A CRITICAL REVIEW OF THE IMPACT OF ARTIFICIAL INTELLIGENCE ON THE ADVANCEMENT OF SUSTAINABLE INNOVATION IN MATHEMATICS EDUCATION IN HIGHER EDUCATION IN NIGERIA

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Abstract
Sustainable innovation has become a vital global requirement, demanding higher institutions to disseminate skills and knowledge required for tackling current societal and economic issues. This research paper presents a critical review of the ***impact of artificial intelligence on the advancement of sustainable innovation in mathematics education in higher education in Nigeria.*** *This was done by synthesizing research findings through a systematic review. The findings revealed that Artificial intelligence (AI) tools such as interpretive structural modelling (ISM), dual eye-tracing, adaptive learning platforms, intelligent tutoring systems, customized learning pathways, dynamic assessment tools, data-driven insights, engagement monitoring, peer collaboration opportunities, resource recommendation systems and predictive analytics provide personalised learning experiences tailored to each student's needs and abilities and revolutionize how students learn and interact with complex concepts in mathematics education enhancing sustainable innovation. AI-powered virtual tutors offer instant feedback, personalised guidance, and support for critical thinking and innovation. The findings also showed hindrances to the integration of artificial intelligence for sustainable innovation in mathematics education, including inadequate digital infrastructure, limited access to technological tools, a lack of digital skills among teachers, erratic power supply, and concerns regarding data privacy and algorithmic bias. To address the identified gaps and capitalise on the opportunities, this research offered these recommendations, among others. Firstly, higher institutions of learning should revise their mathematics education curricula to incorporate sustainable innovation. Secondly, all hands must be on deck towards ensuring that infrastructure for artificial intelligence is provided, lecturers should be given digital training, and the problem of erratic power should be solved.*

Keywords: *Mathematics education, Innovative Research, Higher Education, Sustainable innovation*

INTRODUCTION

Mathematics education is an ongoing process of study that facilitates teaching, learning, and the acquisition of mathematical skills (Alata, 2016). The specific aims of mathematics

education may include developing mathematical proficiency and literacy, fostering logical reasoning and problem-solving skills, and cultivating an appreciation for the role of mathematics in various life contexts (Duma et al., 2024; Sachdeva & Eggen, 2021). Mathematics education also aims to equip students with the ability to apply mathematical knowledge and skills to real-world situations, prepare them for further studies, and instil positive attitudes towards mathematics (Ilyas et al., 2022).

The above aims of mathematics education are, however, still far from being attained in higher education in Nigeria. It has been observed that higher education in Nigeria has not been able to catch up with its counterparts in developed nations in terms of attaining the broad and specific aims of mathematics education. Specifically, **the sustainability of innovation in mathematics education in higher education in Nigeria remains uncertain.** Sustainable innovation in mathematics education, which refers to the process of developing and implementing mathematical teaching and learning practices that are not only effective in the short term but also contribute to the long-term well-being of individuals and the planet, is not yet fully realised in some Nigerian higher education institutions (Daso, 2012; Sam-Kayode, 2017; Widiati & Juandi, 2019). Sustainable innovation, which emphasises the integration of sustainability concepts and principles into mathematics curriculum and pedagogy, fostering critical thinking, problem-solving skills, and a sense of responsibility towards social, environmental, and economic issues, seems to be limited in the higher institutions (Ozomadu & Edeoga, 2024; Uzorka et al., 2024).

A situational analysis of some higher education institutions in Nigeria shows that mathematics education seems far from attaining sustainable innovation (Azuka, 2015; Daso, 2012; Olasoji et al., 2023). This author is of the position that sustainable innovative approaches to mathematics education in higher education institutions in Nigeria are inadequate. Empirical data confirms that innovative strategies and techniques for mathematics education in higher institutions in Nigeria are largely inadequate (Abdulwahed, 2019; Daso, 2012). Hence, this paper sought to examine whether Artificial Intelligence (AI)can facilitate the advancement of sustainable innovation in mathematics education in higher education in Nigeria.

Artificial intelligence is described as a computer with the capability to perform various human cognitive tasks, such as reasoning, communicating, learning, and/or problem-solving (Chong et al., 2020). Artificial intelligence produces a high-tech environment that re-shapes the human brain, analyses the environment, and takes actions with some freedom to achieve a specific goal (Krafft et al., 2020; Mynbayeva et al., 2017). When the human brain is re-shaped, sustained innovation in learners could be developed. Artificial Intelligence (AI) as a digital tool has benefited applied science, healthcare, and finance (Baker &Inventado, 2014). However, the impact of artificial intelligence in advancing **sustainable innovation in mathematics education in higher education in Nigeria** has not been given adequate attention, hence the rationale for this paper.

Statement of the Problem

In Nigeria, in higher education, the principles of sustainable innovation remain poorly integrated into mathematics education. Despite its recognised significance, there are vast gaps that exist in the curriculum and pedagogy. In some Nigerian higher educational

institutions, mathematics programs tilt more towards the traditionalistic methodologies, which leave very little room for sustainable innovation. This narrow focus leaves students unprepared for contemporary mathematical and environmental issues. Teaching methodologies are often outdated and do not foster critical thinking, problem-solving, or innovation. Innovative pedagogies are seldom put into practice, thus hindering the practical application of knowledge. A major problem is the very low level of integration of principles of sustainable innovation in the higher education setting of Nigeria. This paper, therefore, examined the impact of artificial intelligence in advancing sustainable innovation in mathematics education in higher education in Nigeria.

Objectives

The main objective of this paper was the impact of artificial intelligence **on the advancement of sustainable innovation in mathematics education** in higher education in Nigeria. The specific objectives were to examine various literature on the:

1. Role of artificial intelligence in advancing sustainable innovation in mathematics education in Nigeria; and
2. Hindrances to integrating artificial intelligence advancing sustainable innovation in mathematics education in Nigeria.

Research Questions

1. What are the roles of Artificial Intelligence in advancing sustainable innovation in mathematics education in Nigeria?
2. What are the hindrances to integrating Artificial Intelligence advancing sustainable innovation in mathematics education in Nigeria?

CONCEPTUAL CLARIFICATIONS

Sustainable innovation

Sustainable innovation is defined as the process of developing and implementing new products, services, technologies, or models that have a positive environmental, social, and economic impact. It involves finding creative and efficient solutions to addressing pressing challenges, such as climate change, resource depletion, pollution, inequality, and poverty. The goal of sustainable innovation is to meet the needs of the present generation without compromising the ability of future generations to meet their own needs (Nick, 2022). Sustainability innovation ensures that new products, processes, and systems actively deliver a positive future and align with a vision of a sustainable economy and society - rather than exacerbate societal challenges, such as pollution, nature degradation, poverty, and inequality (Zhou, 2024). Sustainable innovation means that companies seek out ways in which to sustain continuous innovation/improvement for company growth, competitive advantage, increased market share, etcetera (Shields, 2023). Unlike traditional innovation, which often prioritises short-term gains, sustainable innovation focuses on long-term viability, ensuring that progress today does not come at the expense of future generations (Lloyd, 2025).

Mathematics education

Mathematics education deals with the impartation and/or dissemination of rational reasoning abilities, structure, order, and quantitative calculations to humans (Sulai & Sulai, 2020). Mathematics education is the process of acquisition of mathematical competencies, aptitude, attitude, and capabilities that enable learners to be functional and productive in a

nation (Liman et al., 2016). Mathematics education is a branch of scientific education that deals with the science of computation, measurement, and description of shapes and sizes of objects (Sulai & Sulai, 2020). Mathematics education is a continuous process of research and study that fosters the instruction and acquisition of mathematical expertise that boosts the nation's growth and development (Alata, 2016). Mathematics education involves the teaching, learning, and assessing of formulae and systems essential for computations and problem solving (Inah & Agbudu, 2021).

Sustainable Innovation in Mathematics Education

Sustainable innovation is the application of new ideas to create value while prioritising benefits for both people and the planet (Nick, 2022). Sustainable innovation involves making intentional changes to a mathematics education, services, or processes to generate long-term social and environmental benefits while creating economic profits for the institution (Lee, 2021). Sustainable innovation is a strategic approach that combines innovation with sustainability principles to create new products, services, or models in mathematics education that address environmental, social, and economic challenges. It is a critical component of building a sustainable and resilient future (Nick, 2022; Zhou, 2024).

Sustainable innovation in mathematics education focuses on developing a curriculum and pedagogy that equips students with the mathematical knowledge, skills, and values to address current and future sustainability challenges. This involves integrating sustainability principles into mathematics teaching, fostering interdisciplinary approaches, and promoting critical thinking and problem-solving skills relevant to real-world sustainability issues (Makramalla et al., 2025). Key aspects of sustainable innovation in mathematics education include:

a) Emphasizing values and attitudes related to sustainability in mathematics teaching;
b) Encouraging participatory decision-making and empowering students to become change agents;
c) Promoting critical thinking, creativity, and collaboration through mathematics;
d) Integrating technology and online platforms for learning and knowledge sharing (Gaanya et al., 2025; Makramalla et al., 2025; Zhao, 2023);
e) Shifting from traditional, compartmentalised mathematics to more holistic and interdisciplinary approaches;
f) Incorporating sustainability concepts and real-world applications of mathematics into the curriculum;
g) Developing mathematical models and problem-solving activities that address sustainability challenges (Gaanya et al., 2025; Makramalla et al., 2025);
h) Providing teachers with the necessary training and professional development to effectively teach mathematics for Sustainable innovation;
i) Equipping teachers with the skills to integrate sustainability concepts into their lessons and create engaging learning experiences (Bulut & Ferri, 2025; Makramalla et al., 2025);
j) Assessing students' understanding of sustainability concepts and their ability to apply mathematical knowledge to solve real-world problems; and
k) Evaluating students' communication, collaboration, and critical thinking skills (Gaanya et al., 2025; Makramalla et al., 2025).

Artificial Intelligence

Artificial Intelligence (AI) is the ability of a machine to display human-like capabilities such as reasoning, learning, planning, and creativity. It could be defined as a tool that has been designed and developed to assist in or replace decision-making processes through analysis of data, and prediction of the best value for a designated outcome variable, that is conveyed through a user interface (Channa et al., 2021). Artificial Intelligence (AI) is described as a computer with the capability to perform a variety of human cognitive tasks, such as communicating, reasoning, learning, and/or problem-solving (Chong et al., 2020). AI techniques can permit the intelligent tutoring systems themselves to solve the problems which it sets for the user, in a human-like and appropriate way, and then reason about the solution process and make comments on it (Chong et al., 2020).

AI tools in education include the following:

1. Virtual & augmented reality for immersive training (for example, cadavers for medical learners);
2. Personalised, hyper-tailored, self-paced individual learning;
3. Adaptive learning to recommend lesson content;
4. Virtual personal assistants;
5. Intelligent Tutoring Systems and personalised tutors;
6. Robo-readers and robo-graders;
7. Empathetic AI to detect learner distress early;
8. Simulations for 'trial and error' tools (Petrie et al., 2020); etcetera.

AI was defined as artificially intelligent tutors that construct responses in real-time using their own ability to understand the problem and assess learner analyses (Johnson et al., 2009). Popenici & Kerr (2017) defined AI as computing systems that can engage in human-like processes such as learning, adapting, synthesizing, self-correction, and the use of data for complex processing tasks. AI systems for learning could be proposed as technological tools programmed to interact with decision-making intelligent actions and predictions through intelligence capabilities of computational systems generated after a deep systematic analysis of digital data gathered from various digital tools (that is, visual perception, facial recognition) (Russell &Norvig, 2016).

THEORETICAL FOUNDATION

Technology Acceptance Model by Davis (1989)

The Technology Acceptance Model (TAM) by Davis (1989) is a theory in information systems that explains how users (mathematics educators and learners) come to accept and use new technologies such as Artificial Intelligence. The theory proposes that perceived usefulness and perceived ease of use are key factors that influence users' intention to use a technology such as Artificial Intelligence, which in turn affects their actual use of the technology. Essentially, users such as mathematics educators and learners are more likely to adopt a technology (AI) if they believe it will be helpful and easy to use in impacting sustainable innovation (Marikyan & Papagiannidis, 2025).

Core components of the model include:

1. **Perceived Usefulness:**
   This refers to the extent to which users, such as mathematics educators and learners, believe that using a particular technology, such as Artificial Intelligence, will enhance

their performance or help them achieve their goals and objectives, such as sustainable innovation (Marikyan & Papagiannidis, 2025; Mulugeta et al., 2020).

2. **Perceived Ease of Use:**
   This describes how simple and effortless users, such as mathematics educators and learners, perceive the technology (Artificial Intelligence) to learn and operate for sustainable innovation in higher education (Davis, 1989; Marikyan & Papagiannidis, 2025).
3. **Behavioural Intention to Use:**
   This refers to users' conscious plan to use the technology (Artificial Intelligence), driven by their perceptions of usefulness and ease of use for sustainable innovation in higher education.
4. **Actual System Use:**
   This is the outcome, representing the extent to which users actually utilise the technology (Artificial Intelligence) for sustainable innovation in higher education (Davis, 1989).

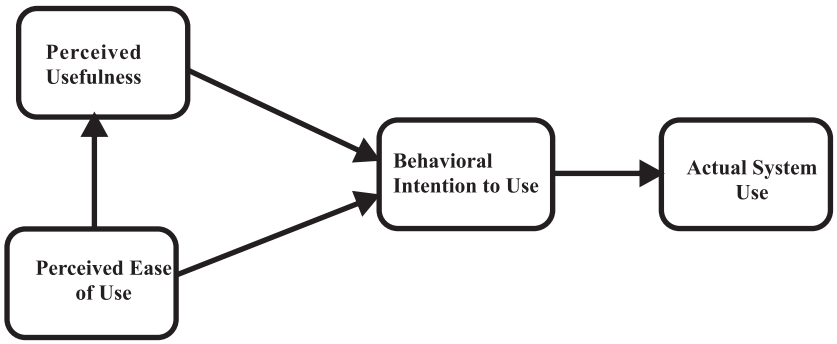

Figure 3.1: Technology Acceptance Model (Source: Davis, 1989; Marikyan & Papagiannidis, 2025)

Methodology

Systematic review procedures were used to search, select, and extract empirical articles that met this study's criteria. This study's criteria were based on peer-reviewed empirical and opinion articles carried out on Artificial intelligence and sustainable innovation in mathematics education, only in Nigeria. Thus, the peer-reviewed articles were filtered to identify those that met the inclusion criteria. The principles of Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) were employed.

Research Findings

1. **What are the roles of Artificial Intelligence in advancing sustainable innovation in mathematics education in Nigeria?**

A Nigerian research revealed that Artificial intelligence (AI) tools, such as interpretive structural modelling (ISM) and dual eye-tracing, to broader approaches, including ChatGPT and coding/transcribing can revolutionize how students learn and interact with complex concepts in mathematics education, enhancing sustainable innovation. Using AI, teachers can provide personalised learning experiences tailored to each student's needs and abilities. Subsequently, AI can analyse students' performance data to identify areas of weakness and provide additional support and resources to help them improve their understanding of

innovative mathematical concepts (Opesemowo & Habeeb, 2024). The findings of a study also revealed that AI-driven educational tools significantly improve students' comprehension and mastery of mathematical concepts through personalised, adaptive, and interactive learning experiences in tertiary institutions in Ondo State, Nigeria. The students who utilised AI tools reported increased engagement, confidence, and proficiency in mathematics, while the educators acknowledged the effectiveness of AI in delivering tailored instruction and reducing administrative burdens, which enhances sustainability (Fawehinmi et al., 2025).

AI plays vital roles in mathematics education, such as real-time assessment and feedback, curriculum enhancement, and empowerment of educators (Opesemowo & Habeeb, 2024). Personalised learning is essential to mathematics education since it allows students to learn at their own pace and concentrate on areas requiring extra assistance, which improves their innovation. For instance, algorithms can monitor students' performance and personalise the learning experience to their specific needs using AI integration (Fernandes et al., 2023; Opesemowo & Adekomaya, 2024). This improves students' understanding of mathematical ideas and increases their confidence, motivation, and overall innovation. AI tools and/or technologies improve students' mathematics skills by enhancing their comprehension and performance. AI-driven platforms assess strengths and weaknesses, and create customized learning paths (Onesi-Ozigagun et al. 2024). This approach boosts engagement and performance, especially in mathematics. In addition, AI-powered virtual tutors offer instant feedback, personalised guidance, and support for critical thinking and innovation (Adeleye et al., 2024).

Personalised learning, including AI-driven systems, caters to individual paces and promotes mastery, allowing progress based on competence. This allows the mathematics students lots of time to fully comprehend and build innovation that is sustainable. These AI systems also leverage data to address misconceptions, provide feedback, and adjust instructions (Idowu, 2024). Intelligent tutoring systems (ITS) use machine learning to analyse performance data and create customized paths aligned with each learner's pace and understanding, which boosts engagement and performance through immediate feedback and targeted interventions (Onesi-Ozigagun et al., 2024). It was agreed by respondents in a study that artificial intelligence systems such as adaptive learning platforms, intelligent tutoring systems, customized learning pathways, dynamic assessment tools, data-driven insights, engagement monitoring, peer collaboration opportunities, resource recommendation systems, and predictive analytics facilitate personalised learning experiences for diverse students to support sustainable innovation in Imo State higher education (Ojiako, 2025).

Egara & Mosimege (2024) reported that teachers who integrated ChatGPT into mathematics teaching observed improved teaching effectiveness, heightened student engagement, and enhanced comprehension of complex concepts for sustainable innovativeness. A research carried out among lecturers in mathematics and science departments at University of Abuja, College of Education, Zuba; and National Open University of Nigeria (NOUN) noted that AI creates a student-centred learning environment that allows them to take ownership of their learning through experience because they sought for information online and do most of the activities independently, unlike in the lecture-based method, in which students become passive learners. This improves their ability to innovate. Students' taught with AI animations

can make connections about what they are learning, which allows them to understand the topic better and be innovative. AI thus catalyses improved academic performance and a deeper grasp of scientific principles. The lecturers noted that creating online learning groups with AI enabled them to monitor students' activities within the shortest time available and provide immediate feedback to students, which would have been challenging if AI was not used, thus expanding pedagogical possibilities and sustainable innovation in mathematics education (Olatunde-Aiyedun, 2024).

The findings of a study indicated that AI can significantly enhance the relevance and adaptability of science curricula for sustainable innovation especially in areas like curriculum customization, real-time feedback, data-driven insights, integration of emerging technologies, interdisciplinary learning, skill development alignment, cultural and contextual relevance, flexible learning environments, continuous curriculum evolution and collaboration with industry in Imo State higher education(Ojiako, 2025). A research showed that mathematical and technical students who develop creative thoughts on the use of AI, easily find new jobs; those who can produce and explore potentials on the use of AI are quickly employed; the ability of the students to transform enables the generation of previous idea with the advent of AI enhance employment; students' ability to provide problem-solving-based pedagogies through AI enhance the chance of getting job and those who develop their innovative skills on the use of AI are easily employed. These findings suggested that there is an impact of Artificial Intelligence on sustainable creativity and innovation skills for employability among technical students in Nigeria (Olojuolawe, 2024).

In Nigeria, where STEM education faces numerous challenges, AI offers innovative solutions to enhance sustainable learning and innovation. Platforms like ULesson leverage AI to provide personalised video lessons, quizzes, and assessments for mathematical students preparing for national and international examinations. By analysing student performance, the platform customizes learning materials to address specific gaps, ensuring that no student is left behind (Adegboye & Okafor, 2022). This approach is particularly beneficial for underserved regions where access to qualified STEM teachers is limited. Personalised learning fosters engagement, builds confidence, and ensures better academic outcomes for students (Samuel &Salisu, 2025). AI facilitates the creation of virtual laboratories and simulations, enabling students to conduct experiments and explore mathematical concepts without the need for costly physical infrastructure. Virtual labs replicate real-world scenarios, allowing students to experiment with mathematical simulations, and designs in a safe and interactive environment that propels sustainable creativity (Nwachukwu et al., 2022). Virtual labs not only make mathematical learning more engaging but also help students develop critical skills such as problem-solving, innovative, and analytical thinking (Samuel &Salisu, 2025).

A study carried out in educational institutions in Ekiti State, Nigeria, suggested that Adaptive Learning Systems (ALS) have emerged as an innovative method to transform the conventional teaching model in the field of scientific and mathematical education. Artificial intelligence (AI)-driven Adaptive Learning Systems (ALS) aim to individualise the learning process for every learner, departing from the standardised approach. ALS employs advanced data analytics and machine learning algorithms to thoroughly examine the performance of each student, accurately determining their strengths, limitations, and preferred learning

methods. With this abundance of information, ALS is able to customise content delivery by providing personalised learning pathways, tools, and exams that are specifically designed to meet the individual needs of each learner, which enhances sustainable innovation in the students (Okunade, 2024). A study carried out in Imo state, Nigeria, showed that AI-powered educational tools, including adaptive learning systems, virtual laboratories, and intelligent tutoring systems, offer interactive learning experiences that enhance problem-solving, critical thinking skills, and sustainable innovation in Mathematics education (Ekwu et al., 2025).

AI can alleviate lecturers' administrative burdens by automating repetitive tasks such as grading, attendance tracking, and report generation. In Nigeria, where lecturer shortages and large class sizes are common, automating administrative tasks can significantly enhance efficiency. AI tools like Google Classroom and Microsoft Teams already offer features for automated grading and attendance, streamlining classroom management. By reducing administrative workloads, lecturers can better cater to students' needs and deliver high-quality STEM instruction that enhances sustainable innovation (Samuel &Salisu, 2025). A Nigerian study put forth that AI's role in STEM education extends beyond knowledge acquisition and fosters innovation and critical thinking among students. Project-based learning integrates AI to encourage students to tackle real-world problems, develop sustainable, innovative solutions, and engage in critical thinking. This approach prepares students for future careers in STEM fields and equips them with the skills to become leaders and innovators in an AI-driven economy. Through AI-enabled platforms, students from different cultural and geographical backgrounds can collaborate on projects, share knowledge, and learn from each other, which enhances sustainable innovativeness (Okoye & Mante, 2024).

2. **What are the hindrances to integrating Artificial Intelligence advancing sustainable innovation in mathematics education in Nigeria?**

A study carried out in tertiary institutions in Ondo State, Nigeria, identified challenges hindering the widespread adoption of AI in Nigerian classrooms, including inadequate digital infrastructure, limited access to technological tools, a lack of digital skills among teachers, and concerns regarding data privacy and algorithmic bias (Fawehinmi et al., 2025). According to Festus and Bamidele (2024), challenges hindering the integration of Artificial Intelligence for sustainable innovation in mathematics education in Nigerian Colleges of Education included inadequate funding (42.3%), limited expertise (15.4%), and infrastructural deficiencies (25%). AI offers benefits in Nigerian higher education but presents challenges such as data privacy, algorithmic biases, and teacher training needs (Onesi-Ozigagun et al., 2024). Falebita (2024) revealed in a study on pre-service teachers in Nigerian colleges of education that sociolinguistic issues and resistance to change hindered the adoption of AI. The study showed that pre-service teachers had high AI anxiety and moderate adoption of mathematics education.

Egara & Mosimege (2024) mentioned issues such as technical adaptability, curriculum alignment, and the need for customization to accommodate diverse learning styles as hindrances to the adoption of AI in mathematics education for sustainable development. Ibrahim (2024) noted that technical barriers and limited resources hinder AI integration among lecturers in Nigerian universities. Abubakar et al. (2024) raised the issues of data

privacy, access inequality, and overreliance on AI, potentially undermining critical thinking in Nigerian tertiary institutions. A study noted that the hindrances to the adoption of Artificial Intelligence (AI) in advancing mathematical and science education for sustainable innovation in Imo State, Nigeria, included: infrastructure limitations, insufficient training, curriculum gaps, cost of implementation, limited research and resources, poor interdisciplinary collaboration, measurement of effectiveness, and poor curriculum compatibility (Ojiako, 2025).

A Nigerian study noted that the adoption of AI faces significant hurdles, including infrastructural deficits, high costs, digital literacy gaps, and ethical concerns related to data privacy and algorithmic bias (Samuel &Salisu, 2025). A study carried out in educational institutions in Ekiti State, Nigeria suggested that the hindrances to the integration of AI for sustainable innovation include lack of sufficient access to technology, irregular provision of electricity and insufficient internet access in many schools, the inadequate preparation and competence of teachers in integrating AI into the educational system, and resistance to change, which originates from a lack of familiarity or scepticism over the efficacy of AI (Okunade, 2024). Research carried out in Imo state showed that despite the potential of AI, several challenges hinder its integration into Nigeria's STEM education. These included inadequate infrastructure, limited access to digital resources, a lack of AI-skilled educators, and a policy gap (Ekwu et al., 2025). It was noted that the adoption of AI in Nigerian STEM education is still facing challenges such as inadequate infrastructure, limited funding, and a shortage of skilled educators (Okoye & Mante, 2024).

CONCLUSION

Integrating Artificial Intelligence (AI) in mathematics education offers huge potential for sustainable innovation in Nigeria's higher education. This paper shows the ability of artificial intelligence to enhance curriculum relevance, personalised learning among mathematical students, and address major and continuous challenges in mathematics education. However, hindrances such as infrastructural inadequacy, insufficient training, curriculum gaps, erratic power supply, and internet access must be resolved to fully leverage the huge benefits of the technology for sustainable development.

RECOMMENDATIONS

The following recommendations are therefore given based on the conclusion:

1. Higher education institutions should revise their mathematics curricula to integrate sustainable innovativeness in order to foster problem-solving and critical thinking skills related to sustainability challenges.
2. Hindrances facing the integration of artificial intelligence into mathematics education for sustainable innovation should be strictly resolved. More infrastructure to accommodate artificial intelligence should be provided. The issues of internet supply and erratic power should be solved, and staff and students should be trained and/or equipped on the use of AI for sustainable development in mathematics education.

IMPLICATIONS

The incorporation of Artificial Intelligence (AI) into mathematics education in higher education in Nigeria offers huge potential for advancing sustainable innovation, but faces

hindrances in adoption and implementation. Although AI can personalize learning, provide data-driven insights for improved teaching and resource allocation, and automate tasks, it faces hindrances such as infrastructural inadequacies, privacy/ethical concerns, and inadequate training of educators in digital skills.

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