrates that AI encourages evidence-based strategic decisions, although continued capacity building and system expansion are still needed to deepen its impact across all administrative functions.

Hypotheses Testing

H01: AI-enhanced systems have no significant effect on the efficiency of school administration in selected secondary schools in North-East Nigeria.

Table 3: Pearson Correlation for H01

Variables	r	p-value	Decision
AI Systems & Administrative Efficiency	0.61	0.001	Significant (Reject H01)

Table 3 shows a strong and statistically significant positive correlation between AI systems and administrative efficiency, with an r-value of 0.61 and a p-value of 0.001. Since the p-value is below the 0.05 threshold, the null hypothesis (H01) is rejected. This result suggests that increased integration of AI tools is strongly associated with improved administrative performance in schools, supporting the view that technology enhances efficiency, accuracy, and timeliness in school management processes.

H02: Automated systems do not significantly influence administrative decision-making and operational effectiveness in these schools.

Table 4: Regression Analysis for H02

Predictor Variable	β	t-value	p-value	Decision
AI Systems	0.58	7.12	0.001	Significant (Reject H02)

Table 4 reveals that AI systems have a significant influence on administrative decision-making and operational effectiveness in schools. The regression coefficient (β = 0.58) and t-value of 7.12, along with a p-value of 0.001, confirm a statistically significant effect. Because the p-value is below 0.05, the null hypothesis (H02) is rejected. This result indicates that greater adoption of automated systems positively enhances decision-making efficiency and overall school operations, reinforcing the strategic value of AI in educational administration.

Discussion of Findings

The study indicates that AI-enhanced systems significantly improve the efficiency of school administration in North-East Nigerian secondary schools. High adoption rates were observed for attendance tracking (81%) and digital recordkeeping (77%), highlighting automation's role in reducing administrative workload (Chukwu & Adeyemi, 2023). Pearson correlation and

regression results confirm a strong positive relationship between AI adoption and administrative efficiency ($r = 0.61$; $\beta = 0.58$), demonstrating that automated systems enhance decision-making, resource allocation, and monitoring of staff performance (Olaniyan & Musa, 2024). Socio-Technical Systems Theory explains that while technology improves efficiency, human competence and organizational support are crucial for maximizing benefits (Ibrahim & Yusuf, 2025). Challenges such as staff training, infrastructure limitations, and resistance to change were noted, indicating that strategic interventions are required to ensure sustainable AI integration (Abdullahi & Bello, 2023). Overall, AI systems have the potential to transform school administration, provided that supportive policies and capacity-building measures are implemented.

Conclusion

AI-enhanced administrative systems significantly improve efficiency and decision-making in secondary schools in North-East Nigeria. Adoption of automation reduces workload, streamlines processes, and supports data-driven management. Sustained success requires investment in training, infrastructure, and organizational support to maximize the benefits of AI integration in school administration.

Recommendations

1. Secondary schools should implement AI-based administrative tools for routine operations.
2. Administrators should receive continuous training and technical support to optimize AI system usage.

References

Abdullahi, K. and Bello, S. (2023). Artificial intelligence applications in educational administration: Prospects for developing regions. *Journal of Educational Management Studies*, 11(2), 45–57.

Abdullahi, R., and Bello, S. (2023). Automated school management and performance outcomes in Nigerian secondary schools. *International Journal of Education & Technology*, 4(1), 45–59.

Chukwu, L. and Adeyemi, T. (2023). AI-driven innovations and administrative efficiency in secondary education. *Nigerian Journal of Educational Technology*, 9(1), 22–34.

Chukwu, P., and Adeyemi, J. (2023). Artificial intelligence in educational administration: A Nigerian perspective. *Journal of School Administration & Management*, 12(2), 88–101.

Danladi, A. and Hassan, M. (2024). Evaluating technology integration policies in Nigerian secondary schools. *Journal of Policy and Educational Development*, 6(3), 88–102.

Eze, P. and Ibrahim, U. (2024). Digital transformation and school governance in Nigeria: Emerging challenges and opportunities. *African Journal of Contemporary Education*, 5(1), 13–28.

Ibrahim, A. and Yusuf, R. (2025). Administrative constraints in conflict-affected learning environments. *Journal of Educational Administration in Emerging Societies*, 4(1), 55–70.

Ibrahim, M., and Yusuf, T. (2025). ICT adoption and efficiency in secondary school administration in Nigeria. *African Journal of Educational Leadership*, 8(1), 66–78.

Okonkwo, C. (2024). Barriers to artificial intelligence adoption in public secondary schools in Nigeria. *Nigerian Journal of ICT in Education*, 10(2), 71–83.

Okonkwo, F. (2024). Challenges of adopting AI in school administration: Evidence from Nigeria. *International Journal of Educational Innovation*, 5(3), 12–25.

Olaniyan, K. and Musa, J. (2024). Automation and data analytics for school improvement: A review of AI systems. *Journal of Innovative Teaching and Administration*, 7(2), 101–115.

Olaniyan, K., and Musa, H. (2024). Impact of AI automation on school administrative efficiency. *Journal of Technology in Education Management*, 6(2), 32–46.

Usman, F. and Gambo, L. (2023). Cybersecurity considerations in educational data management systems. *Journal of ICT Security and Ethics*, 3(4), 59–73.