

## THE ROLE OF ARTIFICIAL INTELLIGENCE FOR ENHANCED SECONDARY SCHOOL MANAGEMENT IN NIGERIA

<sup>1</sup>OKHIKU, I.I. Ph.D.; <sup>2</sup>EMOSOGA, J. A.; & <sup>3</sup>OMOROGBE, E.

<sup>1&2</sup>Department of Educational Foundations and Management

Faculty of Education, Ambrose Alli University, Ekpoma, Edo State;

<sup>3</sup>Department of Biology, Edo State College of Education, Igueben

Email: <sup>1</sup>[idonijeokhiku@aauekpoma.edu.ng](mailto:idonijeokhiku@aauekpoma.edu.ng); [josephemosoga@aauekpoma.edu.ng](mailto:josephemosoga@aauekpoma.edu.ng); & <sup>3</sup>[omorogbeeseosa@gmail.com](mailto:omorogbeeseosa@gmail.com)

<sup>1</sup>+2347030205002; & <sup>2</sup>+2349033175616

### Abstract

*The rapid growth of Artificial Intelligence (AI) technologies has transformed many sectors globally, including education. In Nigeria, secondary school management continues to grapple with administrative inefficiencies, poor data management, inadequate supervision, and limited access to information for effective decision-making. This paper examined the role of Artificial Intelligence in enhancing secondary school management in Nigeria, with particular attention to how it can improve efficiency, transparency, and accountability. The paper reviewed existing literature on the application of Artificial Intelligence in school administration, resource allocation, student performance monitoring, and teacher evaluation. The findings indicate that poor digital infrastructure, low technical literacy among educators, high implementation costs, and data privacy concerns are the challenges facing AI adoption. The paper concludes that although Artificial Intelligence offers significant opportunities for educational reform, its successful integration in Nigeria depends on supportive government policies, continuous teacher training, and collaboration between the public and private sectors. The paper recommends that government, school administrators, and other educational stakeholders develop policies that support the effective integration of Artificial Intelligence into secondary school management.*

**Keywords:** Artificial Intelligence, Secondary School Management, Nigeria

### Introduction

Education is widely recognized as the cornerstone of national development, and its effective management is essential for improving educational outcomes at all levels. In Nigeria, secondary education serves as a bridge between primary and tertiary education, equipping learners with essential cognitive, social, and technical skills necessary for nation-building. However, the management of secondary schools in Nigeria faces persistent challenges such as inadequate supervision, poor record-keeping, inefficient resource allocation, and weak administrative structures (Ogunleye, 2020). These challenges have contributed to declining standards, low student performance, and poor accountability in the education system. With the growing influence of the Fourth Industrial Revolution, Artificial Intelligence (AI) has emerged as an important tool capable of reshaping how schools are managed, monitored, and improved.

Artificial Intelligence refers to computer systems or machines that perform tasks that normally require human intelligence, such as reasoning, learning, problem-solving, and decision-making (Russell & Norvig, 2021). Within the education sector, AI encompasses a range of technologies, including machine learning, data analytics, natural language processing, and intelligent automation, that can be used to enhance teaching, learning, and school administration (Luckin et al., 2016). Across many countries, AI applications are increasingly being integrated into

education systems to automate routine administrative functions, analyze large volumes of educational data, provide personalized learning experiences, and support strategic decision making by school leaders (Baker & Smith, 2019).

Nigerian secondary schools' management still relies heavily on manual processes, leading to inefficiencies and delays in communication and record management (Okeke, 2022). School principals and administrators often face difficulties in maintaining accurate student records, monitoring teacher performance, and evaluating institutional outcomes. The introduction of Artificial Intelligence systems can provide valuable insights that improve planning, strengthen accountability, and support informed decision-making. For example, predictive analytics can help identify students at risk of dropping out, while automated administrative tools can streamline tasks such as attendance tracking, grading, and timetable scheduling (Ugwoke & Eze, 2021).

AI can strengthen educational supervision by providing timely information on teacher attendance, lesson delivery, and student engagement. This approach improves transparency and enables educational authorities to identify areas that require prompt intervention. In countries such as China and the United States, AI applications are already being used to assess teacher effectiveness and monitor student progress through intelligent management systems (Zawacki-Richter et al., 2019). For Nigeria, adopting similar innovations could improve schools management and enable schools to respond more effectively to the needs of learners in the twenty first century.

The implementation of AI in Nigerian secondary schools also faces several barriers, including inadequate infrastructure, poor internet connectivity, limited digital literacy among educators, and insufficient policy frameworks (Adebayo & Alabi, 2020). There are also ethical concerns regarding data privacy, algorithmic bias, and job displacement that must be carefully addressed to ensure sustainable adoption. With the growing recognition of technology's role in achieving educational reform, integrating AI into Nigeria's secondary school management system has become an imperative for improving efficiency, transparency, and educational outcomes.

This paper discussed the role of Artificial Intelligence in improving secondary school management in Nigeria. It explores how AI can be applied in administrative automation, resource optimization, decision-making, and performance evaluation. It also discusses the challenges of implementing AI in Nigerian secondary schools and offers recommendations for effective integration into the education sector.

## **Literature Review**

### **Artificial Intelligence**

Artificial Intelligence (AI) has received growing attention in educational research because of its ability to improve teaching, learning, and school administration. Across many educational systems, AI applications are increasingly being integrated into school management systems to improve efficiency, support informed decisions, and enhance personalized learning. Luckin et al. (2016) explained that AI technologies such as machine learning, data analytics, and natural language processing enable systems to analyze large volumes of educational data, providing valuable insights for planning and performance evaluation. These technologies have gradually transformed school management by replacing manual processes with intelligent systems that support administrators and policymakers.

Many developed countries have successfully deployed AI tools to automate administrative duties, streamline communication, and monitor both teacher and student performance. For instance, in China and Singapore, AI-based platforms have been adopted for intelligent attendance management, digital grading, and predictive analytics to identify students needing additional

academic support (Zawacki-Richter et al., 2019). Similarly, in the United States, school districts are using AI to optimize resource allocation and improve data accuracy in student records management (Baker & Smith, 2019). As a result, these innovations have made school operations more efficient and allowed administrators to focus more on instructional leadership and teaching quality.

In Africa, the use of AI in education is still at an early stage with implementation concentrated in higher education institutions rather than at the secondary level (Okeke, 2022). Recent studies indicate that AI helps improve administrative efficiency in African schools by automating repetitive tasks, enhancing transparency, and supporting informed decision-making (Ugwoke & Eze, 2021). AI also assists in human resource management by tracking teacher attendance, evaluating performance, and identifying training needs. It is equally useful to manage student data, forecast enrollment trends, and ensure accountability in school finances.

Within Nigeria, the integration of AI into secondary education remains minimal despite increasing advocacy for educational technology adoption. According to Ogunleye (2020), many Nigerian schools still rely on manual administrative systems that are prone to errors, data loss, and inefficiency. This lack of technological integration contributes to weak supervision, delayed decision-making, and poor record-keeping. Introducing Artificial Intelligence systems could help address these challenges by providing timely data analytics and digital tools for school administrators (Adebayo & Alabi, 2020).

Furthermore, AI can enhance the quality of supervision and monitoring in secondary schools. With tools such as facial recognition and digital attendance tracking, educational authorities can reduce absenteeism and promote accountability among teachers and students. Additionally, intelligent dashboards can provide school leaders with insights into teacher performance, student engagement, and resource utilization (Luckin et al., 2016). The insights generated from these systems can help improve overall institutional performance.

Existing studies have also identified significant barriers to the adoption of Artificial Intelligence in Nigerian secondary schools. According to Okeke (2022), key challenges include poor infrastructure, unreliable electricity supply, limited internet connectivity, and lack of skilled personnel. Many teachers lack digital literacy skills, making it difficult to operate or maintain AI systems (Adebayo & Alabi, 2020). The high cost of AI technologies and concerns about data privacy and ethical use of student information also hinder large-scale deployment (Baker & Smith, 2019).

## Secondary School Education in Nigeria

Secondary education in Nigeria plays an important role in the country's formal education system, serving as a bridge between primary education and tertiary institutions. It remains an important stage for the intellectual, moral, and social development of young Nigerians, and a key platform for promoting civic values, including peace, tolerance, and national integration.

The Federal Republic of Nigeria (FRN) (2013) in her national policy on education stated that secondary education in Nigeria is designed to prepare students for useful living within the society and for higher education. The policy outlines a 6-3-3-4 structure, where students spend six years in primary school, three years in junior secondary, three years in senior secondary, and four years (or more) in tertiary education. Secondary education is further divided into two phases:

1. **Junior Secondary School (JSS 1-3):** This phase offers a broad-based curriculum that includes core subjects like English Language, Mathematics, Basic Science, Civic

Education, Social Studies, and Nigerian languages. The stage exposes students to general knowledge and life skills.

2. **Senior Secondary School (SSS 1-3):** At this stage, students specialize in one of three major tracks Science, Arts/Humanities, or Commercial-while continuing with core subjects such as English Language, Mathematics, and Civic Education. Senior secondary school serves as preparation for the West African Senior School Certificate Examination (WASSCE) and other external exams.

### Secondary School Management in Nigeria

Secondary schools in Nigeria are managed by the federal and state governments, as well as private proprietors each with differences in infrastructure, teacher quality, and access to learning resources. While federal government colleges (Unity Schools) were established to promote national integration by bringing students from diverse ethnic and religious backgrounds together, many state and private schools tend to reflect the local sociocultural dynamics of their host communities (Ajayi & Alabi, 2015).

Secondary school management in Nigeria plays a crucial role in the overall development of the nation's education system, as it serves as the link between primary and tertiary education. It is at this level that students begin to develop critical thinking, leadership skills, and professional orientation that prepare them for future academic and career pursuits. According to the FRN (2013), secondary education aims to provide an integrated curriculum that promotes intellectual, moral, and vocational development. Achieving these goals depends largely on the efficiency and capacity of school management structures.

Secondary school management in Nigeria involves the planning, organization, coordination, and control of human and material resources within the school system to achieve educational objectives (Ogunleye, 2020). The management structure typically includes the principal, vice principals, heads of departments, and teaching staff, who oversee the implementation of educational policies, maintaining discipline, and ensuring effective teaching and learning. The Ministry of Education at both the federal and state levels provide supervisory and policy direction through agencies such as the Post-Primary Education Board (PPEB) and the Teachers Registration Council of Nigeria (TRCN) (Okeke, 2022).

Even with this structure, Nigerian secondary schools face numerous management challenges that hinder the attainment of quality education. Common challenges include poor record-keeping, inadequate funding, shortage of qualified teachers, ineffective supervision, infrastructural decay, and lack of data-driven decision-making (Adebayo & Alabi, 2020). In many schools, administrative processes are still manual, leading to inefficiencies in record management, communication, and performance monitoring. The lack of modern management tools and reliable data systems often results in inaccurate reporting and poor accountability among school administrators (Ugwoke & Eze, 2021).

At the same time, the rapid growth in student enrollment, driven by Nigeria's expanding population, has put additional pressure on secondary schools to deliver quality education amidst limited resources (Obielodan, 2022). Many schools operate in overcrowded environments, with poor teacher-student ratios and inadequate classroom facilities. This has led to declining academic standards, examination malpractice, truancy, and teacher absenteeism. Managing schools under these conditions requires the adoption of innovative approaches that can optimize available resources and enhance administrative efficiency.

The adoption of technology in the management of Nigerian secondary schools has progressed slowly. While developed countries have adopted digital management systems for school administration, most Nigerian schools still rely on outdated manual filing systems (Olanrewaju & Adebayo, 2020). Recent educational reforms also emphasize the importance of Educational Management Information Systems (EMIS) and Information and Communication Technology (ICT) tools in improving school operations. The Federal Ministry of Education, through initiatives such as the Nigeria Education Management Information System (NEMIS), has attempted to digitalize school data collection and management. Yet, the full potential of technology in transforming school management remains largely untapped due to infrastructural and capacity limitations (UNESCO, 2021).

Okeke (2022) noted that the introduction of Artificial Intelligence (AI) could help address many of these long-standing challenges by automating administrative processes, enhancing data management, and supporting evidence-based decision-making. Artificial intelligent tools can assist principals in managing attendance, evaluating teacher performance, allocating resources, and monitoring student progress more effectively. For example, AI-based predictive analytics can help identify patterns of underachievement and absenteeism, enabling timely interventions (Baker & Smith, 2019). In addition, intelligent administrative systems can streamline communication between school administrators, teachers, parents, and government authorities, thereby improving transparency and accountability.

Effective secondary school management also requires continuous professional development for educational leaders. Research indicates that many school administrators lack adequate management training and digital literacy to handle modern educational technologies (Ogunleye, 2020; Adebayo & Alabi, 2020). Integrating AI into school management will therefore require capacity building and training to equip administrators with the necessary skills to operate AI-driven systems efficiently.

### **The Role of Artificial Intelligence in Enhancing Secondary School Management in Nigeria**

Artificial Intelligence (AI) has transformed many sectors of human activity, including education. In Nigerian secondary schools, AI offers practical solutions for improving efficiency, accuracy, accountability, and administrative decision-making. As school administration becomes more demanding, AI-powered tools can help modernize operations and improve the educational process (UNESCO, 2021).

Baker and Smith (2019) described AI as the development of computer systems that can perform tasks typically requiring human intelligence, such as problem-solving, learning, decision-making, and language understanding. In school management, this involves the use of machine learning algorithms, predictive analytics, chatbots, facial recognition, and intelligent data systems to streamline administrative functions, support teaching, and enhance overall school performance (Okeke, 2022).

1. ***AI in Administrative and Record Management.*** One of the major contributions of AI to secondary school management is the automation of administrative tasks. Traditional administrative procedures in Nigerian schools such as student registration, attendance tracking, grading, and record-keeping are often manual, time-consuming, and prone to errors (Ugwoke & Eze, 2021). AI management information systems can automate these processes, improve accuracy, increase efficiency, and provide timely access to data.

For instance, AI-based Student Information Systems (SIS) can automatically

update and store student records, track attendance through biometric or facial recognition systems, and generate analytical reports that help principals and education boards make data-driven decisions (Adebayo & Alabi, 2020). These tools reduce administrative workload, minimize errors, strengthen accountability, and improve transparency.

2. **AI in Decision-Making and Planning.** AI can improve decision making in secondary school management by analyzing large volumes of data and providing useful information for planning and administration. Machine learning algorithms can identify patterns and predict future trends in areas such as student performance, teacher productivity, and resource utilization (Olanrewaju & Adebayo, 2020). For example, predictive analytics can help school administrators identify at-risk students early, enabling timely interventions to prevent academic failure or dropout (Baker & Smith, 2019).

Similarly, AI tools can assist principals in resource planning by optimizing class schedules, forecasting enrollment, and allocating teaching materials effectively. Considering Nigeria's constraints, this approach can improve efficiency and promote a fair distribution of educational opportunities (Ogunleye, 2020).

3. **AI in Human Resource and Performance Evaluation.** Effective teacher management and performance evaluation are essential aspects of secondary school administration. AI systems can help in monitoring teacher attendance, lesson delivery, and student feedback to evaluate teacher performance more objectively (Okeke, 2022). Natural Language Processing (NLP) tools, for example, can analyze teacher-student interactions, classroom participation, and assessment results to identify areas requiring professional development.

Likewise, AI-powered e-learning management systems can track teacher engagement in continuous professional development programs, ensuring that educators remain up to date with the latest pedagogical and technological trends (UNESCO, 2021). This promotes accountability and continuous improvement, both of which are essential for effective school leadership and high-quality instruction.

4. **AI in Communication and Stakeholder Engagement.** AI-powered chatbots and communication platforms can improve communication among school administrators, teachers, parents, and students. In many Nigerian schools, poor communication remains a major barrier to effective management and parental involvement (Obielodan, 2022). Chatbots integrated into school websites or mobile applications can respond promptly to parents' enquiries about student progress, attendance, and school activities.

In addition, AI-based analytics can process parental feedback and sentiment to inform school improvement strategies. By promoting open communication and transparency, AI fosters trust and collaboration among stakeholders, leading to better school governance (Olanrewaju & Adebayo, 2020).

5. **AI in Financial and Resource Management.** Financial mismanagement and poor resource allocation remain major challenges in Nigeria's educational institutions (Adebayo & Alabi, 2020). AI technologies can assist with financial planning by automating accounting processes, detecting anomalies in expenditures, and forecasting future budgetary needs. Predictive analytics enables school administrators to anticipate financial shortfalls and allocate available resources to priority areas more effectively.

AI can also assist in maintaining school inventories-such as textbooks, laboratory materials, and ICT equipment by monitoring usage patterns and generating alerts for restocking or maintenance. These systems reduce waste, promote transparency, and ensure accountability in resource management.

6. **AI in Monitoring and Evaluation (M&E).** Monitoring and evaluation (M&E) are essential aspects of effective school management. AI tools can collect, analyze, and present school performance data to assess the effectiveness of educational policies, programmes, and interventions. For instance, data dashboards powered by AI can provide real-time insights into key performance indicators (KPIs) such as student achievement, attendance, and teacher effectiveness (Ugwoke & Eze, 2021).

This approach enables education boards and ministries to make informed decisions, identify areas that need improvement, and introduce appropriate reforms. Integrating AI into monitoring and evaluation enables secondary schools to address challenges early, improve institutional performance and strengthen accountability.

### Challenges and Considerations in Implementing AI in Nigerian Secondary Schools

Although Artificial Intelligence (AI) has the potential to transform secondary school management in Nigeria, its implementation is constrained by technological, economic, infrastructural, institutional, and ethical challenges. These barriers stem from systemic issues within the Nigerian education system, coupled with the broader socio-economic and technological limitations of the country. The following are the challenges of implementing AI in Nigerian Secondary Schools

1. **Inadequate Technological Infrastructure:** A major challenge facing the implementation of AI in Nigerian secondary schools is inadequate technological infrastructure. Most schools, especially those in rural areas, operate without reliable electricity, modern computer systems, or stable internet connectivity (Ogunleye, 2020). AI systems depend on reliable digital infrastructure, including high-speed internet, cloud computing resources, and data storage facilities. However, many public schools in Nigeria lack even basic Information and Communication Technology (ICT) facilities, such as functional computer laboratories or digital record management systems (Adebayo & Alabi, 2020). The challenge is worsened by the uneven distribution of resources between urban and rural schools. While some private schools in urban centers have begun experimenting with digital learning tools and school management systems, the majority of public schools struggle to meet the minimum technological requirements for AI deployment (UNESCO, 2021). Unless there is significant investment in ICT infrastructure and power supply, AI implementation will remain largely theoretical.
2. **Insufficient Funding and High Cost of Implementation:** Implementing AI technologies requires substantial financial investment in hardware, software, maintenance, and staff training. Nigeria's education sector, however, suffers from chronic underfunding. According to the National Bureau of Statistics (2022), less than 7% of the national budget is allocated to education—far below the UNESCO-recommended benchmark of 15-20%. This financial constraint limits the ability of schools to acquire AI-enabled management systems, computers, and other necessary digital tools (Okeke, 2022). The adoption of AI also involves substantial costs, including software licensing, system upgrades, and cybersecurity maintenance. Most Nigerian secondary schools depend on government subventions, which are often insufficient to cover operational expenses, let alone advanced technological innovations. Consequently, introducing AI into school management will require collaboration between government and the private sector, supported by sustainable funding models (Olanrewaju & Adebayo, 2020).

3. **Low Digital Literacy and Capacity Deficit:** Another major barrier to AI implementation in Nigerian secondary schools is the limited digital literacy among teachers, administrators, and policymakers. Many principals and teachers lack the technical knowledge required to operate AI-based management systems effectively (Adebayo & Alabi, 2020). Training in digital competence is often inadequate or absent from professional development programs for educators and school managers. Ugwoke and Eze (2021) observed that a large percentage of school administrators in Nigeria are still accustomed to manual record-keeping and traditional management practices. Without proper training and orientation, these personnel may resist or misuse AI tools, leading to poor system adoption and inefficiency. Continuous training programs, workshops, and certification courses are therefore necessary to equip school personnel with the skills required for effective AI implementation.
4. **Data Quality, Privacy, and Security Concerns:** AI technologies depend heavily on data for their functionality especially in areas such as predictive analytics, performance monitoring, and decision-making. Nevertheless, data management in Nigerian schools remains weak and fragmented. Many institutions lack proper data collection, storage, and retrieval systems (Ogunleye, 2020). The absence of reliable and standardized data makes it difficult to train AI algorithms effectively and generate accurate insights. In addition, data privacy and cybersecurity are growing concerns. The use of AI involves processing sensitive student and staff information, including personal identification, attendance records, and academic performance. In the absence of robust data protection frameworks, there is a risk of unauthorized access, misuse, or data breaches (UNESCO, 2021). Nigeria's Data Protection Act (2023) provided a legal foundation, but compliance at the institutional level remains low due to poor awareness and enforcement. Therefore, protecting personal data and promoting the ethical use of AI should remain a key priority in any implementation strategy.
5. **Resistance to Change and Cultural Challenges:** Resistance to technological change also poses a challenge to AI integration in Nigerian secondary schools. Many educators and school administrators fear that AI will replace human roles or undermine their authority, leading to reluctance or outright rejection of the technology (Okeke, 2022). Much of this resistance stems from a lack of understanding of AI's purpose and benefits. In some cases, cultural perceptions of technology as a threat to traditional teaching values hinder acceptance among older educators.  
There is an inherent skepticism about AI's reliability and fairness in decision-making processes. Concerns about algorithmic bias, dehumanization of education, and overreliance on machines can generate distrust among staff, students, and parents (Olanrewaju & Adebayo, 2020). Addressing this resistance requires effective change management, awareness campaigns, and active stakeholder engagement to build confidence in the technology.
6. **Policy and Regulatory Challenges:** The absence of a comprehensive national policy on AI in education remains a major challenge. While Nigeria has made strides in ICT policy development, there is still no clear regulatory framework guiding AI deployment in secondary schools (UNESCO, 2021). The absence of such policy creates uncertainty regarding standards, ethical practices, and accountability measures. It also makes integrating AI into existing educational policies more difficult. A lack of coordination among key stakeholders such as the Federal Ministry of Education, National Information

Technology Development Agency (NITDA), and Teachers Registration Council of Nigeria (TRCN) further complicates AI adoption.

7. ***Inequality in Access and the Urban-Rural Divide:*** The digital divide between urban and rural schools in Nigeria is another key consideration. AI adoption could widen existing inequalities in access to quality education. Schools in urban centers with better internet connectivity and financial resources may quickly adopt AI solutions, while rural schools—often lacking basic facilities—will be left further behind (Ogunleye, 2020). This unequal access could deepen educational disparities and contradict the inclusive goals of the Sustainable Development Goal 4 (SDG 4), which seeks to ensure equitable quality education for all. To avoid this, deliberate efforts must be made to prioritize rural schools in AI initiatives through targeted subsidies, infrastructural support, and community-based ICT programs. Providing equal access to digital tools will help ensure that AI serves as a bridge rather than a barrier to educational equity in Nigeria.
8. ***Sustainability and Maintenance Issues:*** Even when AI technologies have been deployed, sustainability remains a challenge. Many ICT projects in Nigerian schools have failed due to lack of maintenance, inadequate technical support, and absence of long-term planning (Adebayo & Alabi, 2020). AI systems require regular updates, technical servicing, and cybersecurity management, all of which involve continuous costs. Without sustained government commitment and institutional capacity, these systems risk becoming obsolete within a few years. Sustaining these systems requires establishing technical support structures at local and state levels, training in-house IT personnel, and integrating AI maintenance costs into annual school budgets. Partnerships with private technology firms can also help ensure continuous system upgrades and technical assistance.

## Conclusion

This paper examined the role of Artificial Intelligence (AI) in enhancing secondary school management in Nigeria. The review showed that AI can enhance administrative efficiency, record management, resource allocation, teacher supervision, and decision making. Its application can also promote accountability and contribute to more effective school management. However, the adoption of AI in Nigerian secondary schools is constrained by inadequate digital infrastructure, limited funding, poor internet connectivity, low digital literacy, and concerns about data privacy. Addressing these challenges is essential for the effective use of AI in school management. Artificial Intelligence has the capacity to improve secondary school management in Nigeria when the necessary infrastructure, technical expertise, and policy support are in place. Its effective application can contribute to a more efficient, accountable, and responsive education system.

## Suggestions

Based on the issues discussed in this paper, the following recommendations are made:

- i. The Federal Ministry of Education should develop a national policy to guide the integration of Artificial Intelligence into secondary school management.
- ii. Teachers, school administrators, and education officers should receive regular training on the use of Artificial Intelligence and digital technologies.
- iii. Government should improve digital infrastructure by providing reliable electricity, internet access, and ICT facilities in secondary schools.
- iv. Artificial Intelligence solutions should be designed to address the specific management needs of Nigerian secondary schools.

- v. Schools should adopt effective data protection measures to ensure the ethical and secure use of Artificial Intelligence.
- vi. Government and research institutions should support studies on the application of Artificial Intelligence in educational management.
- vii. The introduction of Artificial Intelligence should begin with pilot programmes before nationwide implementation.
- viii. Government, schools, the private sector, and development partners should collaborate to support Artificial Intelligence integration.
- ix. School administrators and teachers should be encouraged to adopt innovative Artificial Intelligence practices through appropriate incentives.
- x. Regular monitoring and evaluation should be conducted to assess the effectiveness of Artificial Intelligence in secondary school management.

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