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# ARTIFICIAL INTELLIGENCE FOR TRANSFORMATIVE LEARNING OPPORTUNITIES: CHALLENGES IN THE 21ST CENTURY NIGERIA'S EDUCATIONAL SYSTEM

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**Abstract**

*This paper examines the transformative potential of Artificial Intelligence (AI) in Nigeria's 21st century educational system, highlighting both opportunities and challenges. AI can enhance learning outcomes by providing tailored instruction, immediate feedback, automating administrative tasks, and increasing access to educational resources. These capabilities promise to personalize education, improve efficiency, and bridge educational disparities between urban and rural areas. However, the adoption of AI faces significant obstacles, including inadequate infrastructure, insufficient teacher training, privacy and security concerns, and the risk of exacerbating existing inequities. To address these issues, the paper recommends several strategies: the Nigerian government should invest in technological infrastructure and resources, offer comprehensive training and support to educators, develop robust policies to ensure data privacy and security, and promote accessibility to AI technologies for all students. Furthermore, stakeholders cooperation is essential to create a supportive ecosystem for AI in education. By addressing both technical and behavioral factors, this paper aims to contribute to a safer and more effective digital learning environment, ultimately enhancing educational outcomes across Nigeria.*

**Keywords***: Artificial Intelligence, Transformative Learning, Opportunities, Education, Nigeria*

## Introduction

Nigeria has one of the biggest 21st century education systems on the continent and is the most populated nation in Africa. To provide its residents with high-quality education, particularly those who live in rural regions, the nation must overcome a number of obstacles. Current developments in artificial intelligence (AI) hold the potential to revolutionize the Nigerian educational system by delivering tailored learning experiences, automating administrative duties, and expanding access to top-notch educational materials (Fagbohun, Adesina, &Ojokoh, 2021; Oladokun, Adu, &Falade, 2020). The introduction of AI in Nigeria faces major obstacles despite the potential advantages it might have for education. Lack of infrastructure and resources necessary for efficient AI implementation is one of the major issues. Further impeding the adoption of AI is the fact that policymakers and educators are not sufficiently informed about and not adequately knowledgeable about it (Alimi, 2020).

Nigeria must make the required technological and infrastructure investments, as well as give teachers the training and up skilling they need, to fully realize the promise of AI in education (Adesina & Oluwatobi, 2021; Babajide& Oluwafemi, 2020; Bello 2020). This paper examines the potential advantages of AI in education, the barriers to adoption, and the procedures required to successfully integrate AI into the Nigerian educational system.

AI has been successfully incorporated into a number of industries recently, including manufacturing, banking, and healthcare. AI systems are made to carry out activities like learning, problem-solving, decision-making,

and natural language processing that traditionally needs human intellect. AI systems may be utilized in the educational sector to deliver individualized learning experiences, automate administrative duties, and give access to top-notch educational materials (Fagbohun et al., 2021; Oladokun et al., 2020).

Algorithms and data analysis are used by AI-powered customized learning systems to gather data on students' development, interests, and learning preferences. Next, each student's own learning route is developed using this data. It has been demonstrated that personalized learning improves academic results, especially for students from low-income families (Eze, 2020; Oladokun et al., 2020; Daramola et al., 2020).

Another useful method for raising student performance is real-time feedback. Students receive rapid feedback on their work through real-time feedback systems driven by AI, allowing them to make changes and enhance their learning. When it comes to raising student performance, real-time feedback has been proven to be more beneficial than delayed input (Adesina &Oluwatobi, 2021).

Teachers may potentially save a substantial amount of time by automating administrative duties like grading and assessment, freeing up their time to concentrate on instruction and student assistance. Teachers are now able to provide their students more in-depth feedback thanks to automated grading systems that are driven by AI (Fagbohun et al., 2021). Regardless of their location, students may access excellent educational tools and materials thanks to AI-powered platforms. These platforms employ AI algorithms to provide educational content depending on the interests and requirements of the users. Platforms driven by AI have been demonstrated to enhance students' learning results by giving them additional chances for independent study (Oladokun et al., 2020).

Many issues with the Nigerian educational system, particularly in rural regions, have long prevented many students from receiving a high-quality education. Recent developments in AI have, however, created new opportunities for enhancing education in Nigeria. This paper explores the potential advantages of AI in education and the difficulties in implementing it in Nigeria. The following are some instructional methods used with AI:

**Personalized Learning**

Personalized learning is a method of instruction that adjusts instruction to each student's unique learning style, interests, and strengths and limitations (Eze, 2020). Artificial intelligence has made personalized learning feasible by enabling instructors to recognize each student's distinct learning preferences and create tailored learning programmes (Oladokun et al., 2020). It has been demonstrated that using AI into customized learning increases student motivation, engagement, and performance (Eze, 2020). AI can assist in identifying trends in students' learning, such as the subjects they find challenging and the most effective teaching techniques (Fagbohun et al., 2021). Using this knowledge, AI can then give each student with customized learning experiences, such as presenting content in a way that fits their learning preferences or suggesting extra resources to help them comprehend a subject better (Oladokun et al., 2020). In Nigeria, where teachers frequently struggle to offer each student particular attention due to overcrowded classrooms, personalized learning has the potential to alleviate this issue (Babajide& Oluwafemi, 2020). AI can help instructors by automating grading, attendance monitoring, and student feedback activities so that teachers can concentrate on more individualized teaching responsibilities (Fagbohun et al., 2021).

**Real-Time Feedback**

Real-time feedback is another area where AI may have a huge influence on the education system in Nigeria. Feedback on students' work is typically given after the task, which might restrict its usefulness for encouraging them to do better (Adesina &Oluwatobi, 2021). AI enables real-time feedback, enabling students to make changes and improvements right away (Babajide& Oluwafemi, 2020). Using chatbots to provide students immediate feedback on their work is one example of AI-powered real-time feedback (Fagbohun et al., 2021). Chatbots may review student replies and give

rapid feedback, pointing students in the direction of the right response and pointing out areas where they need to improve (Adesina &Oluwatobi, 2021). Adaptive testing is one example of an AI-powered assessment tool that may deliver real-time feedback. A student's replies to questions are analyzed using AI algorithms in adaptive testing, and the difficulty level of following questions is changed in response to the student's performance (Babajide& Oluwafemi, 2020). This makes it possible to evaluate students' knowledge levels more precisely and provide specific comments on their areas for development (Fagbohun et al., 2021). AI-powered real-time feedback has the potential to boost student performance by offering prompt direction and assistance. This can encourage students to stay motivated and interested in their studies, which will result in higher performance (Oladokun et al., 2020).

**Automated Administrative Tasks**

Automated administrative tasks are another area where AI might have a big influence on the Nigerian educational system. It can be time-consuming and distracting for instructors to focus on administration duties like scheduling, attendance monitoring, and grading (Babajide& Oluwafemi, 2020). These duties can be automated by AI, giving teachers more time to work on more individualized lessons. Grading software is one instance of an AI-powered automated administrative task. Machine learning algorithms can be used by automated grading systems to evaluate student work, cutting down on the time teachers must devote to grading (Oladokun et al., 2020). Teachers may now concentrate on giving student's feedback and creating more individualized learning experiences. Automation of attendance tracking is also possible with AI. AI can rapidly and effectively record attendance by employing facial recognition technology, saving instructors' time and lowering the possibility of mistakes (Babajide& Oluwafemi, 2020). AI-driven scheduling systems may also help with class and event scheduling, ensuring that resources are utilised effectively and minimizing scheduling conflicts (Fagbohun et al., 2021). The communication between instructors, students, and parents can also be improved with the use of automated administrative duties. For instance, chatbots may be utilized to tell students and parents about future events, homework assignments, and grades (Adesina &Oluwatobi, 2021). As a result, there may be greater openness and communication, fostering a more cooperative learning environment.

By saving time and money on administrative activities and enhancing communication between educators, students, and parents, the application of AI in automated administrative tasks has the potential to completely improve the Nigerian educational system.

**Access to Resources**

Access to resources is a big issue that many Nigerian schools must deal with. Many schools lack sufficient resources, including computers, textbooks, and internet access, which might hinder students' ability to learn efficiently (Babajide& Oluwafemi, 2020). By giving students access to materials they would not otherwise have, AI can assist to solve this problem. Virtual classrooms are one instance of resource access enabled by AI. Through the use of virtual classrooms, students may access educational resources and communicate with their instructors and classmates from any location with an internet connection (Fagbohun et al., 2021). This may aid in closing the accessibility gap between rural and urban locations for educational materials. AI is also capable of making tailored recommendations for instructional materials. AI algorithms can suggest educational materials, such as videos, textbooks, and quizzes, that are suited to each student's needs by evaluating their learning preferences and performance (Adesina &Oluwatobi, 2021). Making and ensuring that students have access to the tools they need to succeed can assist with this.

Furthermore, AI can aid in facilitating the accessibility of instructional materials for students with impairments. For instance, text-to-speech technology makes educational materials accessible to students with visual impairments, while voice recognition technology makes it simpler for students with hearing impairments to interact with their professors and peers (Oladokun et al., 2020).

Leveraging AI to provide access to educational resources can potentially transform the Nigerian educational system by offering students materials that might otherwise be inaccessible. This could lead to improved learning outcomes and help reduce the achievement gap across different socioeconomic groups.

**Challenges of using AI in Nigerian Education System**

While implementing AI in the Nigerian educational system has many potential advantages, there are also a number of challenges that must be overcome. The dearth of resources and infrastructure in many schools is one of the biggest problems. In many schools in Nigeria, the infrastructure required to enable AI-based instructional tools is lacking, including computers and dependable internet access (Oladokun et al., 2020). This may reduce AI's capacity to enhance educational results.

The fact that instructors lack AI knowledge is another problem. It is possible that many instructors in Nigeria lack the knowledge and abilities needed to employ AI-based instructional technologies successfully (Babajide& Oluwafemi, 2020). This may discourage the use of AI-based technology and restrict their potential advantages.

Concerns over privacy and security present a serious challenge as well. When AI is used in education, a lot of student data is collected and analyzed, which raises questions regarding data security and privacy (Adesina &Oluwatobi, 2021). To safeguard students' privacy and guarantee that their data is utilized properly, procedures and regulations must be created.

Additionally, there is a chance of escalating current inequities. Not all students, particularly those from low-income or rural locations, may have access to AI-based instructional technologies (Fagbohun et al., 2021). It's important to make sure that the advantages of AI-based education are equitably spread and that steps be taken to close the digital gap between urban and rural communities.

To fully utilize AI in the Nigerian educational system, it would be essential to address key issues such as: Providing Infrastructure and resource development, continued capacity training and support for educators, creating enabling privacy and data security policies, and ensuring that all students can use AI-based teaching tools with ease.

**Conclusion**

Finally, personalized learning, real-time feedback, automation of administrative work, and improved accessibility to educational materials are some of the potential ways that AI can revolutionize the Nigerian educational system. AI-based educational resources can help close student achievement gap, enhance learning results, and get students ready for the future workforce with corresponding employability skills. The absence of infrastructure and resources, requirement for teacher preparation, privacy and security issues, and the possibility of escalating already-existing inequities are all obstacles that must be resolved. Government, educational institutions, and private sector entities must collaborate to overcome these issues in order to fully actualize successful implementation of AI in the Nigerian educational sector. Infrastructure and resource development, educator support and training, privacy and data security policy and regulatory development, accessibility promotion, and stakeholder engagement are all areas that require improvement. By doing this, Nigeria would be able to use AI to give all students a high-quality education that is fair and unrestricted, thereby preparing them for success in the economy of the twenty-first century.

**Recommendations**

1. Enhance resources and infrastructure: The Nigerian government should make investments to enhance resources and infrastructure in schools, especially in rural regions. This includes giving them access to computers and other relevant equipment as well as dependable internet connectivity.
2. Educator training and support programs should be offered by the Nigerian government to ensure that educators have

the knowledge and abilities needed to use AI-based educational technologies effectively. Workshops, online courses, and mentorship programs can offer a more positive support in this regard.

3. Create policies and regulations: To safeguard student privacy and guarantee that their data is utilized properly, the Nigerian government should create laws and regulations. To do this, regulations and rules governing the use of AI in education should be established.
4. Encourage accessibility: It is important to make sure that all students, regardless of socioeconomic status, can utilize AI-based instructional tools. This may entail giving grants or subsidies to schools in low-income communities so they may buy the equipment they need.
5. Promote collaboration: Collaboration across public, corporate, and non-profit groups can aid in promoting the adoption and efficient use of AI-based educational technologies. This can involve collaborations between educational institutions and IT firms to create and execute AI-powered solutions.

By putting these suggestions into practice, Nigeria may overcome most of the challenges confronting AI in the educational field and take full use of this technology will surely enhance learning outcomes and close the educational achievement gap.

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