
WWJMRD 2024; 10(10): 13-16
www.wwjmrd.com
*International Journal*
*Peer Reviewed Journal*
*Refereed Journal*
*Indexed Journal*
*Impact Factor SJIF 2017: 5.182 2018: 5.51, (ISI) 2020-2021: 1.361*
*E-ISSN: 2454-6615*

**Ugbe Joseph Udie**
Department of Public Health, ISQ/JPTS Institute of Science Management and Technology. Abuja-FCT Region, Nigeria.

**Correspondence:**
**Ugbe Joseph Udie**
Department of Public Health, ISQ/JPTS Institute of Science Management and Technology. Abuja-FCT Region, Nigeria.

# The Impact of Artificial Intelligence (AI) on Teaching and Learning in Nigerian Schools: Perception of Nigerian State College of Education Mathematics Lecturers Towards Deployment of Artificial Intelligence in Instruction, FCT-Abuja, Nigeria from 2023 to 2024.

**Ugbe Joseph Udie**

**Abstract**
This comprehensive study examines the perspectives of mathematics lecturers in Nigerian State Colleges of Education regarding the integration of Artificial Intelligence (AI) in teaching and learning processes. The impetus for this research arises from the persistent issue of mass failures among students in higher education, attributed to inadequate facilities and outdated pedagogical methods. The adoption of AI is proposed as a transformative solution to enhance educational quality and address these challenges.
Employing a robust mixed-methods research design, the study collected data from 50 lecturers through surveys and conducted in-depth interviews with 20 participants. The findings indicate that a significant majority (80%) of lecturers exhibit a favorable disposition towards AI adoption, recognizing its potential to improve student learning outcomes, instructional efficiency, and overall academic excellence. However, 60% of respondents expressed concerns regarding the adequacy of training, resources, and infrastructure necessary for effective AI integration.
To address these challenges, the study recommends a multi-faceted approach that includes:
Professional Development Programs: Initiatives aimed at enhancing lecturers' AI literacy and pedagogical skills.
Infrastructure Enhancements: Upgrades to support AI-driven educational practices and ensure reliable access to necessary technologies.
Strategic Planning: Integrating AI into the curriculum and instructional design to maximize its benefits.
By tackling these issues and leveraging AI's capabilities, Nigerian State Colleges of Education can revolutionize mathematics education, improve student outcomes, and contribute to national development. This study serves as a foundational resource for future research and informs evidence-based decision-making regarding AI adoption in Nigerian education.

**Keywords:** Artificial Intelligence, FCT-Abuja, mathematics lecturers, higher education

## Introduction
The integration of Artificial Intelligence (AI) in education has gained significant attention in recent years due to its potential to revolutionize teaching and learning practices. AI can facilitate personalized learning experiences, enhance student engagement, and improve educational outcomes, particularly in mathematics instruction (Fernandez et al., 2019). However, the successful implementation of AI technologies in educational settings largely depends on the perceptions and attitudes of lecturers, who play a crucial role in the adoption and integration of these technologies (Thomas et al., 2022).
This study aims to explore the perceptions of mathematics lecturers at Nigerian State Colleges of Education regarding the deployment of AI in instructional practices. Understanding the lecturers' views, concerns, and expectations is essential to developing

effective strategies for the successful integration of AI in mathematics education..... .....The Status of Colleges of Education in Nigeria

There are currently 205 accredited colleges of education and other NCE Certificate-Awarding institutions in Nigeria, consisting of 27 federal, 82 private, and 54 state colleges of education[1]. These institutions play a crucial role in training teachers for primary and secondary schools across the country.

However, many colleges of education in Nigeria face significant challenges, including:

- Inadequate funding: Many state-owned colleges suffer from underfunding, leading to a lack of resources for infrastructure, equipment, and staff development.

- Outdated curricula: The curricula in some colleges may not be keeping pace with the rapidly evolving educational landscape and the needs of 21st-century learners.

- Quality of instruction: The quality of instruction can vary across colleges, with some institutions struggling to attract and retain highly qualified faculty members.

The Potential of Artificial Intelligence (AI) in Teaching and Learning

In the face of these challenges, the introduction of artificial intelligence (AI) as a medium for enhancing teaching and learning methods holds great promise for Nigerian colleges of education. AI-powered tools and technologies can help address some of the key issues faced by these institutions, such as:

**Personalized Learning**

AI-based systems can analyze student data to provide personalized learning experiences tailored to each student's strengths, weaknesses, and learning preferences. This can help improve student engagement and outcomes.

**Intelligent Tutoring Systems**

AI-powered tutoring systems can provide students with immediate feedback, guidance, and support, allowing them to learn at their own pace and freeing up lecturers to focus on more complex tasks.

**Automated Grading and Assessment**

AI algorithms can be used to automate the grading of assignments and assessments, reducing the workload on lecturers and providing faster feedback to students.

**Predictive Analytics**

AI can help identify students at risk of falling behind or dropping out, allowing lecturers and administrators to intervene early and provide targeted support.

## Literature Review

**Artificial Intelligence: Trends and Applications**

Artificial Intelligence (AI) is a rapidly evolving field that has the potential to transform various aspects of our lives, including education. AI refers to the development of computer systems capable of performing tasks that typically require human intelligence, such as learning, problem-solving, and decision-making (Shukla & Jaiswal, 2013).

In the context of education, AI has found numerous applications, including personalized learning, adaptive assessment, intelligent tutoring systems, and automated grading. These AI-based technologies have the potential to enhance the learning experience, provide real-time feedback, and enable more efficient use of educational resources (Comia, 2017).

**The Impact of Technology in Nigerian Schools**

The integration of technology in Nigerian schools, particularly in Colleges of Education, has been a gradual process. While some institutions have embraced technological advancements, many still face challenges in terms of infrastructure, resources, and teacher training (Madu & Musa, 2024).

The deployment of AI in Nigerian schools has the potential to address some of these challenges by providing personalized learning opportunities, improving access to educational resources, and enhancing the overall quality of instruction. However, the success of AI integration largely depends on the perceptions and attitudes of lecturers, who are the primary facilitators of the learning process.

**Methodology**

This study employed a mixed-methods approach, utilizing both quantitative and qualitative data collection techniques. A sample of 50 mathematics lecturers from Nigerian State Colleges of Education was selected for the study.

**Participants**

The participants were selected using a purposive sampling technique, ensuring that they were actively involved in teaching mathematics at the selected institutions. The demographic information of the participants is presented in Table 1.

| Demographic Variable | Frequency | Percentage (%) |
|---|---|---|
| Gender | | |
| Male | 30 | 60 |
| Female | 20 | 40 |
| Age Group | | |
| 20-30 | 10 | 20 |
| 31-40 | 15 | 30 |
| 41-50 | 15 | 30 |
| 51 and above | 10 | 20 |

**Data Collection and Analysis**

The study used a combination of surveys and interviews to gather data from the participants. A structured questionnaire was administered to all 50 lecturers, which included both closed-ended and open-ended questions to assess their perceptions of AI integration in mathematics instruction. Additionally, in-depth interviews were conducted with 10 randomly selected participants to gain deeper insights into their views and experiences.

The quantitative data from the surveys were analyzed using descriptive statistics, while the qualitative data from the interviews were subjected to thematic analysis. This approach allowed for a comprehensive understanding of the lecturers' perceptions and the identification of key themes related to AI integration in mathematics education.

**Results**

The findings of this study reveal a generally positive attitude among mathematics lecturers towards the integration of AI in instructional practices. The survey results indicate that 80% of the participants are open to using AI in their teaching, citing benefits such as personalized learning experiences, improved student engagement, and enhanced learning outcomes (Thomas et al., 2022).

However, the study also identified several concerns and challenges related to AI integration. Approximately 60% of the lecturers expressed concerns about inadequate training and resources necessary for effective AI implementation. They highlighted the need for professional development programs to enhance their competencies in using AI tools and technologies (Madu & Musa, 2024).

The qualitative data from the interviews further emphasized the importance of addressing these concerns and providing the necessary support for successful AI integration. Lecturers stressed the need for institutional support, including access to AI tools, infrastructure, and ongoing training and development opportunities.

**Discussion**

The positive perception of AI among mathematics lecturers at Nigerian State Colleges of Education aligns with global trends in educational technology, where AI is increasingly recognized for its potential to enhance teaching and learning practices. The findings of this study are consistent with previous research conducted in other educational contexts, which have also highlighted the benefits and challenges associated with AI integration (Shukla & Jaiswal, 2013).

To address the concerns raised by the lecturers, it is essential for institutions to prioritize the development of comprehensive training programs and provide adequate resources to facilitate the adoption of AI technologies in educational practices. This includes investing in infrastructure, such as reliable internet connectivity and hardware, as well as ensuring access to AI tools and software (Comia, 2017).

Furthermore, the successful integration of AI in education requires a collaborative effort involving lecturers, administrators, and policymakers. It is crucial to foster a culture of continuous professional development and create opportunities for lecturers to share their experiences, best practices, and challenges related to AI integration.

**Conclusion**

The findings of this study highlight the potential of AI to enhance mathematics instruction in Nigerian State Colleges of Education. However, the successful integration of AI technologies depends on addressing the concerns and challenges raised by lecturers, particularly those related to training and resource availability.

By investing in comprehensive training programs, providing adequate resources, and fostering a culture of continuous professional development, institutions can create an enabling environment for the effective integration of AI in mathematics education. This, in turn, can lead to improved learning outcomes, increased student engagement, and the development of essential skills for the 21st century.

**Recommendations**

1. Institutions should invest in comprehensive training programs for lecturers to improve their understanding and use of AI technologies in mathematics education (Madu & Musa, 2024).
2. Adequate resources, including access to AI tools and infrastructure, should be provided to facilitate effective implementation of AI in instructional practices (Thomas et al., 2022).
3. Collaborative efforts involving lecturers, administrators, and policymakers should be encouraged to develop and implement effective strategies for AI integration in education (Comia, 2017).
4. Continuous professional development opportunities should be created to enable lecturers to stay updated with the latest advancements in AI technologies and their applications in education (Shukla & Jaiswal, 2013).
5. Research should be conducted to evaluate the impact of AI integration on student learning outcomes and to identify best practices for effective implementation (Fernandez et al., 2019).
6. Partnerships with technology companies and research institutions should be established to leverage expertise and resources for the successful deployment of AI in Nigerian schools (Madu & Musa, 2024).

**Way Forward**

1. Develop a national policy framework for the integration of AI in education, outlining guidelines, standards, and support mechanisms for institutions and lecturers (Thomas et al., 2022).
2. Establish AI research centers in Nigerian universities to drive innovation and develop context-specific solutions for the deployment of AI in education (Comia, 2017).
3. Integrate AI-based learning modules and resources into the curriculum of teacher education programs to ensure that pre-service teachers are equipped with the necessary skills and knowledge to effectively use AI technologies in their teaching practices (Shukla & Jaiswal, 2013).
4. Provide financial incentives and grants to encourage institutions and lecturers to engage in AI-based educational projects and research (Fernandez et al., 2019).
5. Conduct large-scale studies to assess the impact of AI integration on student learning outcomes and to identify factors that contribute to successful implementation (Madu & Musa, 2024).
6. Organize national conferences and workshops to facilitate knowledge sharing, collaboration, and networking among lecturers, administrators, and policymakers interested in AI integration in education (Thomas et al., 2022).

By addressing these recommendations and charting a clear way forward, Nigerian schools, particularly Colleges of Education, can harness the potential of AI to transform mathematics instruction and enhance the overall quality of education.

**Citations**

1. [PDF] lecturers' level of awareness of artificial intelligence as correlate of ... https://jeredajournal.com/index.php/home/article/download/251/181/2245
2. The Impact of Emerging AI Technologies on Nigerian Education https://susafrica.com/2023/04/05/the-impact-of-emerging-ai-technologies-on-nigerian-education/
3. The Role of Artificial Intelligence in Teaching of Science Education in ... https://eajournals.org/ejcsit/vol12-issue-1-2024/the-role-of-artificial-intelligence-in-teaching-of-science-education-in-secondary-schools-in-nigeria/
4. [PDF] Impact of Artificial intelligence in Curriculum Development in ... https://www.ajol.info/index.php/ijer/article/download/270098/254927
5. Use of AI in Nigerian Educational System. - LinkedIn https://www.linkedin.com/pulse/use-ai-nigerian-educational-system-benjamin-ndubuisi-nwagbara-rmcnc

**References**

1. Fernandez, A., Perifanou, M., & Sulaiman, A. (2019). The role of artificial intelligence in personalized learning. *Journal of Educational Technology*, 45(2), 123-135.
2. Thomas, G., Gambari, A. I., & Sobowale, F. M. (2022). Assessment of lecturers' utilization of artificial intelligence for education in a Nigerian university. *Educational Technology Research and Development*, 70(4), 745-762.
3. Shukla, A., & Jaiswal, A. (2013). Artificial intelligence in education: A review. *International Journal of Computer Applications*, 78(6), 1-5.
4. Comia, M. (2017). Utilization of artificial intelligence in education: The perception of University of Ibadan lecturers. *Journal of Educational Technology and E-Learning*, 13(4), 1-12.
5. Madu, C. O., & Musa, A. (2024). Lecturers' level of awareness of artificial intelligence as correlate of their digital competence at Federal University Wukari, Nigeria. *Journal of Educational Research in Developing Areas*, 5(1), 59-67.