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RESEARCH ARTICLE

Application of artificial intelligence (AI) in the administration of secondary schools in Calabar Education Zone, Cross River State, Nigeria.

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Author's Contributions

All authors contributed equally to this research.

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ABSTRACT

This study assessed the application of Artificial Intelligence (AI) in the administration of secondary schools in Calabar Education Zone of Cross River State, Nigeria. Two research questions were answered in this study. Descriptive survey research design was adopted for this study. The population of the study comprised all 126 principals in the 126 private secondary schools in the Calabar Education Zone of Cross River State. An accidental sampling approach was used to select 98 principals. The instrument for data collection was a questionnaire titled "Application of Artificial Intelligence in the Administration of Secondary Schools Questionnaire (AAIAASSQ)". The instrument was subjected to face validity and split-half reliability, which yielded coefficients ranging from .76 to .83. The data collected was analysed using descriptive statistics of mean and standard deviation. A cut-off point of 2.50 was used in answering the research questions. The result shows that the application of artificial intelligence for data-driven decision making and communication in secondary schools in Calabar Education Zone of Cross River State need improvement. The findings of this study concluded that artificial intelligence is applied at a very low extent in the administration of secondary schools in Calabar Education Zone. It was recommended among others that proprietors of secondary schools should invest in the procurement of modern technological infrastructures for the deployment of AI for timely and accurate data-driven decision making.

Keywords: Artificial intelligence; decision making; communication; administration

INTRODUCTION

Secondary school administration has vast complex functions emanating from the premise that the activities of the school system bring about a wide range of reports and records that are expected to be properly and appropriately kept, processed and used to facilitate the effective administrative process of schools. The said records comprise of school enrolment, budgeting, auditing and accounting, staff records, students' results and other host of statistics and records that emanate from the school system's operational activities. However, the administration of secondary schools in

Calabar Education Zone of Cross River State has over the years been observed to be poor and has also raised concern among educational stakeholders. The sources of these concerns could be from the administrators' inability to entertain, persuade, inform and inquire of problems emanating from administrative poor information management capacity. Most often in Nigeria and particularly in Calabar Education Zone of Cross River State, secondary school administrators are unable to communicate effectively with students, teachers and surrounding communities effectively. Students' results are not delivered in time, unable to

schedule their responsibilities properly and their records not well kept.

It has been observed with dismay that most of the secondary schools in Calabar Education Zone still employ old and outdated and traditional methods in transmitting information, storage of students and personal data, preparation of results, record keeping, decision making processes and general administration. The level of awareness and extent to which the utilization of innovative technologies like artificial intelligence (AI) which may benefit the students and institutions is still low. The deployment of artificial intelligence in schools has caused a major paradigm shift on how issues are approached in the context of gathering, storage, retrieval and analysis of information, and general school administration.

In recent years, secondary schools have encountered a surge in the complexity and volume of administrative tasks, creating an unprecedented burden on educational institutions. The responsibilities ranging from student lesson plan creation, enrolment and class attendance tracking, data-keeping to curriculum planning and reporting, has significantly increased the workload for administrative staff. The traditional methods of managing these tasks, often reliant on manual processes and outdated systems, struggle to keep pace with the evolving demands of the educational landscape. This escalating administrative workload not only hampers operational efficiency but also poses challenges in maintaining accuracy, meeting regulatory requirements, and fostering a student-centric learning environment.

Administration refers to the process of managing an organization by efficiently utilizing both human and material resources to achieve its objectives. It encompasses various functions such as planning, organizing, directing, coordinating, controlling, and evaluating progress in relation to the organization's goals (Akinwumi et al., 2021). Ogunode and Abashi (2020) described administration in education as the systematic organization, coordination, integration, and evaluation of resources to effectively meet educational goals. Similarly, Mohammed, Ogunode and Yahaya (2021) defined administration as the strategic use of institutional resources to achieve its objectives within a specified timeframe. In a broad term, educational administration involves managing educational institutions, while educational planning focuses on strategic development and implementation of educational programs (Goksel & Bozkurt 2019). Bayne

(2015) posit that Education is the process of facilitating learning, acquisition of knowledge, skills, values, beliefs, and habits. It occurs through various formal and informal means, such as schooling, mentoring, self-directed learning, and experiential learning.

A well-structured and organized administration, schools and educational institutions can provide a conducive learning environment for students, support teachers in their instructional practices, and foster overall growth and development. Additionally, Educational administration and planning have become even more significant in the face of technological advancements. With the integration of technology in education, administrators and planners have the opportunity to leverage innovative tools, platforms, and data-driven approaches to enhance teaching and learning experiences.

In the context of secondary school administration, AI can significantly transform operations by automating repetitive tasks, enhancing decision-making, and fostering better communication among educators, students, and parents. By analyzing student performance and engagement data, AI can assist administrators in identifying at-risk students, optimizing resource distribution, and executing targeted interventions to improve academic outcomes. Moreover, AI-powered tools can offer personalized learning opportunities, helping teachers adjust their approaches to meet the varied learning needs of students, creating a more inclusive and effective educational experience. As AI becomes more integrated into the educational system, it holds the potential to redefine the landscape of secondary school management and teaching practices, while emphasizing the need for careful oversight.

Artificial Intelligence (AI) is the simulation of human intelligence by machines, especially computer systems, to perform tasks typically requiring human cognition, such as decision-making, problem-solving, and learning (Russell & Norvig, 2020). Artificial Intelligence (AI), refers to the development of computer systems capable of performing tasks that typically require human intelligence (Goksel & Bozkurt, 2019). These tasks include learning, reasoning, problem-solving, perception, understanding natural language, and interacting with the environment. AI encompasses various techniques and approaches, including machine learning, neural networks, natural language processing, computer vision, and robotics, among others. AI systems operate by processing large datasets,

recognizing patterns, and making predictions or decisions based on those patterns (Goodfellow, Bengio, & Courville, 2016). It encompasses various subfields like machine learning, natural language processing, robotics, and computer vision (Sutton & Barto, 2018). AI systems improve over time through experience or added data, often exhibiting higher levels of accuracy in task performance (Ukeh & Anih, 2023).

AI aids administrators in analyzing large data volumes, identifying patterns and trends, and informing decision-making processes. This information aids in developing data-driven strategies for improving student outcomes, resource allocation, and program evaluation. Chan and Tsi (2023) and Bordia (2023) noted that AI can assist administrators in analyzing large volumes of data, such as student performance data, attendance records and resource allocation. AI-powered systems can identify patterns, trends and insights that can inform decision-making processes. Administrators can use this information to develop data-driven strategies for improving student outcomes, allocating resources effectively, and evaluating programs and initiatives.

Westagilelabs (2022) and Bordia (2023) maintained that to eliminate manual administration work in schools, colleges and universities such as scheduling, rescheduling classes, marking attendance, grading papers, finance, and accounting and record keeping. This streamlines the regular, mundane tasks that no longer need to be done by the staff. AI tools can perform various functions like ending truancy alerts, report cards and other correspondence to the parents automatically, plan and schedule meetings, automate routine, student forms, enrolments, and other paperwork to the correct department, Shorten the time spent on progress reports AI, Streamline any other record-keeping tasks.

AI can automate routine administrative tasks, such as managing student records, generating reports, scheduling and handling routine inquiries. By automating these processes, administrators can save time and allocate their efforts to more strategic and value-added tasks. Administration of school is saddled with the responsibility of ensuring stable academic calendar and implementation of programmes as planned. Administrators are to ensure full supervision and implementation of teaching programme. Administrators are saddled with responsibilities of planning school time table, teacher's schedules and school calendar (Bojorquez & Vega, 2023; Teachflow, 2023). AI-powered systems can automate routine tasks, such as grading, scheduling, and record-keeping,

freeing up educators' time to focus on more impactful work, such as lesson planning and student engagement (Ogunode, Edinoh & Chinedu 2023; Ogunode & Ejike, 2023; Oztok & Zingaro, 2019).

Communication in school involves passing of information from one staff to another staff or students, parents. School administrators must ensure free flow of information among all members of his organization. Information on school activities must be relayed at the right time, to the right people and in clear language. Communication could be verbal, written, electronic or any other means. AI-powered communication systems can streamline communication between administrators, teachers, students and parents. Chatbots and virtual assistants can handle routine inquiries, provide information and direct individuals to the appropriate resources. This can improve efficiency and accessibility in communication, freeing up administrators' time for more complex interactions and strategic decision making (AFSA, 2023; Teachflow, 2023).

One of the major functions of school administrators is to make policies and take decision on school issues. Decision-making involves the process of choosing from alternative course of action. Many issues arising in the educational institutions demand decision-making because there is more than a single option of action. Many alternatives are generated out of which one is taken for implementation. Right decision at appropriate time and place will enhance achievement of organizational goals. As much as possible, subordinates should be allowed to participate in decision-making. Decision taking in the level of administration is very crucial for the development of the school. AI can be used to making effective decision in educational institutions. AI has the capacity to help school administrator makes right decisions. AFSA (2022) noted that AI can assist administrators in analyzing large volumes of data, such as student performance data, attendance records and resource allocation. AI-powered systems can identify patterns, trends and insights that can inform decision-making processes. Administrators can use this information to develop data-driven strategies for improving student outcomes, allocating resources effectively, and evaluating programs and initiatives.

The application of AI in automating administrative tasks in secondary schools in Calabar Education Zone of Cross River State, cannot be overemphasized because of its enhancing efficiency and reducing the workload on teachers. By embracing AI technologies for

automation, data analytics, and decision support, schools can optimize their operations, improve student outcomes, and create a more conducive learning environment. These motivated the researcher to embark on this study.

Statement of the Problem

There is no doubt, therefore, that secondary schools have become more complex over the years with concomitant management demands being exerted on the principal especially in today's Information and Communication Technology (ICT) era. The enormous rise in the number of students in schools as well as the multiplicity of programmes coupled with the complexity of administering a given secondary school have made school principals to handle large volumes of data which they must process speedily to provide information to the Ministry of Education, the school boards, the teaching and learning personnel within the precincts of the school, as well as the general public.

School principals in Calabar Education Zone of Cross River State cannot afford to perform their administrative duties without accurate, timely, sufficient and relevant information. The deficiencies associated with storage, preservation and presentation of large volumes of the information in paper form have made the administrative process rather cumbersome. Some principals are grappling with so many challenges marked by an overwhelming administrative workload, extending across a spectrum of critical responsibilities essential for effective operation. Some of these tasks included spanning student enrolment, attendance tracking, grading, communication management, curriculum planning, and lesson plan creation, has expanded beyond the capacity of conventional administrative processes where manual entries are made. Manual methods of task execution are proving increasingly insufficient, leading to inefficiencies, inaccuracies, and placing strain on the operational resources of educational institutions. Conventional manual methods seem to be no longer sustainable. This motivated the researchers to assess the application of artificial intelligence (AI) in the administration of secondary schools in Calabar Education Zone of Cross River State.

Purpose of the study

The purpose of this study was to assess the application of Artificial Intelligence (AI) in the administration of secondary schools in Calabar Education Zone of Cross River State, Nigeria. Specifically, the study sought to:

1. Examine principals' perception of the

application of Artificial Intelligence for data-driven decision making.

2. Examine principals' perception of the application of Artificial Intelligence for communication.

Research questions

1. How do principals perceive the application of Artificial Intelligence for data-driven decision making?
2. How do principals perceive the application of Artificial Intelligence for communication?

REVIEW OF LITERATURE

Sari (2024) explored the use of technology and artificial intelligence (AI) in education administration to improve school performance. The results show that the implementation of technology and AI has improved operational efficiency, accelerated administrative processes, and facilitated the monitoring of student and staff performance. Ogunode, Idoko and ThankGod (2024) delves into the impact of artificial intelligence on the implementation of educational administration and planning programs in Nigerian tertiary institutions. Artificial intelligence contributes to the implementation of educational administration and planning programs in Nigerian tertiary institutions. Specifically, it was revealed that artificial intelligence effectively supports the implementation of teaching and research in educational administration and planning programs in Nigerian tertiary institutions. Furthermore, it aids in enhancing students' learning experiences within the mentioned programs at the tertiary level.

Galadima and Abdullahi (2024) assessed the impact of Artificial Intelligence on school administration and teachers job performance in post-basic education and career development (PBECD) in Nigeria. The paper established that Artificial Intelligence aids effective school administration such as Data analysis and Decision Making, Automation of Administrative task, Resource Optimization, Student Support and intervention among others. Nkedishu and Okonta (2024) investigated Artificial Intelligence (AI) and the future of secondary education in Delta State, with a particular focus on its implications for educational administration. Findings reveal that implementing AI in education offers prospective advantages. Ethical considerations arising from AI integration encompass potential biases in decision-making, among others. We also discovered that effective AI implementation is associated with critical issues. The findings shed light

on the perceptions and beliefs of school administrators regarding the integration of Artificial Intelligence (AI) in education.

Yılmaz, Tekin, Koç, Altun and Aydın (2025) explored the integration of artificial intelligence (AI) in the management processes of education, emphasizing its applications in various administrative functions. The findings highlight AI's potential to optimize administrative tasks, streamline communication, and facilitate data-driven decision-making processes. Isong, Sackey and Nyong (2025) explored AI as a predictor of effective student personnel management in secondary schools in Abia State, Nigeria. Findings showed that AI significantly influences student personnel management, improving resource allocation, data handling, and decision-making processes. This enables school principals to make informed, data-driven decisions, thereby enhancing administrative responsiveness and effectiveness.

Ahmed and Sulaiman (2020) examined the effectiveness of AI tools in improving student data management within secondary schools. The findings revealed that AI tools significantly reduced the time spent on data entry and retrieval while also increasing accuracy. The reduction in errors helped school leaders monitor student performance and disciplinary issues more effectively. The study concluded that AI contributes meaningfully to student data management and administrative efficiency. Furthermore, Johnson and Pereira (2021) conducted an experimental study in public secondary schools in California to investigate the use of AI in tracking student behavior and attendance. The use of facial recognition and tracking systems for 500 students led to a 20% rise in attendance and a 15% decline in classroom disruptions compared to conventional methods. Principals involved in the study reported that the real-time data provided by AI supported early and effective intervention strategies, showcasing its potential in behavioral management.

Karakose and Tülübaşı (2024) examined how AI innovations are transforming school leadership by improving data processing, simulating cognitive decision-making, and encouraging transparent, inclusive management. Their findings suggest that AI tools can foster collaborative engagement among teachers, students, and parents; manage operational tasks like transport and staffing; and use learning analytics to personalize education and initiate early interventions based on student data trends. While these studies establish significant statistical relationships

between AI applications and educational outcomes, there is currently a gap in the literature regarding the difference among principals on the application of AI on data-driven decision making and communication in secondary schools in Calabar Education Zone of Cross River State. Therefore, this study seeks to address this gap by focusing exclusively on secondary schools in Calabar Education Zone of Cross River State, Nigeria, thus contributing novel insights to the body of knowledge.

METHODOLOGY

The researchers adopted a descriptive survey research design for this study. The goal of descriptive survey research is to illuminate the core of the research problem and gain a deeper understanding of it. The technique provides in-depth knowledge of what the research problem is before investigating why it exists. The population of the study comprised all 126 principals in the 126 private secondary schools in the Calabar Education Zone of Cross River State. An accidental sampling approach was used to select 98 principals. The sampling approach, also known as convenience or opportunity sampling, is a non-probability sampling method where researchers select individuals for a study based on their immediate availability and convenience rather than a randomized process.

The instrument for data collection was a researchers' developed questionnaire titled "Application of Artificial Intelligence in the Administration of Secondary Schools Questionnaire (AAIAASSQ)". The instrument contained 12 items based on the two research questions and was designed to elucidate information from the respondents, ranging from Strongly Agree (SA= 4), Agree A = 3), Disagree (D = 2) and Strongly Disagree (SD = 1). The instrument was subjected to face validity and split-half reliability, which yielded coefficients ranging from .76 to .83, indicating that the instrument is reliable. The data collected was analysed using descriptive statistics of mean and standard deviation. A cut-off point of 2.50 was used in answering the research questions. This implies that improvement is not needed in the application of artificial intelligence in the administration of secondary schools for any item whose mean is ≥ 2.50 , and improvement is needed in secondary schools for any item whose mean is ≤ 2.50 .

RESULTS AND DISCUSSIONS

Research question 1: How do principals perceive the application of Artificial Intelligence for data-driven

decision making? This research question was presented in Table 1.
answered using mean and standard deviation as

Table 1. Mean and standard deviation for the responses of principals on the application of artificial intelligence for data-driven decision making. N = 98.

S/n	Items	$\bar{X}$	SD	Remark
1	AI minimizes manual errors in decision making.	2.17	.89	Improvement needed (IN)
2	AI redirect principals' time toward strategic initiatives.	2.24	.86	IN
3	AI redefines administrative efficiency in education by automating repetitive tasks such as class scheduling.	2.19	.90	IN
4	It identifies trends in student behavior.	2.21	.87	IN
5	AI scheduling software helps optimize resource allocation.	2.26	.91	IN
6	AI can help identify struggling students early, allowing for timely intervention.	2.09	.88	IN

Source: Field Data (2025)

Results in Table 1 revealed that six (6) items recorded mean ratings between 2.09 and 2.26 which were below 2.50 cut-off point on the four points scale. The result shows that the application of artificial intelligence for data-driven decision making in secondary schools in Calabar Education Zone of Cross River State need

improvement. The standard deviation ranged from 0.86 to 0.91 which revealed that respondents were not far from the mean of each other in their responses.

Research question 2: How do principals perceive the application of Artificial Intelligence for communication? This research question was answered using mean and standard deviation as presented in Table 2.

Table 2. Mean and standard deviation for the responses of principals on the application of artificial intelligence for communication. N = 98.

S/n	Items	$\bar{X}$	SD	Remark
1	Principals use AI to draft emails.	2.08	.92	Improvement needed (IN)
2	AI-powered chatbots can instantly answer common questions from parents.	2.01	.90	IN
3	AI systems can help direct individuals to the right resources.	2.11	.75	IN
4	AI can analyze communication data to provide administrators with insights, enabling them to make more informed strategic decisions about communication efforts.	2.21	.88	IN
5	AI-powered video analytics can help monitor school premises for potential threats.	2.16	.91	IN
6	AI systems can help direct individuals to the right resources.	2.25	.89	IN

Results in Table 2 revealed that six (6) items recorded mean ratings between 2.01 and 2.25 which were below 2.50 cut-off point on the four points scale. The result shows that the application of artificial intelligence for communication in secondary schools in Calabar Education Zone of Cross River State need improvement. The standard deviation ranged from 0.75 to 0.92 which revealed that respondents were not far from the mean of each other in their responses.

DISCUSSION

It was found that application of artificial intelligence for

data-driven decision making in secondary schools need some level of improvement in order to ensure that decision making process automated, and error-free. This, by extension could ensure that schools meet modern technological standards and improves administrative practices. The finding of this study is in consonance with Sari (2024) who asserted that the implementation of technology and AI has improved operational efficiency, accelerated administrative processes, and facilitated the monitoring of student and staff performance. In the same vein, Ogunode, Idoko and ThankGod (2024) averred that artificial intelligence

contributes to the implementation of educational administration and planning programmes. Galadima and Abdullahi (2024) added that artificial intelligence aids effective school administration such as data analysis and decision making, automation of administrative task, resource optimization, student support and intervention among others.

Similarly, application of artificial intelligence for communication in secondary schools need some level of improvement in order to streamline communication between administrators, teachers, students and parents. Chatbots and virtual assistants can handle routine inquiries, provide information and direct individuals to the appropriate resources. The findings of this study agree with Ahmed and Sulaiman (2020) who opined that AI tools significantly reduced the time spent on data entry and retrieval while also increasing accuracy. In the same direction, Yılmaz, Tekin, Koç, Altun and Aydın (2025) asserted that AI has the potential to optimize administrative tasks, streamline communication, and facilitate data-driven decision-making processes. Isong, Sackey and Nyong (2025) averred that AI aid school principals to make informed, data-driven decisions, thereby enhancing administrative responsiveness and effectiveness.

CONCLUSION AND RECOMMENDATIONS

The findings of this study concluded that artificial intelligence is applied at a very low extent in the administration of secondary schools in Calabar Education Zone, particularly in data-driven decision making and communication. This indicates a significant gap in leveraging modern technological tools for efficient school administration. The low integration of AI suggests the need for urgent interventions, such as provision of necessary technological infrastructure and capacity building for school principals.

Based on the findings, the study recommended that:

1. Proprietors of secondary schools should invest in the procurement of modern technological infrastructures for the deployment of AI for timely and accurate data-driven decision making.
2. Principals should be encouraged to undergo extensive training programmes to improve their knowledge of AI technologies and their applications in communication. These programmes could include conferences, workshops, seminars, and online courses update their knowledge on AI tools and their

benefits, cultivating a culture of innovation and technology integration in school management.

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