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Assessment of Physics Lecturers' Readiness to Adopt Artificial Intelligence in Teaching Practices in Colleges of Education in North-East Nigeria

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Abstract **Case Studies**

Through intelligent tutoring systems, adaptive learning technologies, automated assessment platforms, predictive analytics, and virtual learning environments, artificial intelligence (AI) is revolutionizing educational systems around the world. The degree to which educators are prepared to incorporate new technologies into their teaching and learning processes will determine how well AI integration works in the classroom. This study evaluated the preparedness of physics instructors in North-East Nigerian colleges of education to incorporate AI into their lesson plans. The study had three main goals: to find out how prepared physics lecturers were to accept AI, to identify the elements that influence lecturers' readiness for AI integration, and to look at obstacles to AI adoption in physics teaching practices. A descriptive survey research design was used in the study. Lecturers in physics from North-East Nigerian colleges of education made up the population. Using stratified random sampling procedures, a sample of 120 physics instructors was chosen. The Physics Lecturers' Artificial Intelligence Readiness Questionnaire (PLAIRQ), a tool created by the researcher, was used to gather data. Using Cronbach Alpha, the instrument produced a reliability coefficient of 0.86. Data analysis was done using the mean and standard deviation. The results showed that physics instructors were moderately prepared to adopt AI (Grand Mean = 3.12). Readiness levels were strongly impacted by professional development, digital competency, and institutional support (Grand Mean = 3.34).Inadequate infrastructure, a lack of AI training, and a lack of institutional support were the main obstacles to adoption (Grand Mean = 3.41). The study found that while infrastructure constraints and insufficient capacity development continue to be obstacles to implementation, physics instructors show a positive willingness toward AI integration. The study suggested institutional AI policy development, enhanced technology infrastructure, and ongoing AI training programs.

Keywords: Artificial Intelligence, Physics Education, Lecturer Readiness, Technology Adoption, Colleges of Education, North-East Nigeria.

Introduction

Through intelligent instructional technologies, adaptive learning systems, predictive analytics, and personalized learning environments, artificial intelligence (AI) has become a revolutionary invention that is impacting educational institutions worldwide (Holmes et al., 2022; UNESCO, 2023). Opportunities to

enhance instructional delivery and educational efficacy have increased due to recent advancements in machine learning, natural language processing, and generative AI technologies (Kasneci et al., 2023). AI technologies are being incorporated by educational institutions all around the world to improve academic achievement, student engagement, and teaching effectiveness (Luckin & Cukurova, 2019).

Computational systems that can mimic human intelligence functions including learning, reasoning, pattern recognition, and decision-making are referred to as artificial intelligence (Russell & Norvig, 2021). Intelligent tutoring systems, automated grading systems, adaptive instructional platforms, virtual laboratories, and individualized learning experiences are all made possible by AI technologies in education (Chen et al., 2020).

Because physics concepts necessitate visualization, experimentation, mathematical reasoning, and conceptual modeling, AI technologies are especially beneficial to physics teaching. Scientific research and conceptual comprehension are enhanced by AI-powered simulations, virtual labs, and intelligent educational systems (Woolf, 2021). Without the limitations of a real laboratory, students can perform virtual experiments, change variables, see results, and repeat scientific methods thanks to AI simulations (Holmes et al., 2022).

Lecturers' willingness to embrace advances in education is crucial for the successful incorporation of AI technology (Ayanwale et al., 2025). The term "lecturer readiness" describes the institutional support, competence, confidence, preparation, and willingness of educators to integrate technology (Teo, 2011). The successful use of instructional technologies is correlated with higher preparedness levels (Venkatesh et al., 2003).

Even though Nigerians are becoming more aware of AI technologies, adoption efforts are still hampered by issues like poor institutional support, inadequate infrastructure, low AI literacy, and a lack of professional development (Eleje et al., 2025; Reuben & Kabilan, 2024). Additional difficulties related to digital inequality and infrastructure constraints are encountered in North-East Nigeria.

Lecturers in physics at colleges of education are essential in preparing future teachers to work well in technologically advanced classrooms. However, there is little actual data on how prepared physics professors are for the use of AI in North-East Nigerian colleges of education. Thus, this study evaluated the preparedness of physics instructors to include AI into their instruction.

Objectives of the Study

The study sought to:

1. Determine Physics lecturers' readiness to adopt Artificial Intelligence in teaching practices.
2. Identify factors influencing Physics lecturers' readiness toward AI adoption.
3. Examine challenges affecting Artificial Intelligence adoption in Physics teaching.

Research Questions

1. What is Physics lecturers' readiness level toward AI adoption?
2. Which factors influence AI readiness among Physics lecturers?
3. Which challenges affect Artificial Intelligence adoption?

Literature Review

Concept of Artificial Intelligence in Education

Computational tools for teaching, learning, assessment, and educational decision-making are all part of artificial intelligence in education (Holmes et al., 2022). Applications of AI include virtual simulations, predictive learning analytics, intelligent tutoring systems, automated assessment tools, and adaptive educational systems (Chen et al., 2020).

Lecturer Readiness for Technology Adoption

The ability of instructors to incorporate new technology into their lesson plans is referred to as readiness (Teo, 2011). According to Venkatesh et al. (2003), technology readiness includes technological proficiency, institutional support, possibilities for professional growth, an attitude toward innovation, and enabling circumstances.

Artificial Intelligence and Physics Education

By providing simulations, visualization tools, intelligent tutoring settings, and individualized educational approaches, AI technologies improve the teaching of physics (Woolf, 2021). Virtual laboratories driven by AI enhance students' scientific reasoning skills and engagement.

Theoretical Framework

Unified Theory of Acceptance and Use of Technology (UTAUT)

The study adopted the Unified Theory of Acceptance and Use of Technology developed by Venkatesh et al. (2003). The theory explains technology adoption behaviour using four constructs:

i. Performance Expectancy
ii. Effort Expectancy
iii. Social Influence
iv. Facilitating Conditions

The theory explains that lecturers' readiness toward AI adoption depends on institutional support, technological competence, and perceived instructional usefulness.

Empirical Review

Reuben and Kabilan (2024) assessed university lecturers' readiness toward AI adoption in North-East Nigeria using descriptive survey methods. Findings revealed moderate readiness levels and identified institutional support and digital competence as significant predictors.

Muftawu et al. (2025) investigated lecturers' readiness toward AI adoption within Nigerian universities. Findings revealed positive attitudes toward AI technologies despite infrastructural limitations.

Ayanwale et al. (2025) found that digital competence and institutional facilitating conditions significantly influence educators' readiness toward AI adoption.

Eleje et al. (2025) reported that inadequate infrastructure and insufficient institutional support affect AI implementation in Nigerian higher education institutions.

Kasneci et al. (2023) identified educator competence and professional development as critical determinants of AI integration effectiveness.

Adigun et al. (2025) reported that AI literacy predicts educators' willingness toward educational AI adoption.

Ghimire et al. (2024) found that educators demonstrate positive attitudes toward AI integration but require institutional support and AI literacy development.

The reviewed studies establish growing interest regarding AI adoption but reveal inadequate evidence specifically focusing on Physics lecturers within Colleges of Education in North-East Nigeria.

Summary of Empirical Gap

The majority of the empirical research that has already been done has been on university lectures, teacher attitudes, institutional preparedness, and general trends of AI adoption in educational settings. There is, however, little data on physics instructors in North-East Nigerian colleges of education, especially when it comes to their preparedness to incorporate AI into subject-specific teaching methods. The majority of earlier research did not specifically look at physics teaching situations and instead focused on universities rather than colleges of education. This study aims to close this gap by evaluating the preparedness of physics instructors in North-East Nigerian colleges of

education to include AI into their teaching methods.

Methodology

The study adopted a descriptive survey research design. The population comprised all Physics lecturers in Colleges of Education within North-East Nigeria. A sample of 120 Physics lecturers was selected using stratified random sampling techniques to ensure adequate representation across institutions. Data were collected using a structured instrument titled *Physics Lecturers' Artificial Intelligence Readiness Questionnaire (PLAIRQ)*, which consisted of four sections: Section A covered demographic information, Section B assessed readiness toward AI adoption, Section C examined factors influencing AI adoption, and Section D identified challenges affecting AI integration. The instrument recorded a reliability coefficient of 0.86 using Cronbach Alpha, indicating good internal consistency. Data were analyzed using mean and standard deviation to answer the research questions. A decision rule was applied whereby a mean score of 2.50 and above was accepted, while a mean score below 2.50 was rejected.

Results

Research Question One

Lecturers' Readiness Mean and Standard Deviation Scores toward AI Adoption

Item	Mean	SD	Decision
Adequate AI competence	3.11	0.74	Accepted
Confidence using AI technologies	3.04	0.82	Accepted
Willingness toward AI adoption	3.32	0.71	Accepted
Understanding AI applications	3.06	0.79	Accepted
Ability to integrate AI	3.08	0.76	Accepted
Grand Mean	3.12		Moderate Readiness

Source: Field Survey, 2026

Research Question Two

Lecturers' Influencing Factors Mean and Standard Deviation Scores toward AI Adoption

Factor	Mean	SD	Decision
Institutional support	3.45	0.71	Accepted
Digital competence	3.51	0.68	Accepted
Training opportunities	3.41	0.75	Accepted
Infrastructure availability	3.12	0.83	Accepted
Professional development	3.21	0.80	Accepted
Grand Mean	3.34		Accepted

Source: Field Survey, 2026

Research Question Three

Mean and Standard Deviation Scores of Lectures' Challenges Affecting AI Adoption

Challenge	Mean	SD	Decision
Poor infrastructure	3.62	0.66	Accepted
Insufficient AI training	3.51	0.71	Accepted
Limited funding	3.40	0.75	Accepted
Poor internet access	3.29	0.79	Accepted
Inadequate policy support	3.23	0.81	Accepted
Grand Mean	3.41		
			Accepted

Source: Field Survey, 2026

Discussion of Findings

The findings of the study's question 1, showed that North-East Nigerian colleges of education's physics lecturers are only somewhat prepared to include AI into their lesson plans. This implies that although most lecturers are aware of AI technologies and are willing to incorporate them into their teaching, their level of readiness is still below what is needed for widespread use. This finding is consistent with Reuben and Kabilan's (2024) study, which found that lecturers in North-East Nigeria had a similar intermediate level of AI preparation. This suggests that while knowledge of AI is steadily growing, full instructional integration has not yet occurred. Additionally, the results align with those of Ayanwale et al. (2025), who noted that although educators frequently have favorable sentiments toward AI, they still lack the institutional setting and necessary expertise for its implementation. In a similar vein, Kasneci et al. (2023) observed that while generative AI technologies are quickly making their way into educational settings, many teachers are still in the transitional stages of adoption because of a lack of exposure and training. This suggests that physics lecturers are in the early stages of integrating AI, where there is curiosity but the ability to put it into practice is still developing.

The study question 2 also showed that the preparedness of physics lecturers to use AI technology is strongly influenced by institutional support and digital competency. This research suggests that when institutions offer sufficient infrastructure, training opportunities, policy guidance, and technical support systems, lecturers are more inclined to use AI. It also emphasizes how crucial lecturers' individual digital literacy is to their confidence and capacity to include AI tools into physics instruction. This outcome supports the findings of Ayanwale et al. (2025), who found that technological proficiency and enabling circumstances were important factors in determining educators' preparedness for AI. Similarly, Venkatesh et al. (2003) noted that effort expectancy and enabling factors have a significant impact on technology adoption behavior in the Unified Theory of Acceptance and Use of Technology (UTAUT). Additionally, according to Holmes et al. (2022), institutional ecosystems are crucial in helping teachers transition from awareness to actual incorporation of AI-powered teaching aids. This implies that despite increased interest, AI use in physics education will remain restricted in the absence of strong institutional support and enhanced lecturer competency.

The survey question 3, also discovered that inadequate AI training and infrastructure constraints are the main obstacles to AI adoption among physics lecturers. This suggests that effective integration of AI into teaching methods is hampered by a lack of usable digital tools, low funding, limited exposure to AI-specific training programs, and inadequate access to dependable

internet services. This result is in line with the findings of Eleje et al. (2025), who said that insufficient institutional investment and inadequate infrastructure continue to be major barriers to AI implementation in Nigerian higher education institutions. In a similar vein, UNESCO (2023) highlighted that one of the main worldwide issues preventing equitable AI integration in educational systems is unequal access to digital infrastructure. According to Adigun et al. (2025), educators' confidence and readiness to use developing technologies are greatly diminished in the absence of structured AI training programs. This suggests that structural and capacity-related limitations greatly limit lecturers' ability to successfully integrate AI in physics classroom, even in cases where they are willing to do so.

Overall, the results indicate that although physics lecturers are fundamentally prepared to integrate AI, institutional and infrastructure issues limit their ability to do so. This emphasizes the necessity of focused interventions to close the gap between preparedness and successful adoption in North-East Nigerian colleges of education, such as organized AI training programs, enhanced digital infrastructure, and encouraging institutional policies.

Conclusion

The application of AI in teaching and learning activities is widely welcomed by physics lecturers. This demonstrates how many instructors are aware of the potential of AI tools to enhance physics instruction and student engagement, including intelligent tutoring systems, virtual simulations, and automated assessment platforms. Their readiness is a reflection of their rising awareness of worldwide trends in educational technology, where AI is being employed more and more to improve conceptual comprehension and tailored learning in science education (Holmes et al., 2022; Kasneci et al., 2023).

Nevertheless, despite this optimistic outlook, infrastructure issues and inadequate capacity building continue to impede the successful application of AI. Many institutions have limited access to AI technologies due to poor internet connectivity, inadequate digital infrastructure, and inconsistent power supplies. Furthermore, many instructors lack the possibilities for ongoing professional growth and proper training necessary to confidently incorporate AI into their teaching methods. Institutional support and capacity-building are crucial for the successful adoption of AI in physics education since these constraints create a gap between willingness and real classroom application (Eleje et al., 2025; Adigun et al., 2025).

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Continuous AI professional development programmes should be organized for Physics lecturers.
2. Government should strengthen digital infrastructure.
3. Colleges of Education should formulate institutional AI policies.
4. AI literacy training should become compulsory.
5. Funding for AI technologies development should increase.

References

Adigun, O. T., Tijani, F. A., Haihambo, C. K., & Enock, S. L. (2025). Artificial intelligence adoption in inclusive classrooms. *Frontiers in Education, 10*, 1519472. https://doi.org/10.3389/feduc.2025.1519472

Ayanwale, M. A., Idowu, K. O., Adelana, O. P., et al. (2025). Quantifying teachers' readiness for artificial intelligence adoption in education. *Scientific Reports, 15*, 26043. https://doi.org/10.1038/s41598-025-26043

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

Eleje, L. I., Ezeugo, N. C., Esomonu, N. P. M., et al. (2025). Artificial intelligence adoption in higher education in Nigeria. *Discover Artificial Intelligence, 5*, 335. https://doi.org/10.1007/s44163-025-00335

Ghimire, A., Prather, J., & Edwards, J. (2024). Generative AI in education: Educators' awareness, sentiments, and influencing factors. *arXiv*. https://arxiv.org/abs/2403.15586

Holmes, W., Bialik, M., & Fadel, C. (2022). *Artificial intelligence in education: Promise and implications for teaching and learning*. Center for Curriculum Redesign.

Kasneci, E., Sessler, K., Küchemann, S., et al. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, *103*, 102274. https://doi.org/10.1016/j.lindif.2023.102274

Luckin, R., & Cukurova, M. (2019). Designing educational technologies in the age of AI. *British Journal of Educational Technology, 50*(6), 2824–2838. https://doi.org/10.1111/bjet.12868

Muftawu, H. M., Abdulrazak, A., Thomas, G., et al. (2025). Assessment of lecturers' readiness to use artificial intelligence for education in a Nigerian university. *International Journal of Innovative Technology Integration in Education*.

Reuben, B., & Kabilan, M. K. (2024). Assessment of university lecturers' readiness to adopt Artificial Intelligence technology in North-East Nigeria. *International Journal of Advanced Research in Education and Society, 6*(2), 482–490.

Russell, S., & Norvig, P. (2021). *Artificial intelligence: A modern approach* (4th ed.). Pearson.

Teo, T. (2011). Factors influencing teachers' intention to use technology. *Computers & Education, 57*(4), 2432–2440. https://doi.org/10.1016/j.compedu.2011.06.017

UNESCO. (2023). *Guidance for generative AI in education and research*. UNESCO Publishing.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*(3), 425–478. https://doi.org/10.2307/30036540

Woolf, B. P. (2021). *Building intelligent interactive tutors: Student-centered strategies for revolutionizing e-learning*. Morgan Kaufmann.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education. *International Journal of Educational Technology in Higher Education, 16*, 39. https://doi.org/10.1186/s41239-019-0171-0