

Awareness and Utilization of Artificial Intelligence Technologies among Science Education Lecturers in Federal University Wukari

ALEXANDER NTINO¹, MONDAY SIMON², SAMUEL AMACHUNDI ADDA³, ADDA DANJUMA ATO⁴, ADI WAMA⁵, DANLAMI ABRAHAM⁶

¹*Faculty of Computing, Department of Computer Science, Abubakar Tafawa Balewa University, Bauchi.*

^{2,3,6}*Faculty of Computing and information System, Department of Computer Science Federal university Wukari, Taraba State.*

^{4,5}*Computer Science Department, School of Sciences, College of Education, Zing, Nigeria*

Abstract- Artificial Intelligence (AI) has emerged as a transformative technology capable of improving teaching, learning, assessment, and research activities in higher education. This study examined the level of awareness and utilization of artificial intelligence technologies among Science Education lecturers at Federal University Wukari, Taraba State, Nigeria. A descriptive survey research design was adopted, and data were collected using a structured questionnaire administered to Science Education lecturers selected through a random sampling technique. The instrument was validated by experts in educational research and measurement, while reliability was established using a test-retest procedure. Data collected were analysed using descriptive statistics, including frequency, percentage, mean, and standard deviation, using SPSS version 27. The findings revealed that lecturers demonstrated high awareness of commonly accessible AI applications, including adaptive learning platforms, exam integrity systems, plagiarism detection tools, virtual assistants, intelligent tutoring systems, and AI-based content creation platforms. However, awareness of advanced AI applications such as predictive modelling, educational robots, automated content analysis, and assistive technologies was limited. The study further revealed that AI utilization was mainly concentrated on automated assessment systems, simulation technologies, automatic content analysis, virtual assistants, and AI-supported content creation, while advanced applications remained underutilized. The study concludes that although Science Education lecturers possess foundational awareness of AI technologies, enhanced AI literacy, professional training, and institutional support are required to promote effective AI integration into teaching, research, and academic practices.

Keywords: Artificial Intelligence, AI awareness, AI utilization, Science Education, lecturers, higher education, digital literacy.

I. INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) has introduced new possibilities for transforming higher education through improved instructional delivery, personalized learning, academic support systems, and research innovation [1][2]. AI technologies have progressed beyond simple automation by providing intelligent solutions capable of assisting educators in decision-making, content development, assessment, and knowledge creation [5]. Educational applications of AI, including learning analytics, intelligent tutoring systems, and generative AI platforms, are increasingly recognized as tools capable of enhancing teaching effectiveness and student engagement [4]. Within science education, AI provides opportunities to improve scientific learning through interactive simulations, adaptive instructional resources, automated feedback systems, and data-driven approaches to understanding students' learning behaviors. A systematic review by [6] demonstrated that AI integration in science education can positively influence learner engagement, conceptual understanding, and instructional innovation. Furthermore, incorporating AI into science education programmes has been identified as a pathway for developing technologically skilled educators capable of meeting the demands of modern education systems [11].

Despite these potential benefits, effective AI integration in universities is associated with several challenges, including inadequate digital infrastructure, limited technical skills, ethical concerns, data privacy issues, and insufficient institutional policies. Lecturers' perceptions and preparedness significantly influence whether AI technologies are adopted effectively within academic environments. [8] emphasized that science educators' understanding of AI capabilities and concerns regarding its educational implications shape their willingness to incorporate AI into teaching practices. In Nigeria, AI adoption within higher education is still evolving. Although lecturers recognize the potential contribution of AI to teaching and research, studies have identified barriers related to training, accessibility, institutional readiness, and technological competence [12]. These challenges highlight the need to examine not only AI usage but also its perceived educational impacts and future opportunities within Nigerian universities.

Science Education lecturers at Federal University Wukari play an important role in preparing future educators and professionals who will operate in increasingly digital environments. Therefore, understanding their perceptions regarding AI benefits, challenges, and future prospects is essential for developing appropriate strategies for sustainable AI adoption.

This study therefore examines the perceived impacts, challenges, and future prospects of artificial intelligence integration among Science Education lecturers at Federal University Wukari, Taraba State, Nigeria. The findings will provide valuable insights for university administrators, policymakers, and educators in developing effective approaches for responsible AI implementation in science education.

1.1 Research Objectives

The main objective of this study is to examine the level of awareness and utilization of artificial intelligence technologies among Science Education Lecturers at Federal University Wukari. The specific objectives are to:

- i. Determine the level of awareness of artificial intelligence technologies among Science

Education Lecturers at Federal University Wukari.

- ii. Identify the types of artificial intelligence tools known and used by Science Education Lecturers at Federal University Wukari.
- iii. Assess the extent of utilization of artificial intelligence technologies for teaching, research, assessment, and academic activities among Science Education Lecturers at Federal University Wukari.
- iv. Examine the relationship between lecturers' level of awareness and their utilization of artificial intelligence technologies.
- v. Determine the factors influencing the adoption and utilization of artificial intelligence technologies among Science Education Lecturers at Federal University Wukari.

II. LITERATURE REVIEW

2.1 Concept of Artificial Intelligence in Education

Artificial Intelligence (AI) has become an important technological innovation influencing the transformation of contemporary education systems. AI refers to the ability of machines to perform tasks that traditionally require human intelligence, including learning, reasoning, problem-solving, decision-making, and pattern recognition [3]. Unlike conventional computer systems that operate based on fixed instructions, AI technologies can analyse large volumes of data, learn from previous experiences, and generate intelligent responses. In education, AI has evolved from being merely a computational tool to becoming an intelligent support system capable of enhancing teaching, learning, assessment, and academic research[14]. The application of AI in education includes machine learning algorithms, intelligent tutoring systems, automated assessment tools, adaptive learning platforms, educational recommendation systems, and generative AI applications. These technologies provide opportunities for personalized learning by analyzing learners' characteristics and providing tailored educational resources [4]. According to[5], the major contribution of AI in education is not simply replacing teachers' activities but augmenting human intelligence by supporting educators in designing

effective learning experiences and improving educational decision-making.

In science education, AI provides significant opportunities because science teaching requires analytical thinking, experimentation, data interpretation, and problem-solving skills. AI-based applications can assist lecturers in developing instructional materials, analyzing students' learning patterns, providing automated feedback, and improving research processes. [11] emphasized that integrating AI into science education curricula is necessary for preparing educators and learners with digital competencies required in modern knowledge-based societies.

2.2 Awareness and AI Literacy among Educators

Awareness represents an individual's knowledge, understanding, and familiarity with a particular technology. In the context of AI adoption, lecturers' awareness determines their ability to recognize available AI tools, understand their applications, and evaluate their relevance within educational practices. AI literacy has become increasingly important because educators require not only technical knowledge but also the ability to critically assess AI capabilities, limitations, and ethical implications [10]. Studies conducted among Nigerian academics indicate that awareness of AI technologies is gradually increasing; however, differences exist in knowledge level and practical application. [12] found that university lecturers demonstrated awareness of AI for educational purposes, but variations were observed in their understanding and readiness to integrate AI into academic activities. Similarly, [9] reported that lecturers' awareness of AI tools significantly influences their ability to apply AI technologies for effective teaching and research activities.

Among science education stakeholders, [7] examined awareness and utilization of AI applications among science education students and found that although respondents demonstrated knowledge of AI tools, effective utilization was affected by limited exposure, training opportunities, and technological support. These findings suggest that awareness is a

fundamental requirement for successful AI integration because individuals are unlikely to adopt technologies they do not understand [1].

2.3 Utilization of Artificial Intelligence Technologies in Higher Education

The utilization of AI refers to the actual application of AI tools to perform academic, instructional, and research-related activities. In higher education, lecturers utilize AI technologies for preparing teaching materials, developing assessments, conducting literature reviews, analyzing data, and supporting students' learning processes. AI-powered platforms enable educators to improve efficiency and provide more interactive learning experiences.

[14], in their review of AI applications in education, classified AI utilization into three major areas: development, extraction, and application. The development dimension focuses on creating AI systems such as recommendation algorithms and smart learning environments, while extraction involves using AI-generated information for feedback, reasoning, and adaptive learning. The application dimension includes areas such as intelligent tutoring, immersive learning, and human-computer interaction.

However, effective utilization depends on lecturers' technological competence, accessibility to AI resources, and institutional readiness.[8] observed that science educators' perceptions and knowledge of AI strongly influence their willingness to incorporate AI tools into teaching practices. Therefore, examining AI utilization among Science Education lecturers provides important information regarding the level of institutional preparedness for AI-driven educational transformation.

III. MATERIALS AND METHODS

This study adopted a descriptive survey research design to examine the awareness and utilization of artificial intelligence (AI) technologies among Science Education lecturers at Federal University Wukari, Taraba State, Nigeria. The population comprised Science Education lecturers, from whom respondents were selected using a random sampling

technique. Data were collected using a structured questionnaire developed in line with the research objectives, covering demographic information, AI awareness, knowledge of AI applications, and utilization of AI tools for academic activities. Responses were measured using a five-point Likert scale. The instrument was validated by experts in educational measurement and research methods, while reliability was established through a test-retest procedure. Data collected were analysed using SPSS version 27, employing descriptive statistics such as frequency, percentage, mean, and standard deviation

to determine the level of AI awareness and utilization among lecturers. The findings provide insights into lecturers' readiness and adoption of AI technologies in science education.

IV. RESULT AND DISCUSSION

4.1 Extent of Awareness of Artificial Intelligence Technologies among Science Education Lecturers

Table 1: Extent of Awareness of Artificial Intelligence Technologies among Science Education Lecturers

S/N	Artificial Intelligence Technologies	Mean	Decision
1	Virtual assistants (e.g., Chatbots)	3.54	Accepted
2	Smart content creation (e.g., ChatGPT, Coursera)	3.18	Accepted
3	Intelligent Tutoring System (ITS)	3.34	Accepted
4	Automated grading and assessment systems	1.68	Rejected
5	Adaptive learning platforms (e.g., Duolingo)	3.97	Accepted
6	Predictive modelling/early warning systems for student performance	1.01	Rejected
7	Simulation technology	1.69	Rejected
8	Augmented Reality systems	2.03	Rejected
9	Virtual Reality systems	2.99	Accepted
10	Plagiarism detection systems	3.64	Accepted
11	Exam integrity monitoring systems	3.68	Accepted
12	Assistive technologies (e.g., text-to-speech tools)	1.69	Rejected
13	Automatic content analysis	1.68	Rejected
14	Educational robots	1.70	Rejected

Table 1 presents the extent of awareness of artificial intelligence (AI) technologies among Science Education lecturers at Federal University Wukari. The findings revealed varying levels of awareness across different AI applications. Lecturers demonstrated higher awareness of adaptive learning platforms (Mean = 3.97), exam integrity monitoring systems (Mean = 3.68), plagiarism detection systems (Mean = 3.64), virtual assistants such as chatbots (Mean = 3.54), intelligent tutoring systems (Mean = 3.34), and smart content creation tools such as ChatGPT and Coursera (Mean = 3.18). This indicates that lecturers are more familiar with AI applications that are increasingly accessible and directly related to academic activities, including content development, assessment support, academic integrity monitoring, and personalized learning.

However, awareness was limited for several advanced AI applications, including predictive modelling/early warning systems for student performance (Mean = 1.01), automatic content analysis (Mean = 1.68), automated grading and assessment systems (Mean = 1.68), simulation technology (Mean = 1.69), assistive technologies (Mean = 1.69), and educational robots (Mean = 1.70). This suggests that lecturers possess greater knowledge of commonly available AI tools but have limited exposure to specialized AI systems that require advanced technical knowledge and institutional support.

The variation in awareness levels indicates that while AI literacy among Science Education lecturers is developing, there remains a need for continuous professional development programmes focused on

expanding lecturers' understanding of emerging AI applications. This finding agrees with [12], who reported that Nigerian university lecturers generally possess awareness of AI applications but demonstrate differences in their understanding and readiness to apply advanced AI technologies. Similarly, [9] emphasized that improved awareness and training

opportunities are essential for enhancing lecturers' confidence and competence in AI adoption.

4.2 Extent of Utilization of Artificial Intelligence Technologies among Science Education Lecturers

Table 2: Extent of Utilization of Artificial Intelligence Technologies among Science Education Lecturers

S/N	Artificial Intelligence Technologies	Mean	Decision
1	Virtual assistants (e.g., Chatbots)	2.81	Accepted
2	Smart content creation (e.g., ChatGPT, Coursera)	2.70	Accepted
3	Intelligent Tutoring System (ITS)	1.45	Rejected
4	Automated grading and assessment systems	3.70	Accepted
5	Adaptive learning platforms (e.g., Duolingo)	2.15	Rejected
6	Predictive modelling/early warning systems	2.30	Rejected
7	Simulation technology	3.04	Accepted
8	Augmented Reality systems	2.81	Accepted
9	Virtual Reality systems	2.47	Rejected
10	Plagiarism detection systems	2.49	Accepted
11	Exam integrity monitoring systems	2.51	Accepted
12	Assistive technologies	1.34	Rejected
13	Automatic content analysis	2.85	Accepted
14	Educational robots	1.82	Rejected

The extent of AI utilization among Science Education lecturers is presented in Table 2. The findings revealed that AI utilization was concentrated mainly on practical applications that provide direct support for teaching and academic management. Automated grading and assessment systems recorded the highest utilization level (Mean = 3.70), followed by simulation technologies (Mean = 3.04), automatic content analysis (Mean = 2.85), virtual assistants/chatbots (Mean = 2.81), augmented reality systems (Mean = 2.81), and smart content creation tools such as ChatGPT and Coursera (Mean = 2.70). The relatively higher utilization of these applications indicates that lecturers are adopting AI tools that improve instructional preparation, assessment processes, and learning resource development. Automated assessment systems, for example, provide opportunities for improving efficiency by reducing repetitive tasks, while AI-based content generation platforms support lecturers in preparing educational materials.

Conversely, utilization remained low for assistive technologies (Mean = 1.34), intelligent tutoring systems (Mean = 1.45), educational robots (Mean = 1.82), adaptive learning platforms (Mean = 2.15), predictive modelling systems (Mean = 2.30), and virtual reality systems (Mean = 2.47). The limited utilization of these technologies may be attributed to inadequate infrastructure, insufficient technical expertise, limited access to advanced AI platforms, and the absence of structured institutional support.

These findings support [7], who observed that although science education stakeholders demonstrate awareness of AI technologies, effective utilization remains constrained by technological readiness, training opportunities, and accessibility. Therefore, strengthening AI-related capacity building, improving digital infrastructure, and developing institutional strategies for AI integration are necessary steps toward increasing effective AI utilization among Science Education lecturers.

V. CONCLUSION

This study concludes that Science Education lecturers at Federal University Wukari demonstrate a considerable level of awareness of artificial intelligence (AI) technologies, particularly commonly available applications such as adaptive learning platforms, plagiarism detection systems, exam integrity tools, virtual assistants, intelligent tutoring systems, and AI-based content creation platforms. However, awareness of advanced AI applications, including predictive modelling, educational robots, automated content analysis, and assistive technologies, remains limited. The study further reveals that AI utilization among lecturers is concentrated mainly on practical applications that support assessment, instructional preparation, and academic content development, while advanced AI systems requiring specialized skills and infrastructure remain underutilized.

The findings indicate that awareness alone does not guarantee effective AI adoption, as utilization is influenced by factors such as digital competence, accessibility, institutional support, and technological readiness. Therefore, universities should prioritize AI literacy programmes, continuous professional development, and improved digital infrastructure to enhance lecturers' capacity to effectively integrate AI into teaching, research, and academic activities. Strengthening AI adoption among Science Education lecturers will contribute to innovative teaching practices and the development of digitally competent educators capable of responding to emerging educational demands.

REFERENCES

- [1] Chassignol, M., Khoroshavin, A., Klimova, A., & Bilyatdinova, A. (2018). Artificial intelligence trends in education: A narrative overview. *Procedia Computer Science*, 136, 16–24.
<https://doi.org/10.1016/j.procs.2018.08.233>
- [2] Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access*, 8, 75264–75278.
<https://doi.org/10.1109/ACCESS.2020.2988510>
- [3] Delipetrev, B., Tsinaraki, C., & Kostic, U. (2020). Historical evolution of artificial intelligence. Publications Office of the European Union.
<https://doi.org/10.2760/801580>
- [4] Dhara, S., Chatterjee, S., Chaudhuri, R., Goswami, A., & Ghosh, S. K. (2022). Artificial Intelligence in Assessment of Students' Performance. *Artificial Intelligence in Higher Education*, July, 153–167.
<https://doi.org/10.1201/9781003184157-8>
- [5] Holmes, W., & Tuomi, I. (2022). State of the art and practice in AI in education. *European Journal of Education*, 57(4), 542–570.
<https://doi.org/10.1111/ejed.12533>
- [6] Peng, L., Jian, S., Kan, Z., Qiao, L., & Li, D. (2024). Not all fake news is semantically similar: Contextual semantic representation learning for multimodal fake news detection. *Information Processing & Management*, 61(1), 103564.
<https://doi.org/10.1016/J.IPM.2023.103564>
- [7] Gambo, H. M., Rabi, A., Yarima, A. A., & Danladi, I. D. (2025). Awareness and utilization of artificial intelligence (AI) applications among science education students in Abubakar Tafawa Balewa University, Bauchi State, Nigeria. *Gombe Journal of Education*, 8(1), 1–12.
- [8] Garofalo, S. G., & Farenga, S. J. (2025). Science teacher perceptions of the state of knowledge and education at the advent of generative artificial intelligence popularity. *Science & Education*, 34(2), 893–912.
- [9] Idika, D. O., Arikpo, E. B., Ekpo, E. E., Idika, C. I., & Okeke, S. U. (2025). Assessment of lecturers' awareness and utilization of AI tools for effective teaching of research methods in the University of Calabar, Nigeria. *Global Journal of Pure & Applied Sciences*, 31(2), 323.
- [10] Miao, F., Holmes, W., Huang, R., Zhang, H., & UNESCO. (2023). AI and education: Guidance for policymakers. UNESCO.

- [11] Olatunde-Aiyedun, T. G. (2024). Artificial intelligence (AI) in education: Integration of AI into science education curriculum in Nigerian universities. *International Journal of Artificial Intelligence for Digital*, 1(1).
- [12] Thomas, G., Gambari, A. I., Yusuf, H. T., Abanikannda, M. O., & Daramola, F. O. (2024). Assessment of lecturers' awareness of artificial intelligence for education in a Nigerian university. *Educational Technology Quarterly*, 2024(4), 378–389.
- [13] Tilak, G. (2020). Artificial intelligence: A better and innovative technology for enhancement and sustainable evolution in education system. *International Journal of Disaster Recovery and Business Continuity*, 11(1), 552–560.
- [14] Zhai, X., Chu, X., Chai, C. S., Jong, M. S. Y., Istenic, A., Spector, M., Liu, J. B., Yuan, J., & Li, Y. (2021). A review of artificial intelligence (AI) in education from 2010 to 2020. *Complexity*, 2021, Article 8812542. <https://doi.org/10.1155/2021/8812542>