

KNOWLEDGE LEVEL AND UTILIZATION OF EDUCATIONAL ARTIFICIAL INTELLIGENCE TOOLS FOR SMART TEACHING AND LEARNING AMONG SECONDARY SCHOOL TEACHERS IN ENUGU STATE, NIGERIA

Felicia Ngozi Ezeaku

Department of Educational Foundations
Faculty of Education, University of Nigeria, Nsukka

Abstract

The study assessed the level of knowledge and utilization of educational Artificial Intelligence (AI) tools for lesson plans, organization of lesson note, teaching materials, classroom delivery, students' assessment, personal learning and support among secondary school teachers in Nsukka Education Zone. Guided by cross-sectional survey research design, four research questions and hypotheses were developed to achieve the aim of the study. Structured questionnaire was developed and administered to 344 teachers randomly selected from 8 public secondary schools from the education zone. Frequencies, percentages, means, standard deviation, correlation, t-test and analysis of variance (ANOVA) were used to analyze the data. Except ChatGPT, there is generally low knowledge level of educational AI tools as well as low utilization among the secondary school teachers in the zone. Knowledge level of the AI tools has no significant ($p > 0.05$) correlation with the utilization. There is no significant different ($p > 0.05$) between the mean responses of the teachers on the low level of utilization based on location, years of teaching experience and academic qualification. Lack of internet access, digital devices (like computers and smart phones), time, digital skills and school support were some of the factors affecting knowledge and utilization of educational AI tools by the teachers. Teacher's personal perception about AI, past experiences and students' readiness to adjust also affect knowledge and utilization. Training on digital skill acquisition and school supports through on-the-job training and workshop, and internet connectivity will increase knowledge and utilization of educational AI tools among secondary school teachers in Nsukka Education Zone.

Keywords: ChatGPT; classroom delivery; digital skills; educational AI tools; personalized learning

Introduction

The rapid advancement of digital technologies has significantly transformed the global educational landscape, with Artificial Intelligence (AI) emerging as one of the most influential innovations of the 21st century. AI refers to computer systems capable of performing tasks that typically require human intelligence, such as learning, reasoning, problem-solving, and decision-making (Ofem, et al., 2025). In education, AI-powered tools are increasingly being integrated into teaching and learning processes, offering new opportunities for enhancing instructional delivery, improving student outcomes, and supporting teachers in their professional practices. This growing integration has given rise to the concept of "smart teaching and learning", which emphasizes the use of intelligent technologies to create more adaptive, personalized, and efficient educational environments.

In recent years, educational AI tools, such as intelligent tutoring systems, chatbots, automated grading platforms, and generative AI applications, have really gained widespread attention due to their ability to transform traditional pedagogical approaches. These tools can analyze student data, provide real-time feedback, and tailor learning experiences to individual needs, thereby promoting personalized learning and increased

student engagement (Bali et al., 2024). Furthermore, AI technologies have been shown to support teachers by automating routine tasks such as lesson planning, grading, and administrative duties, allowing educators to focus more on meaningful instructional interactions and student-centered activities (UNESCO, 2026). As a result, AI is not merely an additional educational resource but a transformative force reshaping how knowledge is delivered and acquired.

Notwithstanding the numerous benefits associated with AI in education, its effective implementation largely depends on the knowledge level and utilization capacity of teachers. Teachers play a critical role in mediating the use of technology in classrooms, and their understanding of AI tools determines how effectively these tools are integrated into teaching practices. Studies indicate that while AI technologies are rapidly evolving, there remains a gap in educators' awareness, technical competence, and pedagogical understanding of these tools (Olaiya et al, 2025). This gap can limit the potential impact of AI in improving teaching and learning outcomes, particularly in developing regions where access to training and digital infrastructure may be constrained. In the context of Nigeria, the adoption of educational technologies, including AI, is gradually gaining momentum as part of broader efforts to modernize the education sector. However, challenges such as inadequate infrastructure, limited digital literacy, insufficient training opportunities, and policy gaps continue to hinder the effective integration of advanced technologies in schools (Olaiya et al, 2025). Secondary education, which serves as a critical stage in preparing students for higher education and the workforce, stands to benefit significantly from the adoption of AI-driven teaching and learning tools (UNESCO, 2026). Yet, the extent to which teachers in this sector are knowledgeable about and actively utilizing these tools remains largely underexplored.

Nsukka Education Zone in Enugu State is one of the prominent educational hubs in southeastern Nigeria, and therefore presents a relevant setting for examining the intersection of AI and education. Secondary school teachers in the zone are expected to adapt to evolving pedagogical demands while addressing diverse student needs in increasingly complex learning environments. The integration of AI tools in such contexts has the potential to enhance instructional effectiveness, facilitate differentiated learning, and promote innovative teaching strategies. However, the success of these innovations depends on teachers' readiness, competence, and willingness to adopt and utilize AI technologies in their classrooms. Additionally, the lack of adequate training and professional development opportunities for teachers may result in improper or limited use of AI tools. Therefore, understanding teachers' knowledge levels and utilization patterns is essential for identifying gaps, designing targeted interventions, and ensuring the responsible and effective integration of AI in education (Eleje et al., 2025).

It against this backdrop that this study focuses on assessing the knowledge level and utilization of educational artificial intelligence tools for smart teaching and learning among secondary school teachers in Enugu State, Nigeria. By examining teachers' awareness, competence, and application of AI tools in instructional practices, the study seeks to provide insights into the current state of AI integration in secondary education. It also aims to identify factors influencing teachers' knowledge and utilization, and explore opportunities for enhancing the adoption of AI-driven educational innovations for teaching and learning.

Purpose of the Study

The aim of the study is to assess the level of knowledge, utilization of AI tools and influencing factors for teaching and learning in secondary schools in Enugu State, Nigeria. The specific objectives include:

1. To assess the level of knowledge of educational artificial intelligence tools among secondary school teachers in Enugu State, Nigeria, within the 2025/2026 academic session.
2. To determine the extent of utilization of educational AI tools for smart teaching and learning among secondary school teachers in Enugu State within the same period.
3. To examine the relationship between teachers' knowledge level and their utilization of AI tools for instructional delivery in secondary schools in Enugu State.
4. To identify factors influencing the utilization of educational AI tools (such as training, access to infrastructure, and years of teaching experience) among secondary school teachers in Enugu State during the study period.

Research Questions

The following research questions guided the study

1. What is the level of knowledge of educational artificial intelligence tools among secondary school teachers in Enugu State, Nigeria, within the 2025/2026 academic session?
2. What is the extent of utilization of educational AI tools for smart teaching and learning among secondary school teachers in Enugu State within the same period?
3. What is the relationship between teachers' knowledge level and their utilization of AI tools for instructional delivery in secondary schools in Enugu State?
4. What are the factors influencing the utilization of educational AI tools (such as training, access to infrastructure, and years of teaching experience) among secondary school teachers in Enugu State during the study period?

Hypotheses

- H₀₁:** There is no significant relationship between the knowledge level of educational AI tools and their utilization among secondary school teachers in Enugu State.
- H₀₂:** There is no significant difference in the utilization of educational AI tools among secondary school teachers based on their years of teaching experience.
- H₀₃:** There is no significant difference in the knowledge of educational AI tools among secondary school teachers based on the location (urban, rural).
- H₀₄:** There is no significant difference in the utilization of educational AI tools among secondary school teachers based on their level of education.

Methods

The study will adopt cross-sectional survey design, which allows for the systematic collection of data at a single point in time to assess the knowledge level and utilization of AI tools, and factors affecting utilization of educational AI tools among secondary school teachers in Nsukka Education Zone, Enugu State. The target population comprised all the secondary school teachers in all the public secondary schools in Nsukka Education Zone. A sample size of 344 teachers was obtained for the study using GPower software version 4.1.3.4 at effect size of 0.315 and power of 0.95. Two-stage cluster sampling was adopted for sample selection. The first stage was the random selection of 8 public secondary schools from the list of all the secondary schools in the zone. Each school was considered a cluster of secondary school teachers and are expected to align with the state government's upgrading of the primary and secondary school structures and curriculum to full smart classrooms with digital structures. The list was obtained from Post Primary School Management Board (PPSMP) office, Nsukka Zone. The second stage was the random sampling of the selected secondary schools where a sample of 43 teachers were drawn from each school using equal allocation. The selected secondary schools included Urban Boys Secondary School, Odenigbo, Model Secondary School, Nsukka, Community Secondary School, Abbi-Ugbene, John Rose Secondary School, Nkpologwu, Community

Secondary, Ede Oballa, Opi High School, Opi, Community Secondary School, Obukpa, and Community Secondary School, Nru. Therefore, there is a total of 344 teachers (sample) for the study.

The instrument for data collection was a well-structured Knowledge Level and AI Utilization Survey Questionnaire (KLAIUSQ) developed for the study. The questionnaire is divided into five sections. Section A comprised of the socio-demographic characteristics of the respondents. Section B contained items on the types and knowledge level of the different AI tools for teaching and learning in secondary schools in the zone. The AI tools were classified into lesson planning and content creation tools, teaching and classroom delivery tools, assessment & evaluation tools, personalized learning & student support tools, and general productivity & support tools. Section C contained items on the level of utilization of educational AI tools. Section D contained items to measure the level of relationship between knowledge and utilization of AI tools while Section E contained factors affecting utilization of AI tools for teaching and learning in secondary schools in the zone. The instrumented was face-validated and the reliability ascertained using the Cronbach's alpha measure of reliability, which gave a reliability coefficient of 0.831, indicating the reliability of the instrument. Data collection was through face-to-face distribution of the questionnaires to the participants. The demographic variables were analyzed using frequencies and percentages while the research questions analyzed using means and standard deviations. The hypotheses were analyzed using correlation, t-test and analysis of variance (ANOVA). All the statistical tests of significance were conducted at 0.05 level of significance such that a p-value less than 0.05 ($p < 0.05$) was considered significant while a p-value greater than 0.05 ($p > 0.05$) implied not significant, upholding the null hypothesis.

Results

Demographic Attributes of Respondents

Table 1: Distribution of the Socio-Demographic Attributes of Respondents

Socio-Demographic Factors		Frequency	Percent
Gender	Male	101	29.4
	Female	234	68.9
	Prefer not to say	6	1.7
Age of respondents	20 - 29 years	66	19.2
	30-39 years	92	26.7
	40-49 years	119	34.6
	50years and above	67	19.5
	Mean age (Std Dev.)	44.7years (19.3years)	
Educational qualification	NCE	116	33.7

	Bachelor's Degree	167	48.6
	Master's Degree	50	14.5
	PhD	11	3.2
Years of teaching experience	1 – 5years	46	13.4
	6 – 10years	51	14.8
	11 – 15years	139	40.4
	16- 25years	101	29.4
	30years and above	7	2.0
Subject area	Arts	112	32.6
	Science	51	14.8
	Business education	70	20.4
	Vocational education	32	9.3
	Technology	25	7.3
	ICT/Computer	15	4.4
	Entrepreneurship	39	11.2

The demographic characteristics of the respondents were summarized in Table 1. The gender distribution showed that 68.9% were women while most (34.6%) of the respondents were between 40 – 49 years with average age of 44.7%. Most (48.6%) have Bachelor's degree as their highest educational qualification, followed by NCE (33.7%). As much as 71.8% have teaching experience from 11 years and above with majority (40.4%) between 11 – 15 years of working experience. Majority (32.6%) of the teachers are from Arts as their subject area, followed by Business education (20.4%) and Science (14.8%).

Level of Knowledge of Educational Artificial Intelligence Tools

Table 2: Teachers' Mean Knowledge Level of Educational AI Tools

Educational AI Tools	Mean	Std. Dev.	Decision
Lesson Planning and Content Creation Tools			
ChatGPT: for lesson plans, explanations, quizzes, and examples.	3.08	1.11	High knowledge

Notion AI: to organize lesson notes, curriculum plans, and teaching materials in one place.	1.89	0.68	Low knowledge
LessonLab AI: for structured lesson planning with objectives, activities, and assessments.	2.01	0.80	Low knowledge
Teaching and Classroom Delivery Tools			
Google Gemini: Integrated into classroom tools for generating diagrams, quizzes, and interactive explanations.	2.21	0.91	Low knowledge
Teachally: Generates personalized lesson plans and instructional guides for classroom delivery.	1.94	0.56	Low knowledge
Kwame for Science: Answers students' science questions based on WAEC curriculum and past questions.	1.58	0.99	Low knowledge
Assessment and Evaluation Tools			
Edves: Provides AI-powered assessments, exam prep (WAEC, NECO, UTME), and performance analytics.	1.66	0.47	Low knowledge
MagicSchool AI: Generates quizzes, rubrics, and grading tools automatically (widely used by teachers globally).	2.04	0.78	Low knowledge
Personalized Learning and Student Support Tools			
Naija Teacher AI: A national AI platform that supports lesson planning, assessment, and teacher training at scale.	1.98	0.56	Low knowledge
AI-powered adaptive learning systems.	2.11	0.88	Low knowledge
Overall	2.41	0.96	Low knowledge

With mean of 3.08, the respondents have high knowledge of ChatGPT as lesson planning and content creation tool but have low knowledge of Notion AI (1.89) and LessonLab AI (2.01). There is low knowledge level of Gemini (2.21), Teachally (1.94) and Kwame for Science (1.58) as teaching and class delivery tools. There is also low level of Edves (1.66) and magicSchool AI (2.04) as assessment and evaluation tools. Similarly, there is low knowledge level of Naija Teacher AI (2.11) and AI-powered adaptive learning systems (2.11) as personalized learning and student support tools. The overall mean of 2.41 showed general low knowledge level of AI tools among the secondary teachers in the study area.

Utilization of Educational AI Tools

Table 3: Mean Level of Teachers' Utilization of Educational AI Tools

Utilization of AI Educational Tools	Mean	Std. Dev.	Decision
I use AI tools like ChatGPT to prepare lesson notes.	2.89	0.98	Low utilization
I use AI tools to generate teaching materials for classes.	1.76	1.03	Low utilization
I use AI tools for classroom instruction.	2.00	1.36	Low utilization

I use AI tools to assess students performances.	1.81	0.32	Low utilization
I use AI tools to personalize learning.	2.21	0.92	Low utilization
I integrate AI tools into daily teaching activities.	1.59	0.77	Low utilization
Overall	2.02	0.88	Low utilization

Table 3 showed the level of utilization of AI tools by the teachers. With mean scores ranging from 1.59 to 2.89, which are below the cut-off mean of 3.0 on a five point Likert scale, there is low utilization of AI tools by the teachers for preparation of lesson notes, teaching materials, classroom instruction, student assessment and performance evaluation, as well as personalized learning. The overall mean score of 2.02 supports this fact.

Relationship between Knowledge Level and Utilization of AI Tools

Table 4: Mean Assessment of Relationship Between Knowledge and Utilization of AI Tools

Utilization of AI Educational Tools	Mean	Std. Dev.	Decision
My knowledge influences my use of AI tools.	3.91	0.66	Agreed
Greater understanding increases my usage.	3.50	1.53	Agreed
Lack of knowledge limits my usage.	3.72	0.94	Agreed
Training would increase my usage.	3.31	0.71	Agreed

The results in Table 4 showed mean scores ranging from 1.31 to 3.91, which are higher than 3.00 cut of point. These implied that the teachers agreed that their use of AI tools is influenced by their knowledge level and greater understanding of the tools. The also agreed that lack of knowledge of the tools limits their usage, and that training on the AI tools use will increase their knowledge and usage.

Factors Influencing Utilization

Table 5: Mean Assessment of Factors Affecting Utilization of AI Tools

Factor	Mean	Std. Dev.	Decision
Internet access influences my use of AI tools.	3.61	0.59	Agree
Access to digital devices like computer and smart phones affects my use.	3.95	0.82	Agree
Training on digital skill acquisition encourages my use educational AI tools.	3.06	1.03	Agree
School supports like on-the-job training and workshop, internet connectivity, etc. influences my use.	3.54	0.37	Agree
Time constraints limit my use.	3.48	0.49	Agree
Experience affects my willingness to use educational AI for teaching and learning.	3.82	0.93	Agree
Students' readiness to learn and adjust influences my use.	4.02	0.31	Agree

Overall	3.82	0.89	Agree
---------	------	------	-------

The analysis of the factors influencing utilization of AI tools by the secondary school teachers is summarized in Table 5. The mean scores ranged from 3.48 to 4.02, indicating that the respondents agreed that internet access, access to digital devices like computer and smart phones, training on digital skills, on-the-job training and workshop, and students' readiness to learn and adjust affect teachers' utilization of educational AI tools.

Hypothesis One: Relationship Between Knowledge Level of Educational AI tools and utilization

Table 6: Correlation Between Knowledge Level of Educational AI Tools and their Utilization

		Knowledge level of AI	
		Tools	Utilization
Pearson	Knowledge level of AI tools	1.000	0.188
Correlation	Utilization	0.188	1.000
Sig. (1-tailed)	Knowledge level of educational AI	.	0.469
	Utilization	0.469	.

Table 6 showed that, with a correlation coefficient of 0.188 and p-value of 0.469 ($p > 0.05$), there is weak positive relationship between teachers' knowledge of educational AI tools and their utilization. This relationship not significant ($p > 0.05$).

Hypothesis Two: Utilization of educational AI tools based on teachers' years of teaching experience

Table 7: One-Way ANOVA for Effect of Teacher's Years of Experience on Utilization of AI Tools

Source of variation	Sum of Squares	df	Mean Square	F-value	P-value	Decision
Between Groups	103.307	3	34.436	1.977	0.117	Not significant
Within Groups	5921.585	340	17.417			
Total	3171.148	343				

Table 7 displayed the results of the ANOVA test of the effect of teachers' years of experience on their utilization of educational AI tools. The results showed that there is no significant difference ($F(3, 340) = 1.977$, $p = 0.117$) between the mean responses of the teachers to utilization of AI tools based on years of experience. Therefore, the null hypothesis was accepted at 0.05 level of significance.

Hypothesis Three: Knowledge of educational AI tools based on the location (urban, rural)

Table 7: T-Test Analysis of Mean Difference Between Teachers in Rural and Urban Secondary Schools on Use of AI Tools

Teacher location	N	Mean	Std. Dev	df	t-value	P-value	Decision
Urban	129	2.050	0.187	343	0.577	0.564	Not

Rural 215 2.039 0.286 significant

The t-test results presented in Table 7 revealed that there is no significant difference ($t = 0.577$, $p = 0.564$) between the mean responses of teachers in urban and rural secondary schools on the utilization of educational AI tools for teaching and learning in secondary schools in Nsukka Education Zone. The null hypothesis was accepted at 0.05 level of significance.

Hypothesis Four: Utilization of educational AI tools based on education qualification
Table 8: ANOVA Results for Effect of Educational Qualification of Utilization of AI Tools

Source of variation	Sum of Squares	df	Mean Square	F-value	P-value	Decision
Between Groups	99.977	3	33.326	2.225	0.085	Not significant
Within Groups	5091.560	340	14.975			
Total	3171.148	343				

The ANOVA results in Table 8 showed that there is no significant difference ($F(3, 340) = 2.225$, $p = 0.085$) between the mean responses of teachers with NCE, Bachelor's degree, Master's degree and PhD on their level of utilization of educational tools for teaching and learning. Therefore, the null hypothesis was accepted at 0.05 level of significance.

Discussion of the Findings

The findings revealed that the secondary school teachers have knowledge of ChatGPT as educational AI tool for lesson plans, explanations, quizzes, and examples but have low knowledge of Notion AI and LessonLab AI as additional AI tools for lesson planning, quiz, examples and content creation. Furthermore, the teachers have low knowledge of teaching and classroom delivery tools such as Gemini, Teachally and Kwame for Science meant to meant for smooth classroom interactions. There is also low knowledge of Edves, MagicSchool AI and and Naija Teacher AI for enhanced student assessment and personalized learning. These reveal generally low knowledge of educational AI tools among the secondary school teachers in the education zone. The high knowledge of ChatGPT among the secondary school teachers collaborates the findings by David et al. (2025) who revealed in their study that most teachers' knowledge of AI tools is dominated by the knowledge of Open AI's ChatGPT but have low knowledge of other essential educational AI tools. However, the low knowledge of other educational AI tools by the teachers contradicts the findings by Philippakos and Rocconi (2025) who revealed higher knowledge level of AI tools among secondary school teachers in some districts of the United States of America. The contradiction with the findings of this study may be attributed to the differences in the level of exposure, advanced digital infrastructure, government policy and support and access between teachers in the US and in Nsukka Education Zone.

As revealed by the study findings, there is generally low utilization of educational AI tools in preparing lesson notes, generating teaching materials, enhancing instructions, assessment and personalized learning, by the teachers. The low utilization of educational AI tools by the teachers could lead to teacher centered and less interactive classroom, reducing teaching effectiveness, innovation and adaptation to individual learning needs. The decline in teacher classroom effectiveness, interactive and innovative classroom is

supported by the assertions by UNESCO (2021). Low utilization of AI tools implied that the teacher may struggle with complex concepts, leading to passive teaching and learning, and decline in motivation among the students. Generally, there is decline in the academic performances of the students. This corroborates the position of World Bank (2020), outline the implications of poor adoption of AI-enhanced teaching and learning methods among teachers. Furthermore, less utilization of these tools implied that the teacher relies more on manual processes, spending more time on routine works, exposed to risks of work-related burnouts, and have less time for student support and innovation. This is supported by the findings of OECD (2020), McKinsey et al. (2020) and Muhammad (2025).

The findings of the study further revealed that there is no correlation between level of knowledge of educational AI tools and utilization of the tools by the secondary school teachers. This implied that knowledge of the AI tools like ChatGPT does not translate to its utilization by the teachers to prepare lesson notes, and generate teaching materials for effective and interactive classrooms. This could be due to lack of practical skills needed for the use of such digital-related tools. If the teachers have negative perception towards usefulness of AI in the educational system, this could also affect the knowledge level and utilization of the educational tools. This has been supported by studies by Bhat et al. (2025), David et al. (2025) and Nwokolo and Ubah (2026) on the perception and attitude of secondary school teachers towards AI learning tools. Teachers' resistance to change and attitudinal barriers could play significant role in the adoption of AI in teaching and learning. This implied that some teachers may prefer the traditional methods of teaching and/or may lack confidence adopting the new technologically-driven AI methods of teaching and learning.

The respondents identified internet access, digital devices like computer and smart phones, digital skill acquisition, school support, and students' readiness to learn and adjust as the factors which affect their utilization of educational AI tools for teaching and learning. They also identified time constraints and past experiences as factors contributing to their use of educational AI tools. School support by providing on-the-job training, digital skill acquisition, access to digital tools like smart phones, computers and internet connectivity will not only widen the knowledge of the teachers on available educational AI tools, but also enhance utilization of the AI tools. David et al. (2025) and Sunday-Cookey and Nwankwo (2025) revealed similar findings in their studies.

The t-test and ANOVA results showed that teachers' location (rural or urban), years of experience in teaching and educational qualifications have no significant effect on the low utilization of the AI tools by in teaching and learning in secondary schools in Nsukka Education Zone. This implied that irrespective of years of experience, location and academic qualification, the secondary school teachers are generally influenced by the same factors which limit utilization of educational AI tools to enhance teaching and learning.

Conclusion

Among the many educational AI tools for various purposes the secondary school teachers have high level of knowledge for only ChatGPT. However, this did not translate to usage due to predominant factors such as lack of time, internet access, digital devices (like computers and smart phones), digital skills and school support as well as personal perception about AI, and students' readiness to adjust. The poor level of knowledge and utilization cuts across teachers in the rural and urban areas irrespective of years of teaching experience and academic qualification. Training on digital skill acquisition and school supports through on-the-job training and workshop, and internet connectivity will

increase knowledge and utilization of educational AI tools among secondary school teachers in Nsukka Education Zone.

REFERENCES

- Bali, B., Garba, E.J., Ahmadu, A.S. *et al* (2024). Analysis of emerging trends in artificial intelligence for education in Nigeria. *Discover Artificial Intelligence*, 4, 110. <https://doi.org/10.1007/s44163-024-00163-y>.
- Bhat, M.A.H., Hafeez, I., Mattoo, M.M., Shah, B.A. and Mir, F.A. (2025). Attitude of Secondary School Teachers Towards ChatGPT: A Comparative Study, *Journal of Business, IT and Social Science*, 4 (2), 3 – 10. DOI: <https://doi.org/10.51470/BITS.2025.04.02.04>.
- David, E.T., Nnaemeka, G.U., Akuneme, C.C., and Nwosu, C.K. (2025). AI in education: a cross-sectional study on teachers' attitudes towards AI integration and usage in secondary schools, *Journal of Theoretical and Empirical Studies in Education (Special Issue)*, 417 – 439.
- 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/s44163-025-00452-0>.
- McKinsey and Company (2020). *How artificial intelligence will impact K–12 teachers*.
- Muhammad, A.U. (2025). How artificial Intelligence Can Revolutionize Secondary Education in Nigeria. <https://sun.edu.ng/how-artificial-intelligence-can-revolutionize-secondary-education-in-nigeria/>.
- Nwokolo, C.N. and Ubah, I.A. (2026). AI Learning and Educationally Disadvantaged Students in Rural Secondary Schools in Owerri Education Zone 11, Imo State, Nigeria, *Unizik Orient Journal of Education*, 12(2), 102 – 109.
- OECD (2020). *Teachers and School Leaders as Lifelong Learners*.
- Ofem, U.J., Orim, F.S., Edam-Agbor, I.B., Amanso, E.O.I., Eni, E., Ukatu, J.O., Ovat, S.V., Osang, A.W., Dien, C. and Abuo, C.B. (2025). Teachers' preparedness for the utilization of artificial intelligence in classroom assessment: the contributory effects of attitude toward technology, technological readiness, and pedagogical beliefs with perceived ease of use and perceived usefulness as mediators. *Frontier in Education*, 10, 1568306. DOI: 10.3389/educ.2025.1568306.
- Olaiya *et al* (2025). Assessment of Teachers' Awareness on Integration of Artificial Intelligence Technology for Instructional Delivery among Secondary Schools in Osun State, Nigeria.
- Philippakos, Z.A.T. and Rocconi, L. (2025). AI Literacy: Elementary and Secondary Teachers' Use of AI-Tools, Reported Confidence, and Professional Development Needs, *Education Sciences*, 15(9), 1186. DOI: <https://doi.org/10.3390/educsci15091186>.
- Sunday-Cookey, L.I. and Nwankwo, N.E. (2025). Exploring Artificial Intelligence in Nigerian Secondary School Administration: Barriers, Potentials, and Strategic Directions, *International Journal of Institutional Leadership, Policy and Management*, 7(3), 478 – 496.
- UNESCO (2021). *AI and education: Guidance for policy-makers*.
- UNESCO (2026). Naija teacher AI: An AI-powered system transforming teacher capacity at scale. https://www.unesco.org/sdg4education2030/en/knowledge-hub/naija-teacher-ai-ai-powered-system-transforming-teacher-capacity-scale?utm_source=chatgpt.com.
- World Bank (2020). *Realizing the Future of Learning: From Learning Poverty to Learning for Everyone*.