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Leveraging the Potential of Artificial Intelligence-Powered Technologies for Science Teaching and Learning at Ignatius Ajuru University of Education

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Abstract
The world is gradually moving towards artificial intelligence (AI), as every aspect of life is becoming AI-driven. The education sector is not left out, but most schools lack basic teaching and learning facilities which can be augmented by AI. Leveraging the potentials of AI-powered technologies, scholars at Ignatius Ajuru University of Education require certain skills and knowledge. Four objectives which translated to four research questions and two hypotheses guided the study. Sample size was 200 (183 students and 17 lecturers) and the instrument for data collection was a questionnaire titled "Questionnaire on Leveraging AI-Powered Technologies for Science Teaching and Learning (QOLATSTAL)". The instrument was validated by 3 experts and the reliability coefficient was 0.86, which was obtained after applying Cronbach Alpha analysis. Mean and standard deviation was used to answer research questions while hypotheses were tested with t-test at 0.05 level of significance. Findings show that students and lecturers have low level of awareness and utilization of AI-powered technologies. Challenges and strategies of enhancing AI adoption were considered. Based on findings the study recommended among others that the university management should give institutional support by sponsoring trainings and workshops on the integration of AI into science teaching and learning.

Keywords: Artificial Intelligence, Potential, Technologies, Science Education, Teaching

Introduction

Education is essential for national growth and societal change. In Nigeria, however, science education faces several challenges. These include old teaching methods, limited laboratory facilities, and a lack of technology that effectively engages students (Akin-Olayemi & Idris-Tajudeen, 2025). The 21st-century classroom needs a shift—moving away from the traditional teacher-centered approach to one that embraces digital innovation. This change should foster critical thinking and creativity among students (Mustofa et al., 2025). Adoption of artificial intelligence (AI) in teaching and learning is one way of overcoming those challenges faced by science education in Nigeria. Artificial Intelligence (AI) refers to the ability of machines and computer systems to perform tasks that typically require human intelligence, such as learning, reasoning, problem-solving, and adapting to new situations. In the field of education, AI is increasingly being integrated to transform teaching and learning processes by enhancing personalization, improving instructional delivery, and streamlining educational management (Luckin et al., 2020). AI is also employed to automate routine administrative tasks such as grading, scheduling, and attendance tracking. This allows teachers to focus more on pedagogy and student support. For instance, AI-driven grading tools can assess multiple-choice questions and even essay-style answers through machine learning and linguistic analysis (Zhou et al., 2021). AI also fosters real-time feedback mechanisms that are critical for formative assessment. Immediate feedback enables learners to identify errors and correct misunderstandings promptly, which enhances learning outcomes. Teachers can also use AI-generated analytics to identify struggling students early and provide targeted interventions (Tuomi, 2021).

Worldwide, artificial intelligence (AI) is increasingly seen to transform education. AI includes machine learning, natural language processing, and adaptive algorithms. These technologies can imitate human intelligence to carry

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out cognitive tasks (Crompton & Burke, 2023). In education, AI can automate assessments, provide immediate feedback, tailor learning experiences, and deliver intelligent tutoring systems (Mncedisi & Oluwatoyin, 2025). These uses not only improve teaching efficiency but also allow students to take charge of their learning through adaptive and self-paced methods.

The integration of Artificial Intelligence (AI) in education has revolutionized learning experiences, offering personalized instruction tailored to individual student needs. In science classrooms, traditional teaching methods often fail to cater to diverse learning styles, leading to disengagement and varying levels of academic performance. Many students struggle with complex scientific concepts due to a lack of individualized support, while teachers face challenges in providing real-time feedback and adaptive learning experiences. In Nigeria, the use of AI in higher education is just beginning. Schools like Ignatius Ajuru University of Education are starting to explore new technologies to close gaps in teaching and keep science education in line with global standards. However, this effort is limited by poor digital infrastructure, a lack of policy guidance, and few professional development opportunities for teachers (Ogunyemi & Samuel, 2024). Adding AI to science education is more than just a tech upgrade; it also signals a shift toward inclusive, data-driven, and student-centered learning environments. Research shows that AI tools like ChatGPT, intelligent tutoring systems, and virtual laboratories can greatly help students understand complex scientific ideas (Mustofa et al., 2025; Rajendran & Manickam, 2024). Additionally, AI-powered analytics can assist teachers in identifying learning gaps, personalizing instruction, and improving educational results. Yet, there is a lack of studies on how to effectively use AI in Nigerian higher education, especially in science programs.

The use of AI in science education is very pertinent to the Nigerian educational system as it corresponds with national objectives and ambitions. Nigeria, along with several other nations, is now progressing towards technical progression and economic growth. In order to ensure sustainable development, it is crucial to have a skilled and knowledgeable workforce that is equipped with the necessary technology. Nigeria can cultivate a cohort of students that has expertise in both conventional scientific ideas and advanced technology by integrating AI into science education. This is in line with the government's educational strategy, which prioritizes STEM courses and technical literacy in the national curriculum (Smith, 2018). Furthermore, the significance of AI in Nigerian schools encompasses the resolution of issues such as overcrowded classrooms, inadequate resources, and unequal allocation of educational facilities (Stoeffler et al., 2019). AI technology can offer scalable solutions, guaranteeing the accessibility of high-quality scientific education in many geographical and socio-economic settings. Integrating AI in teaching science in Nigeria is not just about improving educational procedures, but also about strategically equipping students for a future where science, technology, and innovation play a crucial role in social advancement and wealth.

Akarah, et al. (2025) investigated the awareness, availability, and integration of artificial intelligence (AI) tools in teaching and research among lecturers at Delta State College of Education, Mosogar. Findings show that 65.1% of lecturers demonstrate moderate overall AI awareness, with 96.1% recognizing plagiarism detection tools and 87.5% aware of administrative support applications. However, only 37.5% are familiar with lesson-planning tools. Availability is polarized: 50.6% of respondents report high or very high access to AI resources, while 49.4% report low or very low availability. Consequently, AI utilization remains very low, with an overall mean usage of 1.91 on a 4-point scale; only research/writing (mean = 2.40) and plagiarism detection (mean = 2.14) reach “low” usage. ChatGPT emerges as the most commonly adopted tool (63.2%), followed by Turnitin (55.9%). These results highlight a significant gap between nominal awareness and practical integration. To address these challenges, the study recommends campus-wide licensing, targeted professional development, a dedicated AI support unit, and integration of AI competencies into curricula. By bridging these gaps, Delta State College of Education can foster a cohesive, institution-wide culture of AI-enhanced teaching and research.

Ikpoyi, et at (2024) while considering awareness and utilization of AI in teaching, discovered that lecturers’ level of AI awareness for assessment in Nigeria Universities is moderate. Again, level of AI utilization of AI technologies by lecturers in Nigeria schools is low. Especially because their level of acceptance to use AI for teaching and learning in Universities is low. The study recommended that workshops and seminars be organised for lecturers to equip them for better utilization of AI-powered technologies for teaching and learning in the universities.

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Madu and Musa (2024) in a study on the level of awareness of artificial intelligence(AI) among lecturers at Federal University Wukari, Nigeria, found that the level of awareness was moderate and recommended that University management should organize training programmes on AI to increase AI-literacy level and essential skills for adoption of AI in their teaching.

Thomas et al. (2024) assessed lecturers' awareness of artificial intelligence for education in Nigerian University. Findings of the study revealed that lecturers are aware of AI, with a grand mean of 2.57. Independent samples t-test analysis showed that $t = 1.047$, $p > 0.05$, indicating no significant difference in the mean response of male and female university lecturers' level of awareness of artificial intelligence for education. Thomas, et al (2024) went further to recommend that conferences, seminars and workshops should be organized for lecturers to increase their level of awareness of the numerous opportunities that AI can provide in augmenting their teaching activities. More so, education stakeholders to provide enabling environment with adequate facilities for lecturers to acquire adequate knowledge on the use of AI.

The integration of AI in science education is based on the theoretical framework of constructivists learning theories. Constructivism emphasizes the importance of active involvement and practical encounters. It states that individuals develop their own comprehension of the world through their experiences (Bada & Olusegun, 2015). The integration of AI in science education adheres to this notion by offering interactive simulations, virtual experiments, and immediate feedback, enabling students to actively engage in the learning process. This systematic review investigates the incorporation of artificial intelligence (AI) into science education by analyzing 17 studies published from 2020 to 2024. The paper examines the utilization of AI in different scientific fields and educational settings and assesses its influence on the methods of teaching and learning. The findings demonstrate a diverse range of AI applications, including chatbots, intelligent tutoring systems, and AI-enhanced textbooks. These applications serve many functions, from being educational tools to assisting in assessments. The investigation demonstrates the favourable impact of AI on student performance, motivation, and engagement in science education. Additionally, issues related to technological infrastructure, obstacles to the sensitivity and reliability of AI systems, and ethical issues were seen to challenge the adoption AI tools in science education. The study emphasizes the importance of teacher preparation in achieving the successful integration of AI and expresses the necessity of comprehensive professional development. The study's findings indicate that while AI has the potential to greatly improve science education, its successful application necessitates thoughtful evaluation of technological, pedagogical, ethical, and social elements to ensure fair and efficient integration across all educational levels (Fayzullina et al., 2025).

Krause, et al (2024) in a study on the evolution of learning: Assessing the transformative impact of generative AI on higher education, discovered that AI can adapt educational content to students' individual needs, hence optimizing study time and enhancing academic performance. Despite the global advancement in AI-driven personalized learning, its application in Biology education within Universities remain limited. There is a gap in understanding how AI tools such as intelligent tutoring systems, adaptive learning platforms, and data-driven feedback mechanisms can enhance student engagement and improve learning outcomes. Additionally, concerns about teacher readiness, infrastructure, and accessibility further hinder the adoption of AI-based instructional strategies in higher education. Freeman, (2025) in the book, Student Generative AI Survey 2025, reported a sharp rise in the level of utilization of AI tools like ChatGPT for assignments (from 53% in 2024 to 88% in 2025). This result disparity could be as a result of difference in area of study as Nigeria is still a developing country.

Challenges and barriers to the effective adoption of AI in science education include infrastructural limitations, teacher preparation and competence, and ethical considerations. Opportunities for successful integration involve government support, teacher training, and industry partnerships (Okunade, 2024). Future prospects anticipate developments in personalized learning environments, improved data analytics, integration of virtual and augmented reality, enhanced natural language processing, and global cooperation in education. In conclusion, the study recommends the integration of AI into the national curriculum, adequate funding and resources, ongoing professional development for teachers, and a strategic curriculum development that fosters a blended learning environment (Al-Zahrani, & Alasmari, 2025).

Given this background, this study aims to explore how AI-powered technologies can improve science teaching and learning at Ignatius Ajuru University of Education. The research investigated the level of awareness, the

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degree of use, and the challenges that affect AI adoption among educators and students in the department of Science Education.

Aim and Objectives of the Study

This study aims to explore how AI-powered technologies can improve science teaching and learning at Ignatius Ajuru University of Education, Port-Harcourt. Specifically, the study sought to;

1. assess the level of awareness and understanding of AI-powered technologies among science lecturers and students.
2. determine the extent of AI-powered technology utilization in science teaching and learning.
3. identify the challenges hindering the effective integration of AI tools in science education.
4. propose strategies and institutional measures for enhancing AI adoption in science teaching and learning.

Research Questions

1. what is the level of awareness and understanding of AI-powered technologies among science education lecturers and students?
2. To what extent is AI powered technology utilized in science teaching and learning?
3. what are the challenges hindering the effective utilization of AI tools in science education?
4. What strategies and institutional measures can be used to enhance AI adoption in science teaching and learning?

Hypotheses

1. There is no significant difference between lecturers and students' level of awareness of AI-powered technologies for science education
2. There is no significant difference between lecturers and students in the utilization of AI-powered technologies for science teaching and learning

Materials and Methods

This study adopted a descriptive survey design focusing on the department of Science Education, Ignatius Ajuru University of Education, Port-Harcourt. The population consists of science education lecturers and undergraduate students enrolled in Education Biology, Chemistry, and Physics programs. A sample of 200 respondents (183 Students and 17 Lecturers) were randomly selected for the study. A questionnaire titled “Questionnaire on Leveraging AI-Powered Technologies for Science Teaching and Learning (QOLATSTAL)” was used to gather data. The instrument was in 5 sections (A-E); A-Demographic Information, B-Awareness and understanding AI, C-Extent of AI utilization, D-Challenges of AI Integration and E-Strategies for enhancing AI Adoption. Instrument was presented to an expert in educational technology and two experts in science education for face and content validity. The validated instrument was administered to 5 science education lecturers and 15 science education students outside Ignatius Ajuru University of Education to obtain reliability coefficient of 0.86 after analysing the data with Cronbach’s Alpha statistic. The instrument was finally administered to the 200 respondents with the help of research assistants who waited and retrieved all the duly filled questionnaires. The research questions were answered using mean and standard deviation while the 2 null hypotheses were tested with t-test analysis at 0.05 level of significance.

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Results

Research Question 1: what is the level of awareness and understanding of AI powered technologies among science education lecturers and students?

Table 1: mean and standard deviation showing the level of awareness and understanding of AI powered technologies among science education lecturers and students.

S/N	Items	Mean	SD	Decision
1	I am aware of artificial intelligence (AI) and its applications.	3.18	0.45	Agreed
2	I understand how AI-powered tools can be used in education	2.17	0.98	Not agreed
3	I have been exposed to ChatGPT	3.20	0.75	Agreed
4	I have been exposed to Virtual science laboratories	1.40	0.50	Not agreed
5	I can explain the role of AI in improving science learning.	2.21	1.19	Not agreed
6	I have received training on the use of AI-powered tools in education	1.60	0.50	Not agreed
7	My department provides information on AI technologies	1.21	0.41	Not agreed
	Grand Mean	**2.14**	**0.68**	**Low Level**

The findings show that most respondents are aware of artificial intelligence and its applications, as indicated by the high mean score. They also reported that they have been exposed to ChatGPT. However, respondents generally do not understand how AI-powered tools can be used in education and are not familiar with virtual science laboratories. Many of them cannot clearly explain the role of AI in improving science learning. The results also reveal that respondents have not received any formal training on how to use AI-powered tools in education, and their departments do not provide information on AI technologies. Overall, awareness and actual knowledge of AI is low with a grand mean of 2.139, also institutional support in provision of relevant information remain low.

Research Question 2: To what extent is AI powered technology utilized in science teaching and learning?

Table 2: Mean and standard deviation showing the extent of utilization of AI-powered technologies.

S/N	Items	Mean	SD	Decision
8	I use AI tools regularly for teaching/learning	1.61	0.82	Not agreed
9	AI tools help me understand scientific concepts	3.45	0.90	Not agreed
10	AI applications are available in my department	1.38	0.49	Not agreed
11	I use AI for assignments and classroom activities	1.78	0.74	Not agreed
12	AI personalizes my learning experience	2.19	0.97	Not agreed
13	AI improves my engagement in science learning	1.56	0.82	Not agreed
	Grand Mean	**2.00**	**0.79**	**Very Low level**

The results show that respondents generally do not use AI tools regularly for teaching or learning. They also do not agree that AI tools are available in their department or that they use AI for assignments and classroom activities. Most respondents do not feel that AI personalizes their learning experience or improves their engagement in science learning. Although the mean score for understanding scientific concepts with AI is relatively higher, respondents still did not agree that AI helps them understand scientific ideas. Overall, the findings indicate very low (1.995) use of AI tools and limited perceived benefits among the respondents.

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Research Question 3: what are the challenges hindering the effective utilization of AI tools in science education?

Table 3: Mean and standard deviation showing the challenges hindering the effective utilization of AI tools in science education.

S/N	Items	Mean	SD	Decision
14.	Poor digital infrastructure limits AI usage.	3.53	0.63	Agreed
15.	Internet connectivity is adequate for AI.	3.71	0.46	Agreed
16.	I lack technical skills to use AI tools.	3.21	0.78	Agreed
17.	There is insufficient institutional support.	3.03	0.83	Agreed
18.	AI tools are not readily available.	3.82	0.39	Agreed
19.	Cost of AI technologies limit adoption.	3.57	0.62	Agreed

The findings show that respondents believe several challenges hinder the use of artificial intelligence. They strongly agree that poor digital infrastructure limits AI usage and that AI tools are not readily available. They also agree that internet connectivity is adequate, meaning access to the internet is not a major problem. Many respondents feel they lack the technical skills needed to use AI tools, and they also believe that there is not enough institutional support to help them adopt AI. Additionally, the cost of AI technologies is seen as a major barrier. Overall, the results indicate that while internet access is sufficient, other factors—such as lack of skills, limited availability of AI tools, poor infrastructure, weak institutional support, and high costs—make it difficult for respondents to use AI effectively.

Research Question 4: What strategies and institutional measures can be used to enhance AI adoption in science teaching and learning?

Table 4: Mean and standard deviation showing strategies and institutional measures used to enhance AI adoption in science teaching and learning.

S/N	Items	Mean	SD	Decision
20	Regular training and workshops are needed.	3.32	0.71	Agreed
21	The university should upgrade digital infrastructure.	3.14	0.97	Agreed
22	Policies promoting AI should be introduced.	3.10	0.78	Agreed
23	Departments should provide AI learning tools.	2.96	0.92	Agreed
24	Partnering with tech companies should be encouraged.	3.10	1.03	Agreed
25	Lectures/students should integrate AI in coursework.	2.95	0.92	Agreed
	Grand Mean	**3.10**	**0.89**	**Agreed**

The results show that respondents agree on several steps that can improve the use of artificial intelligence in their learning environment. They strongly agreed that more training and workshops are needed to help them understand and use AI tools better. They also believe that the university should upgrade its digital infrastructure to support AI usage. Respondents agree that policies promoting AI should be introduced and that departments should provide the necessary AI learning tools. They also support the idea of partnering with technology companies to enhance access to AI resources. Finally, they agreed that both lecturers and students should integrate AI into coursework. Overall, the responses indicate a strong desire for better support, resources, and institutional efforts to promote AI adoption in science education.

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$H0_1$: There is no significant difference between lecturers and students level of awareness of AI-powered technologies for science education.

Table 5: t-test analysis level of awareness of AI-powered technologies for science education.

Respondents	N	Mean	Std.dev	Df	t-cal	Sig	Decision
Students	183	32.8	2.42				
				198	1.21	0.09	NS
Lecturers	17	34.6	2.40				

The comparison between students and lecturers shows that lecturers had a slightly higher mean score (34.6) than students (32.8). However, the calculated t-value (1.21) is not statistically significant at the 0.05 level, as indicated by the p-value of 0.09. This means that the difference in their scores is not meaningful enough to conclude that students and lecturers differ in their responses. In simple terms, both groups responded in a similar way, and there is no significant difference between them.

$H0_2$: There is no significant difference between lecturers and students in the utilization of AI powered technologies for science teaching and learning

Table 6: t-test analysis Level of utilization of AI-Powered Technologies for Science teaching and learning

Respondents	N	Mean	Std.dev	Df	t-cal	t-crit	Decision
Students	183	35.2	2.37				
				198	1.18	0.15	NS
Lecturers	17	34.9	2.39				

The results show that students had a mean score of 35.2, while lecturers had a very similar mean score of 34.9. Although students scored slightly higher, the calculated t-value of 1.18 is less than the critical value of 0.15, indicating that the difference is not statistically significant. This means there is no meaningful difference between the responses of students and lecturers. In simple terms, both groups gave almost the same responses.

Discussion

Findings on Table 1 show that both students and lecturers in the department of science education have moderately low (2.139) awareness of AI-powered technologies but do not understand how to apply them in science teaching and learning because they have not received training on how to use them. This finding corroborates that of Akarah, et al (2025) who found out that lecturers in Delta State College of Education, Mosogar demonstrated moderate AI awareness. It also agrees with Madu and Musa (2024); Ikpoyi, et al (2024) that the level of AI awareness was moderate among lecturers at Federal University Wukari, Nigeria. Thomas et al (2024) showed a slight disparity, revealing that lecturers are aware of AI.

Table 2 showed very low level of AI utilization as respondents disagreed with all the statements about utilizing AI in teaching and learning. Since level of awareness is quite low it would have been a misnomer for science education teachers and students to utilize AI-powered tools. This is in line with findings of Akarah, et al (2025) that AI utilization is very low among lecturers. This finding disagrees with Freeman (2025) who reported an upward level of AI tools utilization by undergraduates.

Findings on Table 3 indicates that all the listed items, which include; poor digital infrastructure, inadequate internet connectivity, insufficient institutional support and lack of technical skills, were challenges faced in the adoption of AI tools for science teaching and learning. Findings agree with Krause, et al (2024) and Okunade, (2024) who listed similar challenges of AI integration into teaching and learning of science education.

Finally, Table 4 showed some suggested strategies that will enhance the adoption AI-powered technologies if applied conscientiously. These strategies included regular training and workshops for lecturers and students on adopting AI-powered technologies. This corroborates Fayzullina et al., (2025); Thomas, et al (2024); Madu and Musa (2024); Okunade, (2024) who suggested adequate training programmes and institutional support. It also

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agrees with Akarah et al (2025) who advocated professional development and integration of AI into the school curriculum.

Conclusion

The study concludes with a call to action for universities to establish the necessary foundations for the successful integration of AI in ways that involve upskilling of science educators, reimagining teaching models, promote individualized learning, instilling students with requisite skills, and creating ethical guidelines for AI use in teaching/learning and research contexts. This proactive approach will ensure leveraging potentials of AI-powered technologies in effectively and responsibly harnessing and driving transformation of teaching and learning in higher education, especially teacher training institutions.

Recommendations

1. Lecturers and students should be exposed to various AI-powered technologies.
2. AI tools should be used regularly in classroom setting and for personalised learning
3. The university management should ensure availability of digital infrastructure and fund any AI training programmes
4. Policies promoting AI should be introduced and partnership with tech companies be encouraged

References

Akarah E. J., Aziken G. O., & Onanore E. F. (2025). Awareness, availability, and integration of artificial intelligence tools in academic and research tasks among lecturers at Delta State College of Education, Mosogar. *International Journal of Innovative Information Systems & Technology Research, 13*(2), 163-173.

Akin-Olayemi, T. H., & Idris-Tajudeen, R. (2025). From the ground up: Leveraging AI to transform education at the school level in Nigeria. *Tech-Sphere Journal of Pure and Applied Sciences, 2*(1).

Al-Zahrani, A. M., & Alasmari, T. M. (2025). A comprehensive analysis of AI adoption, implementation strategies, and challenges in higher education across the Middle East and North Africa (MENA) region. *Educ Inf Techno,* 30, 11339–11389. https://doi.org/10.1007/s10639-024-13300-y

Bada, S. O., & Olusegun, S. (2015). Constructivism learning theory: A paradigm for teaching and learning. *Journal of Research & Method in Education, 5*(6), 66-70.

Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. *International Journal of Educational Technology in Higher Education, 20*(1), 22.

Fayzullina, A. R., Filippova, A. A., Garnova, N. Y., Astakhov, D. V., Kalmazova, N., & Zaripova, Z. F. (2025). Artificial intelligence in science education: A systematic review of applications, impacts, and challenges. *Contemporary Educational Technology, 17*(4), ep613. https://doi.org/10.30935/cedtech/17519

Freeman, J. (2025). *Student generative AI survey 2025.* https://www.hepi.ac.uk/reports/student-generative-ai-survey-2025/#:~:text=Skip%20to%20main,Privacy%20Notice

Ikpoyi, A. C., Amakiri, H. A. E., Terungwa, H. L., & Agama, E. I. (2024). Assessment of lecturers' level of awareness, utilization, and constraints of artificial intelligence (AI) for teaching and assessment in universities in Nigeria. *African Journal of Theory and Practice of Educational Assessment (AJTPEA), 13*, 1-12.

Krause, S., Panchal, B. H., & Ubhe, N. (2024). The evolution of learning: Assessing the transformative impact of generative AI on higher education. *arXiv,*arXiv:2404.10551. https://doi.org/10.48550/arXiv.2404.10551

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2020). *Intelligence unleashed: An argument for AI in education*. Pearson Education. https://www.pearson.com/content/dam/one-dot-com/one-dot-com/global/Files/about-pearson/innovation/open-ideas/Intelligence-Unleashed-Publication.pdf

Madu, C. O., & Musa, A. (2024) Lecturers' level of awareness of artificial intelligence as correlates of their digital competence at Federal University Wukari, Nigeria. *Journal of Educational Research in Developing Area, 5*(1), 59-61.

Mncedisi, C. M., & Oluwatoyin, A. A. (2025). Leveraging artificial intelligence as a learning tool in higher education. *Interdisciplinary Journal of Education Research, 7*(1), a01. https://doi.org/10.38140/ijer-2025.vol7.1.01

Mustofa, H. A., Kola, A. J., & Owusu-Darko, I. (2025). Integration of Artificial Intelligence (ChatGPT) into Science Teaching and Learning. *International Journal of Ethnoscience and Technology in Education, 2*(1), 108–128. https://doi.org/10.33394/ijete.v2i1.14195

Ogunyemi, A. B., & Samuel, A. F. (2024). Artificial intelligence adoption in Nigerian universities: Prospects and challenges. *African Journal of Educational Technology and Innovation*, *9*(2), 51–64.

Okunade A.I. (2024). The role of artificial intelligence in teaching of science education in secondary schools in Nigeria. *European Journal of Computer Science and Information Technology*, *12*(1), 57-67.

Rajendran, S., & Manickam, M. (2024). The impact of artificial intelligence tools in enhancing science learning outcomes. *International Journal of Science Education and Technology*, *33*(3), 201–215.

Thomas, G., Gambari, A.I., Yusuf, H.T., Abanikannda, M.O. and Daramola, F.O., 2024. Assessment of lecturers' awareness of artificial intelligence for education in a Nigerian university. *Educational Technology Quarterly* [Online], 2024(4), 378–389. https://doi.org/10.55056/etq.777

Tuomi, I. (2021). The Impact of Artificial Intelligence on Learning, Teaching, and Education: Policies for the Future. European Commission Joint Research Centre (JRC).

Zhou, Y., Li, J., & Liu, C. (2021). Intelligent Grading System for Subjective Questions Based on Deep Learning. Education and Information Technologies, 26(1), 723–737.

Cite this article as:
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