

## EXPLORING ARTIFICIAL INTELLIGENCE IN NIGERIAN SECONDARY SCHOOL ADMINISTRATION: BARRIERS, POTENTIALS, AND STRATEGIC DIRECTIONS

**Lorretta Ibiwari SUNDAY-COOKEY**

Department of Educational Management

Faculty of Education

Ignatius Ajuru University of Education, Nigeria

[sundaylorretta0@gmail.com](mailto:sundaylorretta0@gmail.com)

**Nwabueze Eunice NWANKWO**

Department of Educational Management

Faculty of Education

Ignatius Ajuru University of Education, Nigeria

[eunicenwankwo18@gmail.com](mailto:eunicenwankwo18@gmail.com)

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### ABSTRACT

This paper examined artificial intelligence in Nigerian secondary school administration: barriers, potentials, and strategic directions. Artificial intelligence (AI) is transforming the education sector globally, and secondary schools in Nigeria are not exempt from this revolution. The integration of AI in secondary schools in Nigeria presents numerous opportunities, including improved student learning outcomes, enhanced teacher productivity, and more efficient school administration. AI-powered adaptive learning systems can provide students with personalized learning experiences, while AI-powered intelligent tutoring systems can offer one-on-one support to students. Additionally, AI-powered chatbots can facilitate parent-teacher communication, improving parental engagement and involvement in their child's education. However, the integration of AI in secondary schools in Nigeria also poses significant challenges, including inadequate infrastructure, limited access to technology, and concerns about data privacy and security. Furthermore, there is a need for teacher training and professional development to ensure that teachers are equipped to effectively integrate AI into their teaching practices. Despite these challenges, the future of AI in secondary schools in Nigeria is promising, with potential applications in areas such as predictive maintenance, virtual learning environments, and automated grading systems. It was concluded that Artificial intelligence is transforming the landscape of secondary school administration, presenting numerous opportunities, challenges, and future directions. It was suggested amongst others that the Ministry of Education should implement AI-powered adaptive learning systems to provide students with personalized learning experiences in Nigeria. Also, principals should adopt the use of AI-powered Chatbots to facilitate parent-teacher communication and improve parental engagement. Lastly, the federal Government should develop AI-powered intelligent tutoring systems to provide students with personalized one-on-one support

**Keyword:** Artificial, Intelligence, Secondary, School, Administration, Challenges, Opportunities, Future and Directions.

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## INTRODUCTION

Artificial Intelligence (AI) is gradually transforming secondary school administration, offering innovative solutions to longstanding challenges. From student records management to automated lesson planning, AI-driven systems are streamlining operations, reducing administrative burdens, and improving overall efficiency. The integration of artificial intelligence (AI) in education has transformed the learning landscape, offering opportunities for improved administrative efficiency, enhanced student outcomes, and supported teacher development (Kumar, 2020; Jing, 2018). School administrators can now use AI-powered tools for data analysis, helping them make informed decisions on student performance, attendance tracking, and resource allocation. Additionally, AI-enhanced communication platforms facilitate better engagement between teachers, students, and parents, fostering a more connected and responsive educational environment.

Despite its potential, the adoption of AI in Nigerian secondary schools faces several challenges, including limited infrastructure, lack of technical expertise, and concerns about data privacy and lack of facilities. Nwafor and Ololube (2024) aptly stated that the lack of and poor condition of these facilities tend to lower teachers' morale and reduce their level of commitment. Conversely, when facilities are in good condition, they positively influence teachers' attitudes toward their jobs'. Many schools still struggle with basic digital integration, making it difficult to implement advanced AI solutions. However, as government policies and private sector investments in education technology continue to grow, there is hope for wider AI adoption. With proper training and support, AI can play a crucial role in modernizing school administration, enhancing decision-making, and ultimately improving the quality of education in Nigeria.

Indeed, improving the quality of education in Nigeria largely depends on the integration of ICT and more recently, AI technologies. AI technologies have the potential to transform various facets of education, including administrative functions, teaching methods, and leadership practices (Edu & Uwelegbewe, 2025). AI tools can support personalized learning experiences, assist in identifying students' needs, and enable more efficient use of educational resources. Furthermore, when integrated into educational leadership, AI could enhance decision-making processes, optimize school management practices, and improve communication within school systems (Luckin et al., 2019).

This technological integration can lead to improved learning outcomes by providing data-driven insights and creating adaptive learning environments tailored to individual student needs (Chen et al., 2021). Artificial intelligence has the capacity to carry out activities that have historically required human intelligence; it is a rapidly developing technology that has the potential to completely transform global sustainability initiatives. AI is essential to educational leadership because it makes administrative tasks like scheduling, record-keeping, grading, and decision-making much more efficient. Furthermore, by pinpointing areas for development and providing tailored assistance to teachers and students, AI enhances teaching and learning and can eventually help long-term community growth (Edu & Uwelegbewe, 2025).

## School Administration

School administration is fundamental to the effective operation of educational institutions, including schools, colleges, and universities. It involves the systematic coordination of processes that guide these institutions toward achieving their established goals and objectives. Akram et al.

(2018) opined that the success of an educational institution is heavily influenced by the quality of its administration. Strong leadership in education inspires and motivates staff, fostering a shared vision that enhances institutional performance. School administration encompasses the structured management of educational organizations through planning, directing, and regulating school functions to ensure the attainment of learning outcomes. This includes responsibilities such as curriculum development, staff management, resource allocation, and the formulation of policies that create a supportive learning atmosphere. As intermediaries between policy requirements and classroom implementation, school administrators play a key role in shaping and enforcing educational guidelines. Effective school management not only ensures compliance with local, state, and national regulations but also encourages innovative strategies to meet the diverse needs of students and the broader community (Maqbool et al., 2022).

School administration is the internal arrangement of school resources to the implementation of school programmes. School administration look at education from the specific educational institutions. It is the internal activities that deal with coordinating of school programmes for optimum performance (Zaifada et al., 2023). School administration according to Ogunode and Ahaotu (2021); Ogunode et al. (2021) is the arrangement of school input in an order for the smooth realization of the school objectives. Okereke (2008) stated that school administration involves managing, administering the curriculum, teaching, pastoral care, discipline, assessment, evaluation, and examinations. He added as part of school administration: resource allocation, costing and forward planning, staff appraisal, community relationship, use of the practical skills necessary for surviving the policies of organization such as decision-making, negotiation, bargaining, communication, conflict handling, and running meetings. These functions are complex and to efficiently and effectively perform them requires the appropriate tools and resources. Ogunode (2020) defined school administration as the process of organizing and arranging school resources to implement school programmes with the aim of achieving the school objectives. School administration is the systematic way of placing, ordering and arranging both human and materials resources for the execution of school programmes with the aim of achieving the set objectives of the school.

School administration is essential in encouraging cooperation amongst community members, parents, and teachers, among other stakeholders. School administrators can develop rules that address the particular difficulties the school faces while reflecting community values and expectations by include these groups in the decision-making process. In the end, this cooperative approach improves student learning outcomes and fosters fairness within the educational system by ensuring that instructional techniques are effective and relevant (Savage, 2024). The responsibility of school administration in creating flexible and responsive policies to address the needs of all students is becoming more and more important as educational environments continue to change.

Sang et al. (2010) observed that school administration has an essential role in ascertaining that education is put across to students as recommended. School administration also deals with the effective and efficient utilization of school resources to actualizing the school programmes (Ogunode et al., 2020). Ogunode and Emmanuel (2021) opined that the objectives of school administration are to integrate and coordinate all the physical and human resources efficiently towards a common goal. The physical resources mainly contribute to building equipment and instructional materials. The human resources that school administration deals with include; students, teachers, supervisors, administrators and parents.

## Artificial Intelligence

The term artificial intelligence (AI) describes how computer systems may mimic human intellectual functions such as perception, language comprehension, learning, reasoning, and problem-solving. Artificial intelligence (AI) technologies use data analysis and algorithms to carry out activities that normally need human intellect. Alagbe (2023) viewed AI as the ability of a computer or machine to mimic the capabilities of the human mind – learning from examples and experience, recognising objects, understanding and responding to language, making decisions, solving problems – and combining these and other capabilities to perform functions a human might perform, such as greeting a hotel guest or driving a car. Artificial Intelligence refers to the development of computer systems capable of performing tasks that typically require human intelligence (Edu & Uwelegbewe, 2025). These tasks include learning, reasoning, problem solving, perception and natural language understanding. Artificial Intelligence technologies encompass various techniques and approaches, such as machine learning, deep learning, natural language processing, computer vision and robotics. These technologies enable computers to analyze vast amounts of data, recognize patterns, make predictions and automate complex processes.

Ogunode et al. (2023) defined AI as programs designed with human-like intelligence and structured in forms of computer, robot, or other machines to aid in provision of any kind of service or tasks to improve 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 system, packages and application designed into digital computer or computer-controlled robot to carry out assignments and tasks with human-like intelligence. Copeland (2022) stated that Artificial intelligence (AI) is the ability of a digital computer or computer controlled robot to perform tasks commonly associated with intelligent beings. The term is frequently applied to the project of developing systems endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience. Frankenfield (2023) defined Artificial intelligence (AI) as simulation of human intelligence by software-coded heuristics. Artificial Intelligence is a branch of science producing and studying the machines aimed at the stimulation of human intelligence processes. Artificial intelligence (AI) are machines programme forms with capacities and abilities to execute tasks and responsibilities that human beings are performing with the assistance of human-like intelligence (Ogunode & Ejike, (2023).

Applications of artificial intelligence (AI) in education include automated grading, tailored learning platforms, intelligent tutoring systems, and predictive analytics for student performance. AI can improve educational experiences and results by utilizing machine learning and data-driven insights, enabling teachers to customize their methods to meet the needs of each unique student (Ertel, 2024). Since AI is revolutionizing conventional teaching strategies and administrative procedures, its significance in contemporary education is substantial. AI-powered solutions are able to analyse enormous volumes of data in order to spot trends in learning, evaluate students' progress, and give immediate feedback. Implementing tailored learning experiences that accommodate a range of learning styles and speeds, can enhance student engagement and academic performance (Davenport et al., 2019). AI can also expedite administrative work, giving teachers more time to concentrate on instruction and developing deep connections with their kids. The use of artificial intelligence (AI) holds great promise for

addressing present issues and transforming teaching and learning methodologies as educational establishments continue adopt technology.

### **Integrating Artificial Intelligence in Secondary Education**

In light of the existing initiatives and technologies to come, different studies (Laanpere et al., 2014; Luckin et al., 2016; Mayer-Schönberger & Cukier, 2014; Montebello, 2017) have recently contributed to the ways in which AI can help improve learning opportunities for students and management systems. In light of the existing initiatives and technologies to come, different studies (Laanpere et al., 2014; Luckin et al., 2016; Mayer-Schönberger & Cukier, 2014; Montebello, 2017) have recently contributed to the ways in which AI can help improve learning opportunities for students and management systems.

Sustainable Development Goal 4 aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. It emphasises equal learning opportunities for all throughout life. AI technologies are used to ensure equitable and inclusive access to education. It provides marginalised people and communities, people with disabilities, refugees, those out of schools, and those living in isolated communities with access to appropriate learning opportunities. For example, telepresence robotics allow students with special needs to attend schools at home or hospital, or maintain continuity of learning in emergencies or crises. In this way, it is able to support inclusion and ubiquitous access (Pedro et al., 2019).

AI helps advance collaborative learning. One of the most revolutionary aspects of computer-supported collaborative learning is found in situations where learners are not physically in the same location. It provides students variable choices insofar as when and where they wish to study. In respect to computer-supported collaborative learning, online asynchronous discussion groups play a central role. Based on AI techniques such as machine learning and shallow text processing, AI systems are used to monitor asynchronous discussion groups, thus affording teachers with information about learners' discussions and support for guiding learners' engagement and learning (Pedro et al., 2019).

AI can help personalise learning through various ways. AI can help create a better professional environment for teachers to work more on students with difficulties. Teachers spend plenty of time on routine and administrative tasks such as making assignments and answering frequently asked questions over and over again in school settings. A dual-teacher model entailing a teacher and a virtual teaching assistant, who can take over the teacher's routine task, frees up teachers' time, enabling them to focus on student guidance and one-to-one communication. Teachers have already started working together with AI assistants for the best outcomes for their learners (Pedro et al., 2019).

The Computer Assisted Learning (CAL) field creates alternatives to support students' learning strategies with digital and AI technology (Laanpere et al., 2014). AI can help map each student's individual learning plans and trajectories, their strengths and weaknesses, subjects that cost more and are easily assimilated or learned, and learning preferences and activities. Using algorithms to help students navigate through different content paths, AI can personalise learning and improve opportunities for students with the help of their teachers and schools. Intelligent Tutoring Systems are part of the new technological possibilities to expand educational learning in developing countries as shown in recent reviews (Nye, 2015). Moreover, when considering the tremendous amount of time spent on grading tests and homework, AI as an assessment tool can

be applied to learn how a teacher grades and thus free up the teacher's time. AI is not only being used to grade multiple choice tests, but also to assess essays.

These opportunities are starting to unfold in developed countries. There is a myriad of applications presently undergoing tests across public and private initiatives alike. This section presents some examples from developing countries to open a discussion regarding the possibilities and risks involved in bringing AI-powered software to personalise learning. We will begin with the case of China, unique in its scope, dimension and level of comprehensive perspective with cutting-edge technology and public-private partnerships, followed by Uruguay, a small developed country that became a bellwether in Latin America. Next, we will present some other state-based, philanthropic and private initiatives in developing countries. These cases have been included as examples to illustrate the state of the art in this field in developing countries and do not aim to be an exhaustive list of every initiative worldwide (Pedro et al., 2019)..

China is a good country to start with, since it is in many ways unique insofar as its size and recent technological development, and also in its recent economic growth (although it remains a developing country in formal definitions). China has 730 million internet users. In 2016, the government launched a plan to become the largest pole of AI development in the world by 2030. China set its national AI strategy for education as part of this technological vision (Jing, 2018). The state-centred initiative will rely on private pillars. Hujiang, a private digital education company, is developing image and voice recognition software capable of understanding student facial expressions to give AI feedback online. Liulishuo is an adaptive platform that teaches English to 600,000 students at the cost of a single teacher. Master Learner is developing a "Superteacher" capable of answering 500 million simultaneous questions from students preparing for the Gaokao university entrance examination.

In 2016, China's Ministry of Education established that every educational branch of local governments must allocate at least 8% of its budget to the digitisation of education. With 95% of schools connected to the internet, the country is ready for the largest digital education experiment in the world. One of the biggest breakthroughs so far in China is the experimental design to correct essays with AI. The country started to work with 60,000 schools for automatic essay correction with a level of precision matching humans in 92% of the cases. The essay grading machine is based on neural network AI and is improving its ability to understand human language by using deep learning algorithms to plough through essays written by Chinese students and compare notes with human teachers' grading and comments. "It has evolved continuously and become so complex, we no longer know for sure what it was thinking and how it made a judgment," said one of the project researchers (Chen, 2018).

In Latin America, several initiatives have been pushing the introduction of computers in education at a large scale in recent years (Sunkel & Trucco, 2012). Plan Ceibal in Uruguay is probably the most advanced state agency devoted to digital education from the region. One of its main initiatives is an online adaptive learning solution called "Mathematics Adaptive Platform" (PAM for its Spanish acronym). PAM's content has been adapted to the national curriculum and it is a tool that provides personalised feedback according to each student's skill level based on an analysis of student experiences. Some studies have already shown how the program has already had a positive impact on learning (Perera & Aboal, 2018).

## **IMPACT OF ARTIFICIAL INTELLIGENCE ON SCHOOL ADMINISTRATION**

Artificial intelligence (AI) can be integrated into secondary school administration to improve student information management (Egbugara, 2020; Okoroji, 2019; Nwosu, 2020). AI-powered systems can help automate tasks such as data entry, record-keeping, and student tracking, freeing up staff to focus on more strategic and high-value tasks. For instance, AI-powered chatbots can help students and parents access information on student records, grades, and attendance. Another area where AI can be integrated is in student assessment and grading (Egbugara, 2020; Okoroji, 2019; Nwosu, 2020). AI-powered systems can help automate grading, providing instant feedback to students and teachers. AI can also help identify areas where students need improvement, enabling teachers to provide targeted support. For example, AI-powered adaptive learning systems can adjust the difficulty level of course materials based on individual student performance.

AI can enhance student safety and security (Okeke, 2020; Uzochukwu, 2019; Edeh, 2018). AI-powered surveillance systems can monitor school premises, detecting potential security threats and alerting authorities. AI-powered chatbots can also provide students with a safe and confidential way to report incidents or concerns. In addition, AI can be used to improve teacher professional development (Okeke, 2020; Uzochukwu, 2019; Edeh, 2018). AI-powered systems can analyze teacher performance data, identifying areas where teachers need additional training or support. AI-powered adaptive learning systems can also provide teachers with personalized professional development recommendation. It can be used to optimize school operations and facilities management (Nwosu, 2020; Okoroji, 2019; Egbugara, 2018). AI-powered systems can analyze energy usage patterns, identifying opportunities to reduce waste and improve energy efficiency. AI-powered predictive maintenance systems can also help schools identify and address potential facilities issues before they become major problems. Galadima and Adbullah (2024) highlight some ways that AI could influence school administrators' roles and responsibilities, thus:

### **DATA ANALYSIS AND DECISION MAKING**

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. Sang et al. (2010) and Ogunode and Olowonefa (2023) noted that AI can aid school administration in areas of decisions making, forecasting, school objectives, programming school activities planning, budgeting, establishing and interpreting policies, examination, sporting activities and prize-giving/ graduation. 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, enrollments, and other paperwork to the correct department, Shorten the time spent on progress reports AI, Streamline any other record-keeping tasks. It can enable teachers and professors to focus primarily on improving educational quality instead of manual paperwork and reducing work pressure.

### **Automation of Administrative Tasks**

AI can automate routine administrative tasks, such as managing student records, generating reports, scheduling and handling routine inquiries. 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 and Vega (2023) observed that AI can automate routine administrative tasks, such as managing student records, generating reports, scheduling and handling routine inquiries. Automating these processes, administrators can save time and allocate their efforts to more strategic and value-added tasks. AI can be used to improve the efficiency of administrative tasks in educational institutions. 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 et al., 2023; Ogunode & Ejike, 2023; Oztok & Zingaro, 2019). Educational institutions have to deal with a lot of administrative tasks, such as scheduling, grading, and record-keeping. AI can automate many of these tasks, freeing up educators' time to focus on teaching and supporting students

### **Resource Optimization**

AI can help administrators optimize the allocation of resources, such as staff, classrooms and materials. Analyzing data on student enrollment, class sizes and scheduling, AI systems can suggest efficient resource allocation strategies to optimize learning environments and support student needs.

### **Student Support and Intervention**

AI can assist administrators in identifying students who may require additional support or intervention. Analyzing various data points, such as academic performance, attendance and behavior, AI systems can flag students who may be at risk of falling behind or facing challenges. This allows administrators to proactively implement interventions and provide targeted support to improve student outcomes.

### **Streamlined Communication and Engagement**

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 (Teachflow, 2023).

### **Enhanced Security and Safety**

AI can contribute to school security and safety measures. Facial recognition systems and video analytics can help monitor school premises, detect potential security threats, and ensure the safety of students and staff. AI-powered systems can also analyze social media or online platforms to identify potential risks and proactively address them.

## **CHALLENGES ENCOUNTERED BY SCHOOL ADMINISTRATORS IN LEVERAGING ARTIFICIAL INTELLIGENCE FOR SUSTAINABLE COMMUNITY DEVELOPMENT IN NIGERIA**

There are many obstacles in Nigeria when it comes to implementing artificial intelligence (AI) in school administration to promote sustainable community development. The major problems are the absence of proper infrastructure, which includes erratic power supplies and spotty internet access, inadequate funding, lack of technical expertise, data privacy and ethical concerns and digital divide.

### **Potential Bias in AI Decision Making**

AI systems are trained on data, and if the training data contains biases or inaccuracies, it can lead to biased decisions. This is particularly concerning in educational settings, where biases can perpetuate inequalities and impact students' educational opportunities. Ogunode and Gregory (2023c) observed that the problem of AI in educational administration is the potential for bias and discrimination. Igbokwe (2023) asserted that AI algorithms may replicate and amplify existing biases and discrimination in educational systems, leading to further inequality and injustice. For example, AI may perpetuate gender or racial biases in student evaluations or admissions decisions. Educational managers need to be aware of these limitations and work to ensure that AI is used in a fair and equitable manner.

### **Transparency and Accountability**

AI algorithms can be complex and challenging to comprehend, raising concerns about transparency and accountability. Another significant limitation of AI in educational administration is the lack of transparency and interpretability. Igbokwe (2023) noted that AI algorithms can be complex and difficult to understand, making it challenging for educational managers to evaluate their effectiveness and identify potential errors or biases. This lack of transparency and interpretability can make it difficult for educational managers to make informed decisions and improve their institutions' performance

### **Erratic Power supply and spotty internet**

When school administrators in Nigeria try to use artificial intelligence (AI) to support sustainable community development, they face major obstacles due to unstable internet connection and an

unpredictable power supply. These infrastructure constraints make it more difficult to integrate AI technology, which need reliable electricity and fast internet to work at their best. This could make it harder for schools to adopt AI-powered teaching resources, data analysis programs, and other AI applications that could help with community development projects. It is more difficult for educational institutions in underprivileged areas to fully utilize AI in promoting socioeconomic development because of the uneven supply of resources, which further widens the digital divide (Adamu & Mohammed, 2023; Okoye et al., 2022). Effective implementation of AI-based systems is challenging in many schools, particularly those in rural areas, which have limited technology infrastructure. The deployment and operation of AI tools for administrative and educational purposes are hampered in the absence of reliable energy and internet connection, leading to discrepancies in the adoption of AI technology (Montebello, 2017).

### **Inadequate Funding**

Inadequate funding for educational technology efforts is another problem. Due to financial limitations, many Nigerian schools give priority to necessities above new technology. The significant hardware, software, and training costs associated with implementing AI are frequently out of the price range of underfunded public institutions. Additionally, the lack of government funding for educational technology makes this problem even worse by depriving school administrators of the tools they need to successfully incorporate AI into their systems (Adebayo & Adedoyin, 2023).

### **Lack of Technical Expertise**

One major obstacle is the lack of technical skills among educators and school administrators. Many educators in Nigeria lack the abilities and know-how to implement and use AI solutions. The lack of thorough training programs designed to give educators the competences required for integrating AI further widens this skills gap. Because of this, administrators are unable to fully utilize AI's potential to improve school administration and promote community development (Adebayo & Adedoyin, 2023).

Data privacy and Ethical Concerns about ethics and data privacy are also major barriers. Sensitive data about students, instructors, and communities is frequently gathered and processed when AI systems are used. Nigeria does not, however, have strong data protection laws to prevent abuse or security breaches. This deters schools from implementing AI technologies by bringing up ethical questions around the possible misuse of personal data. For Nigerian schools, maintaining adherence to international data privacy requirements continues to be a major concern (Eze et al., 2021).

### **Digital Divide**

The equitable use of AI for sustainable community development is further constrained by the digital divide between urban and rural schools. Rural schools frequently lack even the most basic digital resources, whereas urban schools could have access to basic technical infrastructure. This discrepancy erodes AI's potential to support sustainable development on a national level by maintaining disparities in community involvement and educational quality (Lythreath et al., 2022).

## **OPPORTUNITIES FOR USING ARTIFICIAL INTELLIGENCE IN SECONDARY SCHOOL ADMINISTRATION**

### **Automated Student Information Management**

AI can be used to automate student information management, reducing the administrative burden on school staff (Bellec, 2020; Chen, 2019; Singh, 2018). AI-powered systems can help automate tasks such as data entry, record-keeping, and student tracking, freeing up staff to focus on more strategic and high-value tasks. For instance, AI-powered chatbots can help students and parents access information on student records, grades, and attendance, while AI-powered predictive analytics can help identify early warning signs of student dropout or underperformance.

The use of AI in student information management can also help improve data accuracy and reduce errors (Bellec, 2020; Chen, 2019; Singh, 2018). AI-powered systems can automatically verify and update student information, reducing the risk of human error. Additionally, AI-powered analytics can help identify trends and patterns in student data, enabling schools to make more informed decisions about student support and resources. The benefits of using AI in student information management are numerous (Bellec, 2020; Chen, 2019; Singh, 2018). AI can help schools reduce administrative costs, improve data accuracy, and enhance student support. Additionally, AI-powered systems can provide parents and students with secure and easy access to student information, improving communication and engagement.

### **Personalized Learning and Adaptive Assessment**

AI can be used to personalize learning and assessment for students, enabling teachers to tailor instruction to individual student needs (Kumar, 2020). AI-powered adaptive learning systems can adjust the difficulty level of course materials based on individual student performance, while AI-powered assessment systems can provide instant feedback to students and teachers. For example, AI-powered virtual learning environments can provide students with personalized learning recommendations, while AI-powered assessment analytics can help teachers identify areas where students need additional support.

The use of AI in personalized learning and adaptive assessment can also help improve student outcomes (Kumar, 2020). AI-powered systems can help identify knowledge gaps and provide targeted support to students, enabling them to catch up with their peers. Additionally, AI-powered analytics can help teachers identify effective teaching strategies and adjust their instruction to better meet student needs. The benefits of using AI in personalized learning and adaptive assessment are significant (Kim, 2019; Kumar, 2018). AI can help teachers provide more effective and targeted support to students, improving student outcomes and reducing achievement gaps. Additionally, AI-powered systems can help reduce teacher workload and improve teacher morale.

### **Intelligent Tutoring Systems**

AI can be used to develop intelligent tutoring systems that provide one-on-one support to students, supplementing teacher instruction (Ramesh, 2020; Patel, 2019; Lee, 2018). AI-powered tutoring systems can provide students with real-time feedback and guidance, helping to fill knowledge gaps and improve student outcomes. For instance, AI-powered virtual tutors can

provide students with personalized math support, while AI-powered language learning systems can help students improve their language proficiency.

The use of AI in intelligent tutoring systems can also help improve student engagement and motivation (Patel, 2019; Lee, 2018). AI-powered systems can provide students with interactive and immersive learning experiences, making learning more enjoyable and effective. Additionally, AI-powered analytics can help teachers identify areas where students need additional support, enabling them to provide more targeted and effective instruction. The benefits of using AI in intelligent tutoring systems are numerous (Ramesh, 2020; Patel, 2019; Lee, 2018). AI can help provide students with personalized and effective support, improving student outcomes and reducing achievement gaps. Additionally, AI-powered systems can help reduce teacher workload and improve teacher morale.

### **Predictive Maintenance and Facilities Management**

AI can be used to optimize school operations and facilities management, reducing costs and improving efficiency (Ramesh, 2020; Chen, 2018). AI-powered predictive maintenance systems can help schools identify and address potential facilities issues before they become major problems, while AI-powered energy management systems can help reduce energy consumption and costs. For example, AI-powered sensors can monitor temperature and humidity levels in classrooms, while AI-powered energy analytics can help schools optimize energy usage. The use of AI in predictive maintenance and facilities management can also help improve student safety and well-being (Ramesh, 2020; Chen, 2018). AI-powered systems can help identify potential safety hazards and provide alerts to school administrators, enabling them to take proactive measures to prevent accidents. Additionally, AI-powered analytics can help schools identify areas where facilities improvements can have the greatest impact on student safety and well-being.

### **Enhanced Student Safety and Security**

AI can be used to enhance student safety and security, providing schools with advanced threat detection and response capabilities (Kumar, 2020; Singh, 2019). AI-powered surveillance systems can monitor school premises, detecting potential security threats and alerting authorities. For instance, AI-powered facial recognition systems can help schools identify and track individuals on campus, while AI-powered emergency response systems can provide rapid response to security incidents.

The use of AI in student safety and security can also help improve emergency response times and effectiveness (Kumar, 2020; Singh, 2019). AI-powered systems can quickly identify the location and severity of an emergency, enabling first responders to provide rapid and targeted support. Additionally, AI-powered analytics can help schools identify areas where safety improvements can have the greatest impact. The benefits of using AI in student safety and security are numerous (Singh, 2019). AI can help schools provide a safer and more secure learning environment for students, reducing the risk of accidents and incidents. Additionally, AI-powered systems can help schools reduce costs associated with manual security monitoring and emergency response.

## **Virtual Learning Environments**

AI can be used to create virtual learning environments that provide students with immersive and interactive learning experiences (Wang, 2020; Kim, 2019; Kumar, 2018). AI-powered virtual learning environments can simulate real-world scenarios, enabling students to practice and apply skills in a safe and controlled environment. For example, AI-powered virtual labs can provide students with hands-on science and technology experience, while AI-powered virtual field trips can provide students with immersive cultural and historical experiences.

The use of AI in virtual learning environments can also help improve student engagement and motivation (Wang, 2020; Kim, 2019; Kumar, 2018). AI-powered systems can provide students with personalized learning recommendations, enabling them to learn at their own pace and in their own style. Additionally, AI-powered analytics can help teachers identify areas where students need additional support, enabling them to provide more targeted and effective instruction. The benefits of using AI in virtual learning environments are significant (Wang, 2020; Kim, 2019; Kumar, 2018). AI can help schools provide students with more engaging and effective learning experiences, improving student outcomes and reducing achievement gaps. Additionally, AI-powered virtual learning environments can help schools reduce costs associated with traditional teaching methods and materials.

## **Automated Parent-Teacher Communication**

AI can be used to automate parent-teacher communication, providing parents with regular updates on student performance and progress (Bellec, 2020; Chen, 2019; Singh, 2018). AI-powered chatbots can provide parents with personalized updates on student grades, attendance, and behavior, while AI-powered email systems can help teachers communicate with parents more effectively. For instance, AI-powered parent portals can provide parents with secure access to student records and information.

The use of AI in parent-teacher communication can also help improve parental engagement and involvement (Bellec, 2020; Chen, 2019; Singh, 2018). AI-powered systems can provide parents with timely and relevant information about their child's education, enabling them to provide more effective support and guidance. Additionally, AI-powered analytics can help schools identify areas where parental engagement can have the greatest impact on student outcomes. The benefits of using AI in parent-teacher communication are numerous (Bellec, 2020; Chen, 2019; Singh, 2018). AI can help schools provide parents with more timely and effective communication, improving parental engagement and involvement. Additionally, AI-powered systems can help schools reduce costs associated with manual communication and improve teacher productivity.

## **FUTURE DIRECTIONS FOR THE USE OF AI IN THE ADMINISTRATION OF SECONDARY SCHOOLS IN NIGERIA**

### **Development of AI-powered School Management Systems**

The development of AI-powered school management systems can help improve the efficiency and effectiveness of school administration in Nigeria (Bellec, 2020; Chen, 2019; Singh, 2018). These systems can integrate various administrative tasks, such as student information

management, attendance tracking, and grade reporting, into a single platform. This can help reduce the administrative burden on school staff, enabling them to focus on more strategic and high-value tasks.

AI-powered school management systems can also provide real-time insights and analytics on student performance and behavior, enabling school administrators to make data-driven decisions. For instance, these systems can identify students who are at risk of falling behind their peers, enabling teachers to provide targeted support and intervention. Additionally, AI-powered school management systems can help automate routine tasks, such as attendance tracking and grade reporting, freeing up teachers to focus on more important tasks. The benefits of AI-powered school management systems are numerous (Bellec, 2020; Chen, 2019; Singh, 2018). These systems can help improve student outcomes, reduce administrative costs, and enhance teacher productivity. Additionally, AI-powered school management systems can provide parents with secure and easy access to their child's educational records, improving parental engagement and involvement.

### **Implementation of AI-powered Adaptive Learning Systems**

The implementation of AI-powered adaptive learning systems can help improve student learning outcomes in Nigeria (Kumar, 2020). These systems can adjust the difficulty level of course materials based on individual student performance, providing students with a personalized learning experience. For instance, AI-powered adaptive learning systems can identify areas where students need additional support, providing them with targeted resources and interventions.

AI-powered adaptive learning systems can also provide teachers with real-time insights and analytics on student performance, enabling them to adjust their instruction to better meet student needs. Additionally, these systems can help automate routine tasks, such as grading and assessment, freeing up teachers to focus on more important tasks. The benefits of AI-powered adaptive learning systems are significant (Chen, 2019; Kumar, 2020). These systems can help improve student outcomes, reduce achievement gaps, and enhance teacher productivity. Additionally, AI-powered adaptive learning systems can provide students with a more engaging and interactive learning experience, improving student motivation and engagement.

### **Use of AI-powered Chatbots for Parent-Teacher Communication**

The use of AI-powered Chatbots for parent-teacher communication can help improve parental engagement and involvement in their child's education in Nigeria (Ramesh, 2020; Patel, 2019; Lee, 2018). Chatbots can provide parents with personalized updates on their child's performance, attendance, and behavior, enabling them to provide more effective support and guidance. AI-powered Chatbots can also provide teachers with a more efficient and effective way to communicate with parents, reducing the administrative burden on teachers. Additionally, these Chatbots can help provide parents with secure and easy access to their child's educational records, improving parental engagement and involvement. The benefits of AI-powered Chatbots for parent-teacher communication are numerous (Ramesh, 2020; Patel, 2019; Lee, 2018). These Chatbots can help improve parental engagement and involvement, reduce administrative costs, and enhance teacher productivity. Additionally, AI-powered Chatbots can provide parents with a

more convenient and accessible way to communicate with teachers, improving parent-teacher communication.

### **Development of AI-powered Predictive Maintenance Systems**

The development of AI-powered predictive maintenance systems can help improve the safety and security of students and staff in Nigeria (Chen, 2018). These systems can help identify potential facilities issues before they become major problems, enabling school administrators to take proactive measures to prevent accidents. AI-powered predictive maintenance systems can also provide school administrators with real-time insights and analytics on facilities performance, enabling them to make data-driven decisions. Additionally, these systems can help automate routine maintenance tasks, freeing up facilities staff to focus on more important tasks. The benefits of AI-powered predictive maintenance systems are significant (Chen, 2018; Singh, 2019). These systems can help improve student safety and security, reduce facilities costs, and enhance facilities productivity. Additionally, AI-powered predictive maintenance systems can provide school administrators with a more efficient and effective way to manage facilities, improving overall school operations.

### **Implementation of AI-powered Intelligent Tutoring Systems**

The implementation of AI-powered intelligent tutoring systems can help improve student learning outcomes in Nigeria (Kumar, 2020; Singh, 2019). These systems can provide students with personalized one-on-one support, enabling them to learn at their own pace and in their own style. AI-powered intelligent tutoring systems can also provide real-time feedback and assessment, enabling students to track their progress and identify areas where they need additional support. These systems can simulate real-world scenarios, enabling students to practice and apply skills in a safe and controlled environment. Additionally, AI-powered intelligent tutoring systems can provide teachers with real-time insights and analytics on student performance, enabling them to adjust their instruction to better meet student needs.

The benefits of implementing AI-powered intelligent tutoring systems are numerous. These systems can help improve student outcomes, reduce teacher workload, and enhance student engagement and motivation. Additionally, AI-powered intelligent tutoring systems can provide students with access to high-quality educational resources and support, regardless of their location or socio-economic background. Overall, the implementation of AI-powered intelligent tutoring systems has the potential to transform the education sector, providing students with a more personalized, effective, and efficient learning experience.

## **CONCLUSION**

Artificial intelligence is transforming the landscape of secondary school administration, presenting numerous opportunities, challenges, and future directions. On one hand, AI can automate administrative tasks, such as student information management, attendance tracking, and grade reporting, freeing up staff to focus on more strategic and high-value tasks. Additionally, AI-powered adaptive learning systems can adjust the difficulty level of course materials based on individual student performance, providing students with a personalized learning experience. AI-powered Chatbots can also facilitate parent-teacher communication,

providing parents with personalized updates on their child's performance, attendance, and behavior. However, the integration of AI in secondary school administration also poses challenges, such as the need for significant investment in infrastructure and training, as well as concerns about data privacy and security. To address these challenges, schools must develop strategies for effective AI integration, including providing teachers with professional development opportunities and ensuring that AI systems are designed with transparency and accountability in mind. Looking to the future, AI is likely to play an increasingly important role in secondary school administration, with potential applications in areas such as predictive maintenance, intelligent tutoring systems, and virtual learning environments. Ultimately, the successful integration of AI in secondary school administration will require a thoughtful and nuanced approach, one that balances the potential benefits of AI with the need to ensure that all students have access to high-quality educational opportunities.

### Suggestions

- The Ministry of Education should implement AI-powered adaptive learning systems to provide students with personalized learning experiences in Nigeria.
- Principals should adopt the use of AI-powered Chatbots to facilitate parent-teacher communication and improve parental engagement.
- The Federal Government should develop AI-powered intelligent tutoring systems to provide students with personalized one-on-one support.
- The Schools Board should implement AI-powered predictive maintenance systems to identify potential facilities issues before they become major problems.
- Teachers should use AI-powered analytics to provide insights and recommendations on student performance, attendance, and behavior.
- School administrators should develop AI-powered virtual learning environments to provide students with immersive and interactive learning experiences.
- Teachers should implement AI-powered automated grading systems to help teachers grade assignments and exams more efficiently and accurately.

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