



IMPACT OF ARTIFICIAL INTELLIGENCE ON EDUCATIONAL PLANNING: A REVIEW PAPER

By

Odunola Lovelynn Boluwatife MOGBEYITEREN PhD.

Department of Educational Management
Emmanuel Alayande University of Education Oyo, Oyo State, Nigeria
mogbeyiterenolb@eauedoyo.edu.ng

Folasade Serifat AKINOLA-OJEDOKUN PhD.

Department of Educational Management,
Emmanuel Alayande University of Education, Oyo
sadeakinola2@gmail.com. akinolafs@eauedoyo.edu.ng

Okani Doris Ugo-onyeka PhD.

Department of Educational Management,
Faculty of Education, University of Abuja, Nigeria
okanidoris@gmail.com

Okafor Ikechukwu Maduka PhD.

Department of Foundations, Arts and Social Science Education
Faculty of Education, Federal University Otuoke
okaforii@fuotuo.ke.edu.ng

Abstract

This review paper examines the impact of Artificial Intelligence (AI) on educational planning in Nigeria. Educational planning, traditionally reliant on manual processes and administrative judgment, faces challenges such as inefficiencies, resource constraints, and disparities in access to quality education. AI offers transformative solutions by enabling data-driven decision-making, optimizing resource allocation, automating administrative tasks, supporting personalized learning, and enhancing policy formulation. Through a systematic literature review of studies published between 2015 and 2025, this paper highlights how AI tools and technologies are improving planning efficiency, promoting equity, and enhancing educational outcomes. Findings indicate that AI-driven educational analytics, predictive modeling, and intelligent. This study examined the impact of artificial intelligence on educational planning in Nigeria.



Keywords: Artificial Intelligence (AI), Education, Educational planning

1.0 Introduction

Artificial Intelligence (AI) has rapidly evolved into one of the most influential technological innovations of the 21st century, transforming the way societies function and organizations make decisions. Rooted in the academic field of Artificial Intelligence, AI refers to the development of computer systems capable of performing tasks that typically require human intelligence, such as learning, reasoning, problem-solving, and decision-making. Across sectors such as healthcare, finance, agriculture, and education, AI-driven systems are increasingly being adopted to enhance efficiency, accuracy, and productivity. In education, particularly, AI is redefining traditional practices by introducing intelligent systems that support teaching, learning, and administrative processes. Educational planning, which involves the systematic process of setting goals, determining priorities, allocating resources, and implementing policies for the effective functioning of an education system, plays a critical role in national development.

The growing complexity of educational systems in Nigeria, coupled with increasing demand for access, equity, and quality, necessitates more innovative and data-driven approaches to planning. This is where AI presents significant opportunities. AI-powered tools can analyze vast amounts of educational data in real time, identify patterns, and generate predictive insights that support more informed decision-making. For instance, predictive analytics can assist policymakers in forecasting student enrollment trends, identifying at-risk learners, and planning infrastructure development accordingly. Similarly, machine learning algorithms can support optimal teacher allocation, curriculum planning, and budgeting processes, thereby improving overall system efficiency. AI facilitates the automation of routine administrative tasks such as student registration, examination processing, and data management, thereby reducing human workload and minimizing errors. Intelligent tutoring systems and adaptive learning platforms also provide valuable data on student performance, which can be used by planners to design more responsive and inclusive educational policies. These innovations align with global efforts to harness technology for sustainable development, as emphasized by organizations such as UNESCO, which advocates for the ethical and inclusive use of AI in education.

Despite these promising benefits, the integration of AI into educational planning in Nigeria is not without challenges. Issues such as inadequate digital infrastructure, limited technical expertise, high implementation costs, and resistance to change may hinder effective adoption. Moreover, ethical concerns surrounding data privacy, surveillance, and algorithmic bias must be carefully addressed to ensure that AI systems are fair, transparent, and accountable. There is also a critical need for capacity building among educational planners, administrators, and teachers to enable them to effectively utilize AI technologies in their professional practices. The socio-economic context of Nigeria presents unique considerations for AI adoption in education. The digital divide



between urban and rural areas, disparities in access to internet connectivity, and variations in technological readiness across institutions may affect the equitable implementation of AI-driven solutions. Therefore, while AI holds great promise for transforming educational planning, its deployment must be guided by well-informed policies, strategic investments, and inclusive frameworks that consider the diverse realities of the Nigerian education system.

Against this backdrop, this review paper examines the impact of Artificial Intelligence on educational planning in Nigeria through a systematic analysis of existing literature published between 2015 and 2025. The study seeks to explore how AI technologies are reshaping planning processes, improving efficiency, and enhancing educational outcomes, while also identifying the challenges and ethical considerations associated with their use. By providing a comprehensive overview of current trends and practices, the paper contributes to ongoing discussions on how emerging technologies can be effectively leveraged to strengthen educational systems and support national development goals.

2.0 Conceptual Terms

2.1 Concept of Artificial Intelligences

Artificial intelligence is one of the educational resources that has assisted in the delivery of teaching and learning in the schools system. Integrating AI into education offers many benefits, it also poses important considerations and potential challenges. Ethical concerns about privacy, data security, and algorithmic bias must be considered to ensure responsible and fair use of AI in the classroom. In addition, training and professional development programs are needed to equip educators with the skills and knowledge to effectively leverage AI tools and platforms. It is important to find a balance between the use of AI technology and the essential role teachers play in fostering creativity, critical thinking, and social-emotional skills. Bringing AI into the classroom has the potential to revolutionize education globally. Educators can use the power of AI to personalize learning, automate administrative tasks, create rich learning experiences, and deliver intelligent learning systems. However, careful attention should be paid to ethical considerations and teacher training to ensure responsible and fair behavior (Sharma, Tomar, Bhardwaj, & Sakalle, 2021; Bojorquez & Vega, 2023). AI can potentially revolutionize the crime management of school system to be more effective. With the increasing in the rate of criminalities in the tertiary institutions and other threats, institutions are challenged to implement new and innovative ways to protect students and staff. AI technology offers a variety of solutions that can help tertiary institutions to improve their safety and security measures and enhance their overall emergency preparedness (Sadulski, 2024).

AI operate with different technological tools. These AI tools are designed to handle specific educational programme such as teaching, learning, researching, management, finance, security etc. Additionally, AI can aid in the development of intelligent tutoring systems that provide immediate feedback and guidance to students, even outside the classroom. Intelligent tutoring systems



leverage AI algorithms to assess student progress, identify misconceptions, and offer targeted interventions or resources to address gaps specific learning. These systems can tailor their instruction in real time, providing personalized pathways for each student's academic growth (Sasan, Barquin, Alestre, Librea, & Zamora, 2022). According to UNESCO (2021), Artificial Intelligence refers to “computer systems that can perform tasks that normally require human intelligence, such as learning, reasoning, problem-solving, perception, and language understanding, with potential applications in education, health, and governance.” This definition emphasizes AI as a transformative tool for sustainable development, particularly in improving teaching, learning, and educational administration. Artificial Intelligence (AI) has emerged as a transformative force across various sectors, offering innovative solutions to complex problems. In the realm of education, AI holds the potential to revolutionize traditional teaching methods and streamline research processes. Artificial Intelligence refers to the development of computer systems capable of performing tasks that typically require human intelligence. This includes a range of technologies, including machine learning, natural language processing, and data analytics. AI systems leverage algorithms and data to simulate cognitive functions, enabling machines to analyze information, adapt to changing circumstances, and improve performance over time (Russell & Norvig, in Ogunode 2022). Ogunode & Ukozor (2023e) defined AI as programs designed with human-like intelligence and structured in the forms of computers, robots, or other machines to aid in the provision of any kind of service or tasks to improve the social economic and political development of the society. Artificial Intelligence is an application or program constructed to carry out tasks with human-like intelligence. They also viewed Artificial Intelligence as collections systems, packages and applications designed into digital computers or computer-controlled robots to carry out assignments and tasks with human-like intelligence.

2.2 Concept of Educational Planning

Educational planning can be described as a process of making education decisions about future actions. It can be seen as a critique and readjustment of the present state of education so that the future may be influenced. It is a way of influencing the future of the education system by our actions of today. It can also be described as the process that uses information in an organized and rational way to make decisions about the future of education, which are designed to attain desired goals more effectively (Moss and Pucel, in Ogunode 2020). Educational planning as the application of rational systematic analysis to the process of educational development with the aim of making education more effective and efficient in responding to the needs and goals of the learners and the society (Comb cited in Akpan, 2000). This means that educational planning should take into account the needs of the pupils/students in terms of learning facilities and equipment, textbooks, classroom spaces and qualified educational personnel. In meeting the needs of the society, educational planning should take cognizance of the manpower, cultural, social and communication needs of the society (nation) as well as the economic changes (Akpan, 2000).



Educational planning is critical to the realization of educational goals or objectives (Ogunode, 2021).

Educational planning is a continuous process of obtaining and analyzing facts and, from empirical base, of providing information for decision makers on how best the education system is to accomplish its goals and how best to achieve cost-effectiveness of education programmes (Fabunmi in Ogunode 2020). Educational planning involves taking of decisions for future action with the view to achieving predetermined objectives through optimum use of scarce resources. Therefore, the coverage of educational planning includes curriculum planning, target planning and manpower planning within the education sector (Longe in Ogunode 2020). Educational planning as...the exercise of foresight in determining the policy, priorities and cost of an educational system, having due regard for economic and political realities, for the systems potential for growth and for the needs of the country and the pupils served by the system (Beeby in Ogunode 2020). Educational planning deals with the analysis and synthesis of facts and information relevant to education to make rational decisions that concerns educational policies, programmes and plans. Educational planning as “the application of rational, systematic analysis to the process of educational development with the aim of making education more effective and efficient in responding to the needs of its students and society (Coombs in Ogunode 2020).”

In the area of importances of educational planning; Aghenta in Ogunode (2020), broadly put them as two, they are to:

- (i) Ensure that the educational system is effectively and efficiently planned and operated.
- (ii) Ensure that education serves the needs and aspirations of the society in general and the students in particular.

Specifically, education planning is useful for the following reasons:

- (a) Educational planning enables the education managers gain economic insights in the use of resources, which are in most cases limited, educational planning ensures rational allocation of resources to various education programmes, projects and among the levels of education.
- (b) Because educational planning processes data and information on education through in-depth analysis, it ensures rational and adequate facilities and equipment provision and distribution in the educational institution.
- (c) Education is planned to ensure internal efficiency of the school system. That is, to reduce or eliminate wastage in the system.
- (d) Educational planning ensures the harmonization of the interests of the various stakeholders in education business. That is, the interests of the students, parents and the society.



- (e) Education planning gives direction to actions and facilitates the control of education resources, and provides basis for monitoring and evaluation of the standards, benchmarks and guidelines.
- (f) Educational planning integrates various knowledge areas, such as mathematics, statistics, computer science, economics, sociology etc to operationalize the planning of education.
- (g) Education is planned to ensure relevance to societal values and aspirations. Oguonde (2020) outlined the following as the purpose of planning education: to realize the objectives of education, to meet the manpower requirement of the country, to ensure even development of the country, to reduce educational wastages, to achieve quality education in the country and to meet adjust to any contingency situations in future. According Ogunode (2020) educational planning covers the sub-component of the educational system like manpower planning, school plant planning, infrastructural facilities planning, academic planning, lesson planning, financial planning for schools etc. Educational planning also includes the planning of the early child education, basic education, junior secondary school education, senior secondary school education, higher education, special education, gender education and adult education.

3.0 Method

The impact of artificial intelligence on educational planning in Nigeria. Thee paper is a position paper that adopted a systematic literature review-based method. The method allows to collect and review the related previous literature from various online sources. With the aid of digital platform, the researcher collected secondary information to generate knowledge on this topic from 2015-2025. The position paper followed qualitative narrative design method. The researcher has visited different online sites to collect the previous literature and analyze the impact of artificial intelligence on educational planning in Nigeria. The previous findings are critically analyzed and presented in different themes as on the impact of artificial intelligence on educational planning in Nigeria (Adapted from Ogunode, 2025).

Inclusion and exclusion criteria

Inclusion

This output of the literatures on the impact of artificial intelligence on educational planning in Nigeria presents an in-depth study and result that can infer conclusion on the topic. The study includes: online publication; conference paper, journals sorted from reputable international journals such as CEON, Elsevier, Hindawi, JSTOR, IEEE, Learn Techlib, SAGE, Nebraska and Springer (Adapted from Ogunode, 2025v).

Exclusion

Also, the literature review excludes information from edited books, preprints, monographs, information below 2015 and book chapters (Adapted from Ogunode, 2025).



4.0 Result and Discussion on ways AI is aiding educational planning

Artificial Intelligence (AI) is increasingly reshaping educational planning by introducing data-driven, efficient, and adaptive approaches to decision-making and resource management. Educational planning traditionally dependent on manual forecasting and administrative judgment is now being enhanced through intelligent systems capable of analyzing complex datasets, predicting trends, and supporting policy formulation. The discussion below presents key ways AI is aiding educational planning, supported with scholarly evidence.

Data-Driven Decision Making in Educational Planning

Data-driven decision making is a critical aspect of modern educational planning, and the integration of AI technology has greatly enhanced this process in Nigeria. With the help of AI tools, educational planners in Nigeria are now able to gather large amounts of data and extract meaningful insights that aid in making informed decisions. This has resulted in more efficient and effective decision making, leading to improved education outcomes in the country. One way AI is aiding educational planning in Nigeria is through the use of predictive analytics. By analyzing past and current data, AI algorithms are able to forecast future trends and patterns in educational planning. This allows planners to anticipate potential challenges and proactively identify solutions to address them. AI has also been instrumental in facilitating the development of data-driven policies in education. By analyzing data on student performance, enrollment rates, and teacher effectiveness, AI tools can identify areas of improvement and help to inform policy changes that will benefit the education system in Nigeria. AI has also revolutionized the way educational planners collect and process data. AI-powered data collection and analysis tools are faster, more accurate, and more cost-effective than traditional methods. This has allowed for a more comprehensive and thorough analysis of data, leading to more informed decision making. AI enables planners to make informed decisions through advanced data analytics. Machine learning algorithms process large volumes of educational data such as enrollment trends, student performance, and teacher distribution to guide planning decisions. AI-driven educational analytics support evidence-based planning by identifying patterns and predicting future needs in education systems (Sadulski, 2024; Singh, & Jain, 2022). For instance, AI models can forecast student enrollment and optimize school location planning or infrastructure expansion. AI facilitates real-time policy adjustments by providing continuous feedback from education management systems, improving responsiveness and accuracy in planning.

Efficient Resource Allocation and Management

Efficient resource allocation and management are critical components of educational planning in Nigeria. Thanks to the advancements in AI, these processes have become easier and more effective. AI has enabled educational planners to better understand the needs and demands of different



regions in Nigeria, leading to a more targeted and efficient allocation of resources. AI can also assist in identifying areas where resources may be lacking or underutilized. By analyzing data on student enrollment, performance, and other relevant factors, AI can identify regions or schools that may require additional resources. This helps educational planners to make informed decisions and allocate resources where they are needed the most. AI can also help with the management of resources by automating certain tasks. For example, AI can analyze data on school facilities and maintenance schedules to identify potential issues before they arise. This ensures that resources are used efficiently and effectively, without the need for manual monitoring and intervention. One of the major contributions of AI to educational planning is its ability to optimize resource allocation. Educational planners can use AI tools to match teachers with schools, allocate funding efficiently, and manage classroom resources (Russell, & Norvig, 2021; United Nations Educational, Scientific and Cultural Organization UNESCO 2021). According to UNESCO, AI supports efficient allocation of resources by analyzing demand and supply dynamics, such as teacher deployment and student placement. This ensures equitable distribution of educational resources, particularly in developing regions where disparities in access to education are prevalent.

Personalized and Adaptive Educational Planning

Personalized and adaptive educational planning is an innovative approach to education in Nigeria that utilizes artificial intelligence (AI) to aid in the planning process. This approach aims to develop personalized and adaptive learning experiences for students through the use of AI-based tools and technologies. By leveraging AI, educational planners in Nigeria are able to gather and analyze large amounts of data on each student's individual strengths, weaknesses, and learning preferences. This allows for the creation of personalized educational plans that cater to the unique needs of each student. AI can also be used to adapt and modify these educational plans in real-time based on the student's progress and performance. This ensures that students are constantly receiving the support and resources they need to succeed. AI supports planning that takes into account individual learner differences. Through adaptive learning systems, AI helps design curricula and instructional strategies tailored to students' needs, abilities, and learning pace (Alashwal, 2024; Maia, Bueno, & Sato, 2023; Marcos, 2026; UNESCO 2025).. Research shows that AI-powered systems create personalized learning pathways by analyzing student data and adapting instructional content accordingly. This allows educational planners to shift from a “one-size-fits-all” model to more inclusive and learner-centered planning frameworks (Xu & Ouyang, 2022; Zhai, Chu, Chai, et al. 2021).

Automation of Administrative and Planning Tasks

Automated administrative and planning tasks are playing a crucial role in the field of education in Nigeria, thanks to the constant advancements in Artificial Intelligence (AI) technology. The integration of AI in educational planning has revolutionized the entire process, making it more efficient, accurate, and time-saving. AI has enabled the automation of various administrative tasks,



such as data entry, record-keeping, and scheduling. This has not only reduced the burden on administrative staff but also minimized the chances of human error, ensuring the accuracy and consistency of data (Ogunode & Olowonefa 2023). By automating these tasks, educational institutions in Nigeria are able to streamline their operations and allocate their resources more effectively (; Okonkwo, & Okonkwo, 2024). AI is also aiding educational planning in Nigeria by providing data-driven insights and predictive analytics. With the help of AI algorithms, educational planners can analyze large amounts of data and identify patterns and trends that can inform decision-making. This has greatly enhanced the efficiency of educational planning, allowing for more informed and effective strategies to be implemented. AI reduces the burden of routine administrative tasks, thereby improving planning efficiency. Tasks such as scheduling, admissions processing, and performance tracking can be automated using AI systems (Ogunode, Agbade & Bassey, 2023). Studies indicate that AI streamlines administrative processes and reduces time spent on planning activities, allowing administrators to focus on strategic decision-making. AI-powered tools can generate reports, analyze institutional performance, and support long-term planning with minimal human intervention (Ogunode, & Ejike, 2023). AI-powered tools are also being used to personalize learning for students in Nigeria. These tools can analyze student data and performance to identify their strengths, weaknesses, and learning styles. This allows for the creation of customized learning plans that cater to the individual needs of each student, resulting in improved learning outcomes (Olusegun, & Honmane, 2024).

Early Warning Systems and Predictive Planning

AI plays a crucial role in educational planning in Nigeria by utilizing early warning systems and predictive planning strategies. With the help of AI, educators can now get a thorough understanding of the past and present situation of educational institutions in the country. This allows them to identify potential problem areas and make proactive decisions to improve the overall educational system. Early warning systems, powered by AI, provide advanced analytics and data processing techniques to identify potential issues in educational planning (Onete Akpama, Egong & Okey, 2012). By analyzing various data points such as student performance, attendance, and behavior, the system can detect patterns and provide early warnings to educators. This enables them to take necessary actions to prevent any potential problems and ensure the success of students. Predictive planning is another way in which AI is aiding educational planning in Nigeria (Ogunode & Gregory, 2023). This strategy utilizes machine learning algorithms to analyze historical data and provide predictions for future educational planning. By considering factors such as student enrollment, academic performance, and resource allocation, educators can make informed decisions to optimize the educational system. AI enhances proactive educational planning through predictive analytics. Early warning systems use AI algorithms to identify students at risk of dropping out or underperforming. UNESCO highlights that AI-based early warning systems can detect learning risks and guide timely interventions, improving retention and academic outcomes (Okeke, & Eze, 2022). This predictive capability enables planners to design



targeted interventions and policies that address potential challenges before they escalate (Ogunode & Ukozor 2023).

Improvement of Educational Quality and Outcomes

AI has greatly improved the educational quality and outcomes in Nigeria by aiding in educational planning. This has been achieved through the implementation of various intelligent technologies such as machine learning, natural language processing, and data analytics. With the help of AI, educational institutions in Nigeria are now able to collect and analyze large amounts of data to identify patterns and trends. This allows for more informed decision making and better educational planning. AI can also assist in curriculum development by identifying knowledge gaps and suggesting improvements. AI has played a significant role in personalized learning. It enables the creation of adaptive learning programs that cater to individual student needs and learning styles. This has led to improved educational outcomes and higher student engagement. AI has made it possible to automate administrative tasks, freeing up time for teachers and administrators to focus on more important tasks. This has also resulted in a more efficient and streamlined educational system in Nigeria. AI contributes to improving the overall quality of education by enhancing planning processes that focus on learning outcomes. Through continuous monitoring and evaluation, AI helps planners assess the effectiveness of educational policies and programs. Research indicates that AI-driven systems enhance student engagement and academic performance by supporting adaptive learning environments (Ogunode, Agbade, & Bassey, 2023; Oluyemisi, 2023; Olusegun, & Honmane, 2024). As a result, educational planning becomes more outcome-oriented, focusing on measurable improvements in teaching and learning.

Support for Policy Formulation and Strategic Planning

AI assists policymakers in developing long-term educational strategies. By simulating different policy scenarios, AI helps planners understand the potential impact of decisions before implementation. AI integration into education sector plans allows governments to design more resilient and inclusive systems by incorporating real-time data and predictive insights (Thomas & Gambari, 2021; Okonkwo, 2024). This strengthens governance and ensures that policies are aligned with emerging educational needs. AI has become a valuable tool in education planning in Nigeria, specifically in the areas of policy formulation and strategic planning. Through its advanced analytical capabilities, AI is helping to identify patterns and trends in educational data that can inform policy decisions. AI is able to analyze vast amounts of data and generate insights that can aid in creating effective strategic plans for education in Nigeria (Ogunode, Edinoh, & Chinedu, 2023). By utilizing sophisticated algorithms, AI is able to identify potential issues and provide recommendations for how to address them. This powerful technology is revolutionizing the approach to educational planning in Nigeria, providing decision-makers with data-driven insights to inform their policies and strategies (Ogunode, Edinoh, & Chinedu, 2023).



Enhancement of Equity and Access in Education

The use of artificial intelligence (AI) in educational planning has greatly enhanced equity and access in the Nigerian education system. Through the implementation of AI, educational institutions are able to accurately identify areas of improvement and allocate resources accordingly. This has led to a more equitable distribution of resources, ensuring that all students have access to quality education (Dada, Olowonefa, & Ogunode, 2022). AI has also revolutionized the enrollment process in Nigeria. By using intelligent algorithms, AI tools can identify and match students with the educational programs that best suit their needs and abilities. This has not only improved access to education for students, but also increased the overall efficiency and effectiveness of the enrollment process. AI has also been utilized in the development of personalized learning programs. These programs use AI algorithms to create tailored learning plans for individual students based on their strengths, weaknesses, and learning styles. This has greatly improved the quality of education for students, as well as addressed issues of equity by providing each student with a personalized and equitable learning experience. AI plays a critical role in promoting inclusive educational planning. By identifying underserved populations and gaps in access, AI helps planners design interventions that improve equity. Studies emphasize that AI can expand access to education by supporting remote learning, identifying marginalized learners, and improving distribution of educational opportunities. This is particularly relevant in developing countries where educational inequality remains a major challenge (Ogunode, Eyiolorunse-Aiyedun, & Olatunde-Aiyedun, 2021).

4.1 Conclusion and Recommendations

The review demonstrates that Artificial Intelligence has a significant impact on educational planning in Nigeria by introducing efficiency, adaptability, and data-driven insights into traditionally manual processes. AI enhances decision-making through predictive analytics, improves resource allocation, supports personalized and adaptive learning, automates administrative tasks, and strengthens policy formulation. Additionally, AI contributes to improving educational quality, promoting equity, and addressing challenges such as student underperformance and access disparities. However, the successful integration of AI into educational planning requires addressing ethical considerations, safeguarding data privacy, and ensuring that educators are adequately trained to leverage AI tools effectively.

Based on the findings of this review, the following recommendations are proposed to enhance the effective use of AI in educational planning in Nigeria:

1. The Nigerian government and educational authorities should establish comprehensive policies and regulatory frameworks to guide the ethical and responsible use of AI in education.
2. Continuous professional development and training programs should be implemented to equip teachers, administrators, and planners with the skills to utilize AI tools effectively.



3. Robust mechanisms should be put in place to ensure the privacy, security, and ethical management of educational data used in AI systems.
4. Adequate technological infrastructure, including reliable internet access, AI software, and hardware, should be provided across educational institutions to support AI integration.
5. AI should be leveraged to identify gaps in access and promote inclusive educational planning that addresses the needs of marginalized and underserved populations.
6. Continuous monitoring and evaluation frameworks should be established to assess the impact of AI on educational outcomes and inform ongoing improvements in educational planning.
7. Partnerships with international organizations, research institutions, and AI experts should be encouraged to foster innovation, share best practices, and advance AI-driven educational planning in Nigeria.

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