Leveraging Pedagogical Innovation in Nigerian System of Education: An Application of Artificial Intelligence for Personal Learning and Research Writing

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Abstract:

Pedagogical landscapes are quickly changing worldwide due to the use of digital technology in the delivery of educational instructions. Digital technology has enormous potential for change in our Nigerian educational system which continues to struggle with issues including overcrowding in classrooms, a lack of resources for instruction, and teacher shortage. This paper discourse analyzes how artificial intelligence (AI) could inspire educational innovation with an emphasis on research writing and tailored learning. This contextual literature-based study critically examines the multifaceted implications of Adaptive Learning Algorithms, Intelligent Tutoring System (ITS), Learning Analytics/Predictive Modeling, Natural Language Processing (NLP), Recommendation Systems, Automated Assessment/Personalized Feedback, and Behavioral/Cognitive Modeling tools that can be used to improve students' academic writing skills, customize instruction, and enable self-paced learning. These include improved access to quality instruction, personalized and student-centered learning, enhanced teacher effectiveness, and the bridging of urban-rural educational divides. However, the paper also identifies a number of contextual obstacles that hinder the successful integration of AI in Nigerian schools and universities and thus suggested that government and other parties involved in education should prioritize them, including collaborations, infrastructure investment, established AI laboratories, digital innovation centers, and smart classrooms.

Keywords: Pedagogy, Innovation, Pedagogical Innovation, Artificial Intelligence, Personal Learning, Research Writing

Introduction

The social, economic, political, religious, and technical advancement of nations is propelled by education. Strong and effective planning and management systems are necessary to achieve the objectives of education. This is why the 21st century brought about major changes in the development of education globally because education is not static but dynamic and needs to be adapted to meet the needs of both learners and modern society of today. The internalization of society brought about by the introduction of digital technologies into the educational system is the most widespread. Our communication, thinking, feeling, social skills, and behavior have all been altered by digital technologies, and this has resulted in new approaches to education. According to Bonderud, the school system faces constant and unforeseen difficulties brought on by pandemics, natural disasters, and wars. As a result, researchers came up with better strategies to support remote learning and maintain student engagement. Some implemented individualized instruction and flipped classrooms using the internet or social media apps. It is clear that students are using more and more technological tools, such as smart phones, computers, tablets, and smart whiteboards. Due to digital innovation and the need to give students 21st-century skills like creativity, problem-solving, and digital literacy, education is rapidly changing on a global scale [1]. Digital transformation has made it possible for learning pathways to be more data-driven, flexible, and personalized in many developed and developing economies. This has put education systems in a better position to adapt to the changing demands of the labor market and the diverse needs of learners [2].

Among these developments, artificial intelligence (AI) has become well-known as a potent instrument for revolutionizing research, teaching, and learning. Natural language processing tools, intelligent tutoring systems, adaptive learning platforms, and automated feedback systems are examples of AI applications that improve student engagement, facilitate data-driven instruction, and increase the number of opportunities for customized learning experiences [3]. AI integration in education is becoming more widely acknowledged as a catalyst for reconsidering pedagogical approaches, empowering students, and assisting educators in creating more effective and adaptable teaching strategies. For this reason, Akwitti believes that pedagogical innovation, such as artificial intelligence, should be used to improve our nation's educational system [4].

In as much as our Nigerian education system has undergone a number of reforms with the goal of enhancing teaching and learning outcomes, it still primarily follows the conventional, teacher-centered pedagogical frameworks [5]. This is why Adebayo and Adeyanju stated that the development of higher-order thinking and independent learning skills is hampered by the heavy reliance on rote memorization, lecture-based instruction, and low student participation in many primary, secondary, and postsecondary educational institutions [6]. In addition, shifting to contemporary, student-centered pedagogical practices is still in jeopardy by limited integration of ICT tools, insufficient teacher capacity, and infrastructure limitations [7]. This is because AI has the potential to significantly close long-standing educational gaps in our school systems, in areas such as research writing and personal learning. AI-powered systems can support self-directed learning and enhance academic results by offering personalized learning materials, monitoring student progress, and producing tailored feedback [8]. When we use Artificial intelligence (AI) tools for research writing, such as plagiarism detectors, grammar checkers, literature review assistants, and referencing software, it improves our students' scholarly writing skills and enable them to produce high-quality academic work [9].

Thus, adopting AI-driven pedagogical innovations is becoming more and more crucial for improving student competencies in the digital age, research productivity, and educational quality as Nigerian higher education institutions work to meet international standards. Additionally, through individualized learning opportunities, administrative efficiency, self-evaluation, and research writing, artificial intelligence is transforming the academic landscape and opening doors for career

advancement worldwide in our educational system. Fundamentally, artificial intelligence depends on data. By examining patterns in this data, AI systems can learn things and draw connections that people might overlook [10]. According to UNESCO, artificial intelligence mimics human intelligence by actively participating in our daily lives through creativity, language interaction, and problem solving [11].

The demands of 21st-century learning, which place an emphasis on creativity, digital literacy, problem-solving, and individualized learning pathways, are increasingly at odds with these approaches, even though they may have been successful in previous decades [12]. Nigerian educational institutions continue to struggle with updating teaching methods to satisfy modern learning standards as global education systems quickly embrace learner-centered and technology-enhanced pedagogies [5]. This has made artificial intelligence (AI) is yet to be widely used in Nigerian educational institutions, even though it is increasingly acknowledged as a revolutionary tool for enhancing teaching and learning outcomes. Students still find it difficult to use digital platforms to improve their learning and research writing skills, many teachers lack the technical know-how to integrate AI-based teaching tools [1]. Infrastructure obstacles like erratic electricity supply, restricted access to computers and internet connectivity, and inadequate technology support systems in many Nigerian institutions make these problems worse [2].

Because of this, there is still a big disconnect between the teaching strategies used in Nigerian classrooms and the learning needs of the students. For research writing, learners need individualized learning experiences, instant feedback, and digital support; however, the current educational environment frequently falls short of offering these crucial resources [3]. This discrepancy shows how urgently the Nigerian educational system must use AI-driven pedagogical innovations to improve learning efficacy, foster digital competency, and fortify research writing abilities. Thus, by introducing artificial intelligence for research writing and personalized learning, this paper aims to improve the Nigerian educational system.

Methodology

It reports the findings of a literature-based qualitative and contextual research design that examined how local education system both at primary and secondary education levels have implemented artificial intelligence (AI) applications for personalized learning and research writing in Nigeria. This methodology was appropriate as the aim of the study was to synthesise existing literature, policy documents and empirical studies to achieve a comprehensive narrative of pedagogical innovation through AI integration rather than the collection of primary field data. MethodsRelevant peer-reviewed journal articles, policy reports, institutional publications and scholarly books on AI in education, personalized learning, adaptive learning systems, intelligent tutoring systems, learning analytics and research writing technologies were purposefully sampled and critically appraised. Highlights of global perspectives as well as studies based in Nigeria for relevance to the local educational landscape

This research was conducted through systematic identification, review and thematic organisation of the literature around AI-enabled tools (i.e. adaptive learning algorithms, natural language processing applications, automated assessment systems, and recommendation systems) within education. Thematic analysis was undertaken to identify recurring themes, opportunities and benefits, and contextual infrastructure, digital literacy and policy ethical issues. Policy landscapes and policy implementation strategies suggested for adopting AI in developing country contexts were also explored.

Analytically synthesizing and critically evaluating, lessons were gleaned about how AI might support student-centered learning, enhance research writing skills and facilitate pedagogical change in Nigerian institutions. This methodological approach guaranteed data depth, contextual based interpretation, and conformance to the conceptual area of interest of the study.

Results and Discussion

The Concept of Pedagogy Innovation in Education

Before delving into the discourse, let us briefly expatiate on the concepts of pedagogy, and innovation. The study of teaching strategies used by educators to assist students in meeting learning goals is known as pedagogy in education [4]. Three components are always present in pedagogical approaches, regardless of the subject matter, students' educational attainment, and classroom dynamics: the teacher, the student, and the subject matter. The science of teaching is called pedagogy. The use of cutting-edge techniques, strategies, and technologies in the process of implementing curricula is referred to as pedagogical innovation. The adoption of new or enhanced instructional strategies, technologies, and learning designs that improve learner outcomes and the teaching-learning process is referred to as pedagogical innovation [13].

It entails reevaluating conventional methods and adopting innovative, learner-centered, technology-enhanced strategies that promote critical thinking, active learning, and skill development. According to academics, pedagogical innovation is multifaceted and includes student-centered teaching methods, digital integration, flexible learning environments, curriculum redesign, and innovative assessment [14]. In modern educational systems, pedagogical innovation is considered crucial for meeting the changing needs of students in the twenty-first century, especially in settings like Nigeria where traditional teaching methods are prevalent [5].

Innovation

Innovation is the process of creating something new out of something that already exists and has been established. Innovation is the development of novel concepts, goods, or approaches to an issue. Innovation frequently entails taking a fresh approach to an already-existing concept or product in an effort to make it better. This could be as easy as incorporating a new feature into an already-existing product or service or as difficult as developing a brand-new one. Regardless of the strategy, the overarching objective of this kind of innovation is to improve consumer lives by finding a novel or creative solution to a problem. Improving the procedures involved in developing, providing, and maintaining a good or service is the focus of product innovation. Because it doesn't always result in a direct or quantifiable increase in demand or sales, this kind of innovation is sometimes disregarded. Compared to product or process innovation, business model innovation is a more comprehensive and intricate term. This kind of innovation is more concerned with how the product or service is introduced to the market than it is with the introduction of a new or improved product or service.

Pedagogical Innovative Strategies

The use of cutting-edge techniques, strategies, and technologies in the process of implementing curricula is referred to as pedagogical innovation. In the twenty-first century, pedagogical innovation heavily relies on technology integration. The process of reinventing teaching methods in order to better support student learning is known as pedagogical innovation. One type of social innovation is pedagogical innovation. Pedagogical innovations are essentially novel approaches to student-teacher interaction that guarantee the successful completion of educational activities. It is possible to implement pedagogical innovations at the expense of the educational system's own resources.

Personalized Learning and Its Pedagogical Implications

In the view of Pane et al. personalized learning refers to instructional strategies that adjust learning experiences to each learner's unique needs, learning preferences, interests, and pace [15]. This demonstrates how AI-enabled systems enable personalized learning, content customization, adaptive pathways, and timely feedback to promote deeper comprehension and better educational outcomes. In terms of pedagogy, personalized learning encourages autonomy, ongoing evaluation,

and adaptable learning environments by moving the emphasis from standardized instruction to learner-centered engagement [16]. AI has significantly contributed to personalized learning by analyzing learners' data patterns, forecasting knowledge gaps, and suggesting relevant content or support strategies/systems [17]. As classrooms become more diverse and students look for learning strategies that fit their academic needs, digital habits, and research aspirations, AI-supported personalized learning is becoming more and more important in Nigerian education.

Artificial Intelligence in Education (AIED)

Holmes et al. define artificial intelligence in education (AIED) as the use of AI technologies, such as machine learning, natural language processing, and intelligent data analytics, to support, improve, and automate educational processes [3]. AIED systems are made to evaluate student behavior, modify course materials, and offer tailored feedback, all of which increase the effectiveness and efficiency of instruction. Intelligent tutoring systems, automated assessment tools, adaptive learning platforms, virtual teaching assistants, and AI-supported research writing tools are examples of common AIED applications [18].

AIED is becoming more widely acknowledged as a transformative force that can address pedagogical issues, lessen the workload for teachers, and support customized learning experiences [11]. AIED provides opportunities to close gaps in instructional quality, increase student access to learning resources, and improve research competencies in developing contexts like Nigeria.

As AI is developing quickly, it encompasses a wide range of research and innovation subfields. "Artificial intelligence" refers to a machine-based system that can predict, recommend, or make decisions that affect real or virtual environments for a given set of human-defined objectives. AI is fundamentally dependent on data. Artificial intelligence (AI) systems can obtain insights and draw connections that humans might overlook by analyzing patterns in this data. Here, algorithms are crucial because they serve as rule-based manuals for AI's learning and decision-making procedures. AI systems develop and adapt over time, becoming more adept at tasks like image recognition and language translation [10].

Learning, reasoning, and self-correction are all part of it. Both human and machine intelligence are used in artificial intelligence systems. Rapid advancements in AI capabilities across a wide range of fields, including speech, vision, robotics, and text, are now essential tools that are actively improving education today rather than merely being a promise for the future. Teachers can improve student support, expedite administrative work, and personalize learning experiences by incorporating AI into the classroom. These are a few of the particular advantages AI offers to the field of education.

Artificial intelligence (AI) is defined as computer systems that mimic human intelligence and solve complex problems. With the help of advanced technologies like machine learning (ML) and deep learning, artificial intelligence (AI) offers ground-breaking advancements in a variety of fields, including manufacturing, health, education, and services. This synthesis examines the applications of AI in education as well as its advantages and disadvantages. Adapting instruction to each student's unique learning style is known as personalized learning. It places a strong emphasis on teaching strategies that enable content and methods to be tailored to each learner's particular needs, skills, and interests [15].

PL is widely recognized as an instructional model where the teaching strategy and learning pace are tailored to each student's needs [19]. This tactic aims to improve experience efficiency while allowing people to engage more actively and customistically in the learning process. Constructivist learning theory states that PL promotes the idea that learning occurs via interpersonal relationships and individual experiences. Compared to the conventional uniform approach to education, this aspect of individualized learning results in a distinct learning process. By tailoring

to each learner's unique characteristics, PL provides a more flexible and effective learning environment than traditional learning models, which frequently offer all students the same pace and knowledge. This variation increases students' motivation to engage more fully in the learning process and progress at their own pace. It is a learner-centered approach to teaching.

Future of Artificial Intelligence

Early philosophical investigations into logic, reasoning, and the nature of the mind serve as the foundation for the history of artificial intelligence (AI). Aristotle and other classical philosophers introduced formal logic as a system of rational thought, which is where the idea of mechanical processing, generative AI, and adaptive learning systems. AI is expected to continue expanding into a variety of fields in the future, with revolutionary effects on industry, education, health, governance, and scientific research. According to Brynjolfsson and McAfee, AI is predicted to grow more autonomous, context-aware, and human-centric, enabling more efficient and customized digital ecosystems [20]. AI systems in education will improve intelligent tutoring, adaptive assessment, and personalized learning. They will also support research by providing sophisticated data-analysis tools and automated writing assistants [3].

The next ten years are anticipated to be shaped by new developments like explainable AI (XAI), ethical AI frameworks, and human-AI cooperation. In order to guarantee that AI is consistent with societal values, these models place a high priority on accountability, safety, and transparency [21]. AI's potential in professional and academic contexts will also be further expanded by developments in multimodal AI and generative models, which can process text, images, audio, and data simultaneously [22].

The future of AI in developing nations like Nigeria hinges on bolstering digital infrastructure, raising AI literacy, and enacting supportive legislation. AI has the potential to greatly accelerate research productivity, educational innovation, and national development if these requirements are satisfied. All things being considered, increased integration of AI into daily life is anticipated in the future due to ongoing technological advancement and an increasing focus on its ethical application.

AI in Personalized Learning

By utilizing data-driven and adaptive technologies that customize training to each learner's requirements, preferences, and performance patterns, artificial intelligence makes personalized learning (PL) possible. The following techniques illustrate how AI operationalizes individualized learning in educational settings:

a. **Adaptive Learning Algorithms:** In order to modify instructional materials in real time, AI-powered adaptive learning systems continuously gather and evaluate learner data, including response speed, accuracy, content engagement patterns, and learning rate. According to Baker and Inventado, these systems employ machine learning models to forecast the learner's level of knowledge and suggest the next suitable task or piece of information [17]. These algorithms make instruction more effective and responsive by enabling each student to follow a different learning pathway [23].

b. **Intelligent Tutoring Systems (ITS):** By offering tailored feedback, explanations, and suggestions depending on the learner's behavior, intelligent tutoring systems mimic one-on-one human tutoring. ITS diagnoses misconceptions, scaffolds learning activities, and offers personalized advice using natural language processing (NLP) and decision-making models. According to research, ITS enhances mastery learning and helps students who need more guidance [24].

c. **Learning Analytics and Predictive Modelling:** AI uses learning analytics to track student development, spot learning trends, and identify students who are at risk for academic failure. In order to predict learning challenges and suggest focused treatments, predictive models

examine behavioral characteristics, such as login frequency, assignment submission deadlines, and quiz results. This system increases retention and provides timely support.

d. **Natural Language Processing (NLP) for Feedback and Writing Support:** By providing immediate feedback on writing, grammar, coherence, and content organization, NLP-based AI solutions facilitate individualized learning. These resources assist students in improving their communication and research writing abilities in real time [9]. AI-powered chatbots for educational purposes offer conversational learning, respond to questions, and customize interactions with students [3].

e. **Recommendation Systems:** By recommending educational materials like articles, videos, and practice exercises based on the learner's skills, interests, and performance information, AI-based recommendation engines personalize education. These engines maximize student engagement and instructional relevance, much like e-commerce recommendation systems [25].

f. **Automated Assessment and Personalized Feedback:** AI enables frequent, low-stakes evaluation by automating formative assessments using sophisticated scoring systems. Students can monitor their progress, pinpoint their areas of weakness, and get specific remediation recommendations thanks to the quick feedback mechanisms [26]. Additionally, automated grading guarantees prompt feedback that promotes individualized learning and lessens the strain for teachers.

g. **Behavioural and Cognitive Modeling:** AI systems employ behavioral and cognitive learning models to comprehend how pupils learn, the challenges they face, and the cognitive load they endure while learning. According to Koedinger et al., these models facilitate differentiated instruction, personalized pacing, and difficulty adjustment [27].

Benefits of AI in Education

With major advantages for academic administration, teaching, and learning, artificial intelligence (AI) has become one of the most revolutionary technologies in the field of education. Among the noteworthy advantages are the following:

i. **Personalized Learning:** By tailoring educational materials to each student's requirements, skills, and learning preferences, artificial intelligence (AI) enables individualized learning experiences. AI-powered systems such as adaptive learning platforms monitor student performance and give personalized recommendations, ensuring that learners receive focused help. This individualized approach enhances comprehension, retention, and overall academic performance [28]. AI systems adjust learning rate, feedback, and instructional content to each learner's specific needs.

ii. **Teaching Efficiency:** AI boosts teacher performance by providing instructional support, developing lesson plans, and supplying real-time classroom analytics. AI-powered solutions assess student participation and provide ways to improve instruction tactics. By offering AI-powered learning modules, platforms like Coursera and Google's AI for Education help teachers advance their careers. Also, natural language processing (NLP)-driven evaluation tools and automated scoring systems enable teachers to better manage large classrooms, freeing up time for more in-depth pedagogical exchanges [3]. Teachers are able to concentrate on student support and instructional quality as a result of the administrative workload being reduced.

iii. **Enhanced research writing and academic productivity:** The integration of AI helps students produce better academic work by providing tools like grammar checkers, plagiarism detectors, reference managers, and AI-based literature review assistants. These tools help students improve their academic writing abilities by giving them immediate feedback on their

originality, coherence, and clarity [9].

iv. **Improved Access to Education:** AI-powered tools like chatbots, virtual tutors, and intelligent learning aides help students who need more clarification or revision and expand learning opportunities outside of the classroom. These systems can run around the clock and offer ongoing, individualized guidance, which is especially helpful in situations when teacher availability is limited [18].

v. **Data-Driven Decision-Making:** In school administration, AI also encourages data-driven decision-making. In order to help institutions create responsive interventions and enhance curriculum delivery, learning analytics technologies monitor student performance, identify at-risk learners, and produce insights [2]. This data-driven approach guarantees that classroom decisions and educational planning are grounded in evidence rather than intuition.

vi. **Close Educational Gaps:** AI has the ability to close educational gaps and increase digital learning options in developing nations like Nigeria. AI can help with issues like teacher shortages, packed classrooms, and different levels of student readiness by facilitating remote learning environments [7]. In the end, AI improves education's general quality, applicability, and accessibility by bringing learning settings into line with worldwide digital trends.

Problems of Integrating AI for Personalized Learning

Although there are many chances to improve instructional delivery through the integration of Artificial Intelligence (AI) for individualized learning, there are considerable obstacles to its deployment in many educational institutions, especially in developing nations like Nigeria. These difficulties transcend boundaries linked to capacity, pedagogy, infrastructure, and ethics.

a. **Inadequate Technology Infrastructure:** The lack of technology infrastructure needed to support AI-driven learning environments is a significant obstacle. Many Nigerian schools and colleges still suffer with weak connectivity and antiquated ICT infrastructure, despite the fact that effective personalized learning systems depend on a steady power supply, high-speed internet, and access to digital devices [7]. AI solutions like intelligent tutoring systems and adaptive learning platforms cannot operate at their best without sufficient infrastructure.

b. **Low Level of Digital Literacy:** Another major obstacle to integrating AI in education is the low level of digital literacy among educators and students. Many instructors lack the technical abilities required to operate AI-based educational platforms or evaluate learner data supplied by these systems [11]. This ability gap makes AI technologies less effective and makes it more difficult to incorporate them into teaching methods. Since they are still strongly rooted in traditional pedagogical practices, educators and institutions may be interested in adopting new technology or learner-centered approaches. Resistance is frequently caused by fear of the unknown, a lack of digital literacy, or concerns about an increased workload [29] [30]. Due to limited exposure to digital learning environments and poor training on AI-assisted academic tools, students also struggle to use AI systems for individualized learning [6][31].

c. **High Implementation Costs:** This could prevent AI technology from being widely used. Purchasing, software licensing, upkeep, and teacher training all demand large cost outlays for personalized learning systems. Many African countries, like Nigeria, have little funding for education, which makes it more difficult for institutions to implement AI technology on a large scale [8].

d. **Risk of Data Privacy and Ethical Issues:** AI-driven learning raises additional concerns. Large amounts of student data are produced by personalized learning platforms, which raises questions about data security, permission, and possible misuse. This problem is made more difficult by the lack of explicit legal frameworks controlling the use of AI in Nigerian educational institutions [3].

e. **Change in Pedagogical Perspective:** This is also necessary for integrating AI for tailored learning, which is frequently slow because of reluctance to change. Many teachers are reluctant to embrace technology that change their roles in the classroom or necessitate significant changes to their approaches since they are used to using traditional teaching techniques [5][32]. Even with the availability of technology, this cultural barrier may prevent meaningful adoption.

f. **Contextual Inconsistency between AI Tools and Local Curricula:** Since many AI platforms were created in Western settings, they might not accurately represent the sociocultural realities, linguistic requirements, or curriculum norms of Nigeria [2]. Without localization, AI systems run the risk of giving students recommendations that are erroneous or irrelevant. When taken as a whole, these difficulties highlight the necessity of strategic investment, capacity-building, ethical governance, and contextual adaptation in order to fully realize AI's potential for providing individualized learning [33][34][35][36][37][38][39].

Conclusion

Adhering to the latest trends in pedagogic education is essential for development since it will produce competent products on a worldwide scale. A revolutionary approach to resolving persistent pedagogical issues and improving learning results is the incorporation of artificial intelligence (AI) into the Nigerian educational system. By allowing data-driven decision-making, automating repetitive instructional chores, enabling personalized learning, and improving students' research writing skills, artificial intelligence has proven its ability to promote pedagogical innovation. AI-assisted academic writing tools, intelligent tutoring, and adaptive learning systems allow teachers to deliver more learner-centered, flexible, and responsive instruction that meets 21st-century demands. Despite the great potential of AI-driven educational technology, adoption within Nigerian institutions remains restricted by infrastructure restrictions, low digital literacy, and inadequate legislative support. However, the data indicates that AI has the potential to significantly change teaching methods and make the Nigerian educational system more inventive, successful, and competitive on a global scale with further investment, strong governance, and capacity building.

Suggestions for the Implementation of Artificial Intelligence in Nigerian Educational System

1. **Start small and evaluate:** There is a need to execute departmental pilots with specific success measures (learning gains, user satisfaction) before growing. Also, researcher and postgraduate programmes should incorporate artificial intelligence (AI) tools including plagiarism detectors, academic writing helpers, automated reference software, and data-analysis tools. Also, professors and supervisors should be encouraged to use AI systems to manage research progress, provide automated feedback, and improve the caliber of scholarly writing.

2. **Human Capacity Building:** Our educational system should invest in human capacity by providing learners with digital literacy programmes and educators with ongoing professional development. To improve research productivity and worldwide competitiveness, the government must fund institutional subscriptions to AI-based academic databases and research-support systems. To allow staff and students to investigate AI-driven learning applications, educational systems should set up AI labs, digital innovation centers, and smart classrooms.

3. **Public-Private Partnerships (PPPs):** Use public-private partnerships (PPPs) to strengthen infrastructure through focused investments in device access, regular power supply, and connectivity. This collaboration in turn promotes talent development and technology transfer, partnerships between academic institutions, EdTech businesses, and foreign partners should be promoted.

4. **Policy and governance:** The Nigerian government should implement data-protection guidelines for education, procurement requirements for AI tools, and institutional AI

governance committees. Also, Comprehensive policies that direct the ethical, pedagogical, and infrastructural integration of AI across all educational levels in the nation should be developed by government organizations like the Federal Ministry of Education, NUC, and NBTE.

5. **Localize content and tools:** To guarantee cultural and curricular fit, collaborate with local academics and EdTech developers to co-design AI features that are linked with the curricula.

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