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ARTIFICIAL INTELLIGENCE AND SCHOOL PRINCIPALS' MANAGEMENT EFFICIENCY IN PUBLIC SECONDARY SCHOOLS IN AWKA SOUTH LOCAL GOVERNMENT AREA, ANAMBRA STATE

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ABSTRACT

This research explores the impact of artificial intelligence (AI) on the administrative efficiency of school principals in secondary schools across Nigeria, as well as the obstacles to its successful implementation. While AI has revolutionized educational administration worldwide, its usage in Nigeria remains limited. A descriptive survey design was employed to gather information from 19 public secondary school principals to evaluate their utilization of AI tools in everyday management responsibilities and the degree to which AI aids in decision-making, communication, supervision, and planning. The results indicate that AI significantly enhances administrative efficiency by lessening the time spent on routine activities, improving communication among stakeholders, and facilitating data-driven leadership. Nevertheless, the adoption of AI is impeded by infrastructural limitations, insufficient training, inadequate funding, and ethical dilemmas. The research highlights the necessity for investment in digital infrastructure, professional development for school leaders, and the creation of ethical frameworks for the use of AI in education. The implications for policy, leadership, and future studies are examined.


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Keywords: Artificial intelligence, administrative efficiency, school principals, educational management, digital leadership.

Introduction

Artificial Intelligence (AI) encompasses the use of machines to perform tasks usually requiring human intelligence, such as decision-making, problem-solving, and learning. Since its inception, AI has remarkably transformed education through advancements like adaptive learning systems, personalized tutoring, intelligent assessment design, predictive modeling, educational games, and learning analytics (Karakose & Tulubas, 2024). These changes have significant consequences for school principals, especially in environments marked by insufficient infrastructure, poor data management systems, and ineffective administrative procedures. In Nigeria, school management practices are predominantly manual, leading to delays in record-keeping, inadequate student data management, and inefficient scheduling systems. These outdated methods not only impede productivity but also jeopardize the accuracy and promptness of decision-making (Akinsolu, 2010).

Contemporary principals are expected to embody adaptive, visionary, and technology-oriented leadership that promotes school development and enhances learning outcomes (Avolio et al., 2003). This concept is referred to as digital leadership, which involves guiding an organization through digital changes to improve efficiency and foster innovation and growth (Sagbas, 2022; Erdogan, 2022). In the AI age, the effectiveness of school principals largely hinges on their digital skills, innovative practices, and capacity to lead schools amidst evolving technological landscapes (Karakose et al., 2021; Okeke, 2019a). It is now essential for school principals to adopt digital leadership as a crucial aspect of their administrative roles. This entails directing the implementation of new technologies, cultivating a digital culture, and advocating for the incorporation of AI tools in both educational and managerial activities (Karakose et al., 2022). However, this transition demands a supportive environment that facilitates the integration of technology into school practices, which the school principal must foster. According to Avolio et al. (2009), leadership in the AI era necessitates collaboration among various stakeholders, including teachers, students, administrators, and policymakers. Therefore, this study investigates the role of artificial intelligence in enhancing the administrative efficiency of school principals.

Statement of the Problem

Although AI has the potential to significantly improve educational leadership and administrative efficacy, numerous secondary school principals in Nigeria find it challenging to incorporate AI tools into their management practices. School leadership predominantly relies on traditional methods, marked by outdated administrative procedures, ineffective data management, and inadequate decision-making frameworks. These challenges are exacerbated by low levels of digital literacy among principals, insufficient infrastructure, and a lack of targeted professional development opportunities concerning digital skills. Consequently, principals struggle to utilize AI to enhance school operations, effectively assess teacher performance, improve stakeholder communication, and make data-informed decisions that promote school advancement. This

research aims to explore how AI adoption affects the management efficiency of principals and to identify the primary obstacles that impede its implementation in school leadership.

Research Questions

1. To what extent does the adoption of artificial intelligence influence the efficiency of principals in managing schools?

2. What obstacles do school leaders encounter in adopting AI-driven methods in school administration?

Review of Related Literature

The role of AI in Educational Transformation.

AI serves as a transformative element in education, providing intelligent solutions to learning and administrative challenges. It enables personalized learning experiences, supports data-driven decision-making, and offers real-time feedback for instructional enhancement in educational institutions (Luckin et al., 2016). Tools such as chatbots, Chat GPT, intelligent tutoring systems, and predictive analytics are being utilized in some schools, boosting both instructional quality and administrative effectiveness (Karakose & Tulubas, 2024). In addition, AI has the ability to customize professional development for educators and automate administrative tasks for school leaders (Thakur et al., 2024). By employing machine learning algorithms, AI systems can suggest targeted training based on performance metrics and emerging educational trends. Principals who adopt these technologies are better prepared to steer schools toward the future, fostering an environment of innovation, flexibility, and excellence.

AI also enhances teacher evaluation by providing real-time insights into classroom activities, analyzing student engagement, and generating performance analytics that help schools extract valuable information from extensive databases (Parmar, 2025). This capability enables principals to objectively assess teacher effectiveness and provide constructive feedback for professional development. Moreover, AI-powered communication platforms promote timely and effective interaction among school stakeholders. Chatbots and automated messaging services ensure that parents, students, and teachers receive timely updates, feedback, and support, creating a more inclusive and responsive school environment (Holmes et al., 2019).

Regarding student achievement, AI applications can examine large datasets to detect learning gaps and behavioral patterns. Predictive analytics can identify students at risk of academic failure or dropout, facilitating early intervention and support (Herodotou et al., 2019). These tools empower school leaders to make informed, data-based decisions that enhance student outcomes. Furthermore, AI can assist in optimizing resources by delivering insights into material and infrastructure usage, thus promoting accountability and effective budget management. AI-driven models such as machine learning, deep learning, and cloud platforms can allocate resources based on real-time data, leading to reduced operational costs (Baarnty et al., 2025).

In numerous Nigerian secondary schools, decision-making is not data-driven. School leaders frequently depend on intuition or outdated information, which hampers their ability to proactively address issues like declining student performance or behavioral concerns (Parmar, 2025). The situation is further complicated by extensive resistance to change and the generally low digital literacy levels among many educational leaders (Okeke, 2020). Without proper training and exposure to contemporary technologies, principals are often unprepared to lead schools in the digital era, restricting their ability to embrace innovative strategies that enhance school performance (Olanrewaju et al., 2021). AI offers a timely and efficient solution to many of these challenges. Systems driven by AI can handle routine administrative duties such as tracking attendance, generating timetables, and writing reports (Kumar, 2024). These technologies enhance efficiency, minimize human errors, and boost the overall productivity of school administration (Luckin et al., 2016).

Research indicates that digital leadership is essential for enhancing schools. According to Okeke (2019[b]), school principals should take on the role of technology leaders, utilizing technological tools and motivating teachers and students to engage with digital innovations. This shift necessitates a reevaluation of leadership models to incorporate digital literacy, strategic technology planning, and effective change management. Avolio et al. (2003) pointed out that transformational leadership is significant in the AI context, as it encourages leaders to motivate teams to innovate, embrace change, and develop schools ready for the future. Therefore, effective school leaders must transcend traditional management tasks and focus on visionary, technology-enhanced leadership.

Ensuring efficiency in school management is also crucial, especially, with the principal acting as the team leader responsible for developing, supporting, and equipping staff with the necessary knowledge and digital skills to adapt positively to the evolving educational landscape (Uko, 2015). AI plays a role in this by offering insights through data analytics, streamlining administrative processes, and facilitating predictive planning (Holmes et al., 2019). Principals who adopt AI technologies are more likely to make decisions based on evidence, enhance communication, and manage their teams more effectively.

Challenges of AI Adoption in School Management

The integration of AI in school management encounters several challenges that may hinder its effective use, including inadequate infrastructure, limited training opportunities for both principals and teachers, resistance to change from management, and ethical issues related to data privacy and algorithmic bias (Zawacki-Richter et al., 2019). These challenges can lead to diminished administrative efficiency, poor decision-making, increased workload for management, and a digital divide (UNESCO, 2019, Holmes et al., 2019). To address these obstacles, focused investments in capacity-building and policy reforms are necessary to support digital transformation in education.

Another challenge lies in supervising and assessing teacher performance. Many school principals lack effective methods for monitoring classroom instruction (Olorunsola & Bello, 2012), which often results in decreased teacher motivation, increased absenteeism, and lower productivity

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(Olorunsola & Bello, 2012). Furthermore, inadequate communication among stakeholders heavily impacts the successful integration of AI in school management: there may be a lack of collaboration between principals, teachers, parents, and students due to insufficient communication channels and the absence of collaborative platforms (Venkatesh et al., 2003). Inefficient usage and distribution of school resources further aggravate these problems. Clearly, without tools to track and manage finances, facilities, and instructional materials, numerous schools may experience resource waste and mismanagement.

Methods

This research employs a descriptive survey design to investigate the effect of AI on the management efficiency of school principals. This design is appropriate for gathering data on current practices, competencies, and challenges associated with the adoption of AI in schools. The census technique was applied to sample the entire population of 19 public secondary school principals in Awka South.

A structured questionnaire titled "AI in School Management" was utilized for data collection. The questionnaire includes three segments: demographic data, items regarding the impact of AI usage in school management, and obstacles to AI integration. The questionnaire was developed using a 4-point Likert scale ranging from strongly agree to strongly disagree. Validation of the instrument was performed by experts in educational management, and reliability testing was conducted using Cronbach's Alpha. The data was distributed and collected immediately by research assistants. The collated data were analyzed using descriptive statistics (mean and standard deviation) with the aid of SPSS software.

Presentation and Data Analysis

Table1: Influence of artificial intelligence on principal administrative efficiency

s/n	ITEMS	M	SD	Decision
1	I use AI-based tools in my daily administrative tasks.	2.64	0.52	Agreed
2	AI helps reduce time spent on routine administrative functions.	3.05	0.72	Agreed
3	I use AI analytics to track student performance and behaviour.	2.43	0.53	Agreed
4	AI enhances communication among school stakeholders	3.42	0.68	Agreed
5	I make data-driven decisions using AI-generated reports.	2.73	0.77	Agreed
6	AI improves the supervision and evaluation of teaching staff.	2.81	0.64	Agreed
7	My management tasks have become more efficient through AI integration.	3.02	0.82	Agreed
8	AI contributes to better planning and resource allocation in my school.	2.43	0.65	Disagreed
9	AI has positively influenced my leadership and school management.	2.56	0.68	Agreed
	Grand mean	3.06		Agreed

Table 1 shows the influence of AI on the administrative efficiency of principals, with an overall mean of (3.06), which indicates a generally favorable perception regarding AI's effect on administrative efficiency among school leaders. This suggests that, on average, participants concur that AI positively aids their administrative functions. Principals exhibit a moderate level of AI tool utilization in their administrative tasks (2.64). "Low use of AI Analytics for monitoring student performance" scored (M = 2.43). The "AI influence on leadership" (M = 2.56) was rated just above

the established benchmark. The standard deviation of the responses ranged from 0.52 to 0.77, which demonstrates consistency in the opinions of the respondents.

Table 2: Challenges facing school principals in adopting AI-driven practices in school management.

s/n	ITEMS	M	SD	Decision
1	My school lacks the infrastructure to support AI tools.	3.25	0.80	Agreed
2	I have not received adequate training on using AI for school management.	2. 35	0.67	Agreed
3	Teachers and staff are resistant to using AI technologies.	2.49	0.54	Disagreed
4	There is limited access to reliable internet and electricity.	2.24	0.61	Disagreed
6	Ethical concerns prevent the full adoption of AI.	3.26	0.74	Agreed
7	Budget constraints hinder the procurement of AI tools.	3.02	0.68	Agreed
8	AI integration is not prioritized by the school management board.	2.84	0.84	Agreed
9	I find it difficult to interpret AI-generated data and report	2.50	0.57	Agreed
	Grand Mean	2.99		Agreed

Table 2 shows the responses of school principals on the difficulties encountered when incorporating artificial intelligence (AI) in school management, with an overall mean score of 2.99 indicating that principals identify considerable challenges in integrating AI tools into administrative processes. The most highlighted challenge was the lack of infrastructure (M = 3.25), suggesting that numerous schools do not possess the essential technological foundation. Inadequate training received a rating of (M = 2.35), while "limited access to internet and electricity" (M = 2.24) was rated the lowest but underscores the infrastructural shortcomings, particularly in underfunded schools. "Difficulty interpreting AI data" scored (M = 2.50). While the standard deviation of items ranged from 0.54 to 0.84, indicating a uniformity in the perspectives of respondents.

Discussion of Findings

The study illustrates that artificial intelligence (AI) tools play a role in enhancing the administrative efficiency of school principals in Nigerian secondary schools. The participants generally concurred that AI alleviates routine administrative burdens (2.64), advances communication (3.42), boosts staff supervision (2.81), and supports data-driven decision-making (2.73). These results align with those of Holmes et al. (2022) and Karakose et al. (2022), who assert that AI enhances school operations by fostering efficiency, responsiveness, and informed leadership.

The results presented in Table 2 reveal various challenges to successful AI adoption. Significantly, ethical concerns (M = 3.26), infrastructural inadequacies (M = 3.25), and restricted funding (M = 3.02) were identified as the most significant obstacles. These concerns represent broader systemic issues within the Nigerian education sector, as noted by UNESCO (2019), where insufficient investment in digital infrastructure contributes to low AI adoption rates. Another essential factor is the lack of training for school leaders (M = 2.35) and resistance from staff (M = 2.49), indicating a notable gap in human resources. Without sufficient professional development, school leaders might not fully leverage AI, even with its apparent advantages. This reflection is consistent with

the findings of Holmes et al. (2019) and Olorunsola & Bello (2012), who pointed out that the attitudes and competencies of teachers and leaders significantly influence technology integration.

The results of this study suggest various implications for policy and practice, such as the need for focused training programs on AI applications aimed at school management. Providing principals with skills in data analysis, AI ethics, and digital leadership is vital for optimizing efficiency. The integration of AI should be reinforced by a definitive digital transformation policy along with a leadership culture that fosters innovation. School boards should place AI integration as a priority and establish clear expectations for its responsible application. One limitation of this research is its dependence on self-reported data, which might have introduced response bias, as participants may have overestimated or underestimated their familiarity with AI tools.

Conclusion

This study concludes that AI possesses the potential to improve principals' administrative efficiency by enhancing decision-making, communication, and task automation. However, considerable obstacles such as insufficient infrastructure, ethical concerns, and a lack of training hinder its successful integration. Addressing these challenges will necessitate strategic investment, reforms in leadership, and comprehensive capacity-building initiatives. If these issues are resolved, AI could act as a significant catalyst for educational enhancement, allowing principals to manage school resources and outcomes more responsively, strategically, and efficiently.

Recommendations

The study recommends that:

1. Government and educational stakeholders should focus on ensuring reliable digital infrastructure, including AI-compatible devices, in public secondary schools.
2. Comprehensive training programs should be established to enhance the capabilities of principals and teachers in utilizing AI tools for administrative and instructional purposes.

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