ASSESSMENT OF PERCEPTION, INTENTION AND CHALLENGES IN THE UTILIZATION OF AI FOR LEARNING AMONG BASIC SCHOOL STUDENTS IN FCT, ABUJA

[1] Josiah Owolabi, [2] Ojonugwa James, [3]Wanita Okoronkwo, [4] Ruth F. Lawal, [5] Janet I. Owolabi, [6] Omowumi A. Olowa, [7] Akin Olaleru.

[1,2,3] National Open University of Nigeria, Faculty of Education,
[4,5,6] Federal College of Education (Technical), Akoka, Yaba, Lagos State,
[7] Yaba College of Technology, Yaba, Lagos State.
joowolabi@noun.edu.ng, +2348150762756

Abstract

This study is titled "Assessment of Perception, Intention, and Challenges in the Utilization of AI for Learning among Basic School Students in FCT, Abuja". The study employed a descriptive survey design. The population of the study consists of 80,234 JSS students in both public and private schools in Abuja. 500 students were selected from nine public and private schools as samples. Structured questionnaire named "Students Perception and Intention to Use AI in Learning Questionnaire (SPIA-Q)" was used as data collection instrument. The reliability of the instrument was confirmed through a pilot study using the Cronbach Alpha coefficient of 0.78 and this indicates high consistency. Research questions were analyzed using frequencies, percentages, mean and standard deviation; while hypotheses were tested using independent samples t-test and ANOVA. Findings revealed a high level of perceived competence (mean scores: 3.30-3.45) and positive perception among students who demonstrated strong readiness to adopt AI (mean=3.35) and believed it would improve their academic performance (mean=3.26). Statistical analyses confirmed no significant difference in perception based on gender ($t=0.481$, $p>0.630$) or school type ($t=-1.035$, $p>0.301$), indicating a uniformly positive disposition across demographics. However, significant barriers were identified, primarily the lack of formal AI instruction in schools (mean=2.93, standard deviation = 0.994) and limited access to devices (mean=2.67, standard deviation = 0.014), and internet connectivity (mean=2.69, standard deviation = 0.980). In conclusion, while students in FCT basic schools are positively disposed and ready to embrace AI, the primary impediments are structural. Therefore the successful integration of AI hinges on a coordinated and decisive effort by educational institutions, government bodies and families to address the identified infrastructural and institutional challenges for effective implementation. The study therefore strongly recommends the immediate integration of AI literacy into the curriculum, comprehensive teacher training programmes, and substantial investment in digital infrastructure by the government and school administrators. Concurrently, awareness campaigns are essential to educate parents on the academic benefits of AI.

Keywords: Artificial Intelligence, Perception, Intention, Challenges, Basic Education.

Introduction

Artificial Intelligence (AI) is rapidly evolving and becoming increasingly integrated into everyday life, transforming industries such as education, healthcare, finance, and communication (Russell & Norvig, 2021). Defined as the simulation of human intelligence in

computers, enabling them to perform tasks like learning and problem-solving (Zhang & Lu, 2021): In the educational sector globally, AI is revolutionising learning by enhancing experiences, personalising instruction, and improving student engagement. AI-powered systems are designed to tailor educational content to individual learners' needs, thereby improving outcomes and motivation (Luckin et al., 2016).

The application of AI in education is diverse, encompassing intelligent tutoring systems, adaptive learning platforms, and social assistive robots, all aimed at making learning more engaging and effective (Ma et al., 2014; Nakic et al., 2015). Prominent educational leaders like Khan (2023) posit that AI holds the potential to personalise learning, reduce teacher burnout, and bridge achievement gaps. Tools such as Squirrel AI in China and Knewton in the United States have demonstrated the efficacy of AI in customising instruction based on individual learning needs (AxonPark, 2024). Despite these global advancements, the integration of AI into Nigeria's basic education system remains nascent and fraught with challenges. While a study by Badamasi and Chinonso (2025) found that AI-powered learning platforms positively impact student motivation and performance in the Abuja Municipal Area Council (AMAC), they noted that such tools are not widely used. Key barriers to adoption identified in the Nigerian context include poor infrastructure, lack of trained personnel, and limited government policy support (Edinoh et al., 2025). Consequently, the Nigerian government has yet to establish a clear plan for integrating AI into the basic school curriculum (Adebayo & Abdulhamid, 2021).

This infrastructural and policy gap directly impacts the end-users: the students. In developing countries like Nigeria, student awareness and readiness to adopt AI in learning remain under-researched. Many students are only slightly aware of AI tools, and their exposure largely depends on access to digital devices. This limited familiarity could hinder the effective use and acceptance of AI in classrooms. Research indicates that students' willingness to engage with AI tools is significantly influenced by their perception of its usefulness, ease of use, and their overall understanding of how it works (Li et al., 2023). Since perceptions play a critical role in the adoption of new technologies, it is imperative to understand what students think and feel about AI in learning. Against this backdrop, this study seeks to fill this gap by assessing the perception and intention to use AI in learning among public and private basic school pupils in the Federal Capital Territory (FCT), Abuja. The research aims to determine their awareness, perceptions, and willingness to adopt AI-based educational tools, while also identifying the underlying variables affecting their behavioural intention. The findings from this study are poised to contribute valuable insights for parents, educators, school administrators, and policymakers, thereby informing effective strategies for the implementation of AI in Nigeria's foundational education system.

Statement of the Problem

The global educational landscape is being reshaped by Artificial Intelligence (AI), which offers profound benefits for personalising learning and improving student outcomes. However, within the basic education system of the Federal Capital Territory (FCT), Abuja, a critical disconnect exists. While preliminary studies suggest AI's potential, its integration is hampered by

significant infrastructural and policy challenges, and more critically, by a fundamental lack of understanding of the pupils who are its intended end-users. The current trajectory, if unaddressed, will lead to a scenario where costly AI initiatives are implemented based on assumptions rather than evidence, resulting in wasted resources, low adoption rates, and a failure to harness the technology's potential to bridge educational gaps. At present, there is a dearth of empirical insight into how these young learners perceive AI and whether they even intend to use it. This study, therefore, arises to fill this specific gap by assessing the perception and intention to use AI in learning among basic school pupils in FCT, Abuja, providing the necessary foundational knowledge to guide effective, student-centered implementation strategies and prevent the repeated cycle of ineffective technological adoption in the region's schools.

Objectives of the Study

Specifically, the study focused on the following objectives:

1. Evaluate studentss' level of awareness of AI in learning at basic schools in Abuja.
2. Identify studentss' perception on the use of AI in learning at basic schools in Abuja.
3. Evaluate students' readiness to adopt AI in learning at basic schools in Abuja.
4. Determine the challenges students face in using AI for learning at basic schools in Abuja.
5. Recommend solutions to promote AI Adoption in learning at basic schools in Abuja.

Research Questions

The following research questions guided the study:

1. What is the students' level of awareness in the use of AI at basic schools in Abuja?
2. What are the perception of basic school students in Abuja regarding the use of artificial intelligence in learning?
3. What is the level of students' readiness to adopt artificial intelligence for learning at basic schools in Abuja?
4. What are the challenges facing basic school students in using AI for academic purposes in Abuja?
5. What are the possible solutions to promote AI Adoption in learning at basic schools in Abuja?

Hypotheses

The following hypothesis were also tested:

Ho1: There is no significant difference in the mean responses of male and female students in the level perception of AI in learning at basic schools in Abuja

Ho2: There is no significant difference in the mean responses of private and public school students in the level of perception of AI in learning at basic schools in Abuja.

Ho3: There is no significant difference in the mean responses of urban, semi-urban and rural school students in the level of perception of AI in learning at basic schools in Abuja.

Methodology

This study adopted a descriptive survey research design to investigate the perception and intention to use Artificial Intelligence (AI) in learning among at basic schools in Abuja. The target population was all 80,234 JSS students in both public and private schools within AMAC. A sample size of 500 respondents was determined using the Taro Yamane formula and selected through a multi-stage sampling technique, which involved the simple random selection of schools across urban, semi-urban, and rural districts, followed by the random selection of classes within those schools. The primary instrument for data collection was a researcher-structured questionnaire titled "Students' Perception and Intention to Use AI in Learning Questionnaire (SPIAI-Q)." This instrument is divided into demographic sections and thematic clusters measured on a four-point Likert scale, was validated by experts in educational technology and measurement and evaluation. Its reliability was confirmed through a pilot study which yielded a Cronbach's Alpha coefficient of 0.78, indicating high internal consistency.

Data collection was initiated after obtaining official permission and the cooperation of school principals. The researcher administered the questionnaires directly to students in their classrooms, explaining the study's purpose and ensuring immediate retrieval upon completion. The collected data were analyzed using both descriptive and inferential statistics. The research questions were answered using mean and standard deviation, with a decision point of 2.50. The hypotheses were tested at a 0.05 significance level; specifically, an independent samples t-test was used to examine differences based on gender and school type, while a one-way Analysis of Variance (ANOVA) was employed to assess differences across the urban, semi-urban, and rural school locations.

Results

Research Question One: What is the students' level of awareness in the use of AI at basic schools in Abuja?

Table 1: Level of awareness about the use of Artificial Intelligence in learning among the basic school students in Abuja

S/ N	Item	SA	A	D	SD	Mean	St. Dev.
1.	I am confident that I will perform well in AI lessons.	235(47.0)	261(52.2)	4(0.8)	0(0.0)	3.45	0.515
2,	If I put in effort, I can succeed in learning AI.	178(35.6)	312(62.4)	10(2.0)	0(0.0)	3.34	0.513

3.	I believe I can understand difficult topics about AI.	240(48.0)	177(35.4)	77(15.4)	6(1.2)	3.30	0.769
4.	I can learn the basic ideas about AI	234(47.2)	242(48.4)	20(4.0)	2(0.4)	3.42	0.591

The findings in table 1 indicate that basic school students in Abuja generally exhibits a high level of awareness regarding the use of Artificial Intelligence (AI) in learning. A vast majority expressed confidence in performing well in AI lessons (mean = 3.45) and believed that with effort, they could succeed in learning AI (mean = 3.34). Most also felt capable of learning the basic ideas about AI (mean = 3.42). While confidence in understanding difficult AI topics was slightly lower (mean = 3.30) and showed greater variability, the overall responses reflect strong self-belief, positive attitudes, and readiness to engage with AI-related learning, with only a small minority expressing doubt.

Research Question Two: What are the perception of basic school students in Abuja regarding the use of artificial intelligence in learning?

Table 2: The perception of basic school students in Abuja, regarding the use of artificial intelligence in learning.

S/N	ITEM	SA	A	D	SD	Mean	St. Dev.
1	I think using AI in class helps me understand my subjects better.	170(34.0)	260(52.0)	57(11.4)	13(2.6)	3.17	0.727
2	I trust the information given by AI	224(44.8)	182(36.4)	83(16.6)	11(2.2)	3.24	0.804
3	I think AI can help me do better in school if I use it the right way.	170(34.0)	296(59.2)	30(6.0)	4(0.8)	3.26	0.603
4	I believe AI technologies will follow the instructions I give	214(42.8)	183(36.6)	69(13.8)	34(6.8)	3.15	0.903

The results in table 2 show that basic school students in Abuja generally holds positive perceptions about the use of Artificial Intelligence (AI) in learning. A majority agreed that using AI in class helps them understand their subjects better (mean = 3.17) and that they trust the information provided by AI (mean = 3.24). Most also believed that AI could help them perform better in school if used appropriately (mean = 3.26), and a substantial proportion felt that AI technologies would follow their instructions (mean = 3.15). Although the mean scores

reflect overall agreement, responses to some items, particularly on AI's reliability in following instructions, showed slightly higher variability, suggesting that while perceptions are largely favourable, some students remain cautious about certain aspects of AI use in learning.

Research Question Three: What is the level of students' readiness to adopt artificial intelligence for learning at basic schools in Abuja?

Table 3: The level of students' readiness to adopt artificial intelligence for learning in Abuja.

S/N	ITEM	SA	A	D	SD	Mean	St. Dev.
1	I want to use AI tools to help me study.	202(40.2)	256(51.2)	40(8.0)	2(0.8)	3.32	0.633
2	I am ready to learn how to use AI to help my learning.	193(38.6)	291(58.2)	14(2.8)	2(0.4)	3.35	0.555
3	If my school provides AI tools, I will use them for learning.	184(36.8)	291(58.2)	25(5.0)	0(0.0)	3.32	0.563
4	I believe I can use AI tools on my own if I practice..	171(34.2)	289(57.8)	32(6.4)	8(1.6)	3.25	0.641

Students held generally positive perceptions of AI's utility in their education. The data in table 3 indicated that they believed AI could help them perform better in school if used correctly (Mean = 3.26, SD = 0.60) and trusted the information provided by AI (Mean = 3.24, SD = 0.80). Perceptions of AI's ability to help understand subjects better (Mean = 3.17, SD = 0.73) and follow instructions (Mean = 3.15, SD = 0.90) were also positive, though the latter showed greater response variability.

Research Question Four: What are the challenges facing basic school students in using AI for academic purposes in Abuja?

Table 4: The challenges to the adoption of AI technologies among basic school studentss in Abuja.

S/N	ITEM	SD	D	A	SA	Mean	St. Dev.
1	I do not have a phone, tablet, or computer to use AI tools.	125(25.0)	160(32.0)	139(27.8)	76(15.2)	2.67	1.014

2	There is no internet at home or in school to use AI tools.	133(26.6)	132(26.4)	182(36.4)	53(10.6)	2.69	0.980
3	My school does not teach us about AI.	179(35.8)	158(31.6)	112(22.4)	51(10.2)	2.93	0.994
4	My parent do not allow me to use AI	102(20.4)	74(14.8)	185(37.4)	139(27.8)	2.72	1.080

Several significant challenges were identified. The most prominent challenge, as presented in table 4, was the lack of formal instruction, with students reporting that their schools do not teach them about AI (Mean = 2.93, SD = 0.99). Other major barriers included parental restrictions (Mean = 2.72, SD = 1.08), lack of internet access (Mean = 2.69, SD = 0.98), and lack of access to devices like computers or tablets (Mean = 2.67, SD = 1.01).

Research Question Five: What are the possible solutions to promote AI Adoption in Learning at basic schools in Abuja?

Table 5: The possible solutions to the challenges inherent in the adoption of AI technologies among basic school students in Abuja

S/N	ITEM	SA	A	D	SD	Mean	St. Dev.
1	Schools should teach us how to use AI for learning	133(26.6)	332(66.4)	23(4.6)	12(2.4)	3.17	0.616
2	Teachers should be trained to help students use AI tools	168(33.6)	306(61.2)	16(3.2)	10(2.0)	3.26	0.616
3	The government should provide schools with what will help students to use AI.	131(26.2)	348(69.6)	17(3.4)	4(0.8)	3.21	0.533
4	Parents should allow students to use AI learning.	130(26.0)	349(69.8)	17(3.4)	4(0.8)	3.21	0.531

Students strongly endorsed several strategies to overcome these barriers. As detailed in table 5, the most supported solution was the training of teachers to help students use AI tools (Mean = 3.26, SD = 0.62). There was also strong consensus on the need for schools to integrate AI into the curriculum (Mean = 3.17, SD = 0.62), and for both the government to provide necessary resources and for parents to permit AI use (Mean = 3.21, SD = 0.53 for both).

Hypothesis One: There is no significant difference in the male and female students' perception of the use of Artificial Intelligence in learning at basic schools in Abuja.

Table 6: T-test analysis of no significant difference in the male and female pupils' perception of uses of Artificial Intelligence in learning.

GENDER	N	Mean	Std. Dev.	T	df	Sig. (2-tailed)	Remark
Male	250	7.2080	1.74151	0.481	498	0.630	**N S**
Female	250	7.1320	1.78868				

The results in table 6 show the t-test analysis of the difference between male and female students' perception of the use of Artificial Intelligence (AI) in learning. The mean perception scores for male and female students were 7.21 and 7.13, respectively, with standard deviations of 1.74 and 1.79. The calculated t-value of 0.481 at 498 degrees of freedom yielded a p-value of 0.630, which is greater than the 0.05 level of significance. This indicates that there is no statistically significant difference in the perception of AI use in learning between male and female students. Therefore, the null hypothesis, which states that there is no significant difference in the male and female students' perception of AI in learning, is not rejected.

Hypothesis Two: There is no significant difference in the perception of Artificial Intelligence use in learning between private and public school students in Abuja.

Table 7: T-test analysis of significant difference in the perception of Artificial Intelligence use in learning between private and public school students.

SCH. TYPE	N	Mean	Std. Dev.	T	df	Sig. (2-tailed)	Remark
Public	300	7.1033	1.57722	-1.035	498	0.301	**N. S**
Private	200	7.2700	7.2700				

The results in table 7 present the t-test analysis of the difference in the perception of Artificial Intelligence (AI) use in learning between private and public school students. The mean perception score of public school students was 7.10 (SD = 1.58), while that of private school students was 7.27. The calculated t-value of -1.035 at 498 degrees of freedom yielded a p-value of 0.301, which is greater than the 0.05 level of significance. This result indicates that there is no statistically significant difference in the perception of AI use in learning between students in private and public schools. Consequently, the null hypothesis, which states that there is no significant difference in the perception of AI use in learning between private and public school students, is not rejected.

Hypothesis Three: There is no significant difference in students' perception of uses of Artificial Intelligence in learning across urban, semi-urban, and rural areas of Abuja.

Table 8: Multiple Regression ANOVA

Perception	Sum of Squares	Df	Mean Square	F	p-Value
Between Groups	5.157	2	2.578	0.828	0.437
Within Groups	1547.393	497	3.113		

Total	1552.550	499

Table 9: Multiple Comparison of different school location structure and how they were affected

(I) School Location	(J) School Location	Mean Difference (I-J)	P-value
Urban	Semi-Urban	-0.24405	0.448
	Rural	-0.15941	0.713
Semi-Urban	Urban	0.24405	0.448
	Rural	0.08464	0.909
Rural	Urban	0.15941	0.713
	Semi-Urban	-0.08464	0.909

The results in tables 8 and 9 examine whether there is a significant difference in students' perception of the use of Artificial Intelligence (AI) in learning across urban, semi-urban, and rural areas of AMAC, FCT-Abuja. The ANOVA results in table 8 show an F-value of 0.828 with a p-value of 0.437, which is greater than the 0.05 level of significance. This indicates that there is no statistically significant difference in students' perception of AI use across the three school locations. Furthermore, the multiple comparison results in table 9 confirm this finding, as none of the pairwise comparisons between urban, semi-urban, and rural students yielded statistically significant p-values (all $p > 0.05$). For example, the mean difference between urban and semiurban students is -0.24405 ($p = 0.448$), while that between urban and rural students is -0.15941 ($p = 0.713$). Similarly, semi-urban versus rural students showed no significant difference (mean difference = 0.08464, $p = 0.909$).

Discussion of Findings

The findings revealed that basic school students in Abuja, showed a generally high level of awareness about the use of Artificial Intelligence (AI) in learning. Many students expressed confidence in their ability to excel in AI lessons, while others believed that with consistent effort, they could succeed in learning the subject. A large number of the students also felt capable of grasping the basic concepts of AI. Their confidence, however, was lower in the area of handling more complex AI topics; the overall trend still reflects strong self-belief and a positive attitude toward adopting AI in learning. The findings align with those of Adelana and Akinyemi (2021), who found that senior secondary school students to a high extent were aware of AI-based systems for learning. The findings of the study are also in consonance with the findings of Okoye et al. (2024), who submitted that the majority of secondary school students are aware of AI tools such as Chatbot, Diolingo, Quillbot, Grammarly, Google Translate and Talkpal chat for learning of English language.

The finding indicated that basic school students in Abuja generally had positive perceptions about the use of AI in learning. Many of them agreed that AI could help them better understand their subjects; a good number also expressed trust in the information AI provides. They also

believe that AI could improve their academic performance if applied appropriately. In addition, several students felt that AI technologies were capable of following instructions. However, while the overall perception was favorable, a few students still showed caution regarding the reliability of AI in learning. The finding is in line with the findings of Idroes et al. (2023), who found that students had a positive perception of the use of AI in education because it provides benefits such as improving the quality of learning and providing more learning experiences. The findings of the study also corroborate those of Guanah & Orhibabor (2023), who observed that most of the students have a good perception of the use of AI.

The findings revealed that basic school students in Abuja, demonstrated a high level of readiness to adopt AI for learning. This is because many of them expressed a strong desire to use AI tools to support their studies, while others showed great willingness to learn how to apply AI for educational purposes. A large number of the students indicated that they will readily use AI tools if their schools make them available. Additionally, many of the students believed that they could use such tools independently with practice. In all, the results showed a generally positive and consistent readiness among students to adopt AI, with only a small proportion of the students displaying hesitation. The finding is in agreement with the findings of Adelana and Akinyemi (2021), who observed that senior secondary school students have a high level of readiness to adopt and use an AI-based tutoring system for learning. The finding is also in consonance with that of Adigun et al. (2025), who found a positive and significant relationship between effort expectancy and pre-service teachers' behavioral intention to adopt and use AI tools.

The findings showed that the basic school students in Abuja encountered several challenges in adopting AI technologies for learning. Many of the students expressed that their schools do not provide teaching on AI, and others pointed to parental restrictions as a barrier to using AI tools. Limited access to devices such as phones, tablets and computers also posed a significant challenge, alongside a lack of Internet connectivity both at home and in school. In addition, some important instructional, infrastructural and parental factors were also noted as barriers in one form or the other to the effective adoption of AI in learning among the respondents. The findings align with those of Onyanabo (2024), who found that although AI has the potential to significantly improve educational outcomes, its effectiveness is hindered by systemic issues. The lack of reliable Internet service access and adequate funding emerged as major barriers to the widespread adoption of AI in Nigerian education.

In this study, most of the basic school students in Abuja emphasized the need for teachers to be trained so that they can guide the students in the use of AI tools effectively. Others submitted that the schools should take responsibility for providing AI education to learners. Some stressed the importance of government support in supplying resources and infrastructures that would make AI adoption possible. Additionally, some of the respondents believed that parents should allow and encourage their children to use AI for educational purposes. In all, there is a strong consensus that teachers, schools, government and families all have important roles to play in making AI a successful tool for learning.

The findings align with Onyanabo (2024), who found that overcoming the challenges of AI adoption in Nigerian education requires a coordinated effort from all stakeholders. Specifically, increased funding, improved infrastructure, comprehensive training programmes and supportive policies are necessary. By addressing these issues, AI can be effectively leveraged to bring significant improvements to the educational system, thereby enhancing national development and promoting equality in education. The finding is also in line with the study of Nugroho and Trisusana (2025), who noted that students find solutions such as double-checking

results, training algorithms, purchasing premium versions of AI and human roles to keep the originality in order to overcome the challenges of using AI for academic writing.

Conclusion

This study concludes that basic school students in the FCT possess a strong positive perception and a high level of readiness to adopt Artificial Intelligence (AI) for learning. The primary impediments to adoption are not student willingness but systemic challenges, including a lack of infrastructure, formal instruction, and supportive environments. Therefore, the integration of AI into basic education is both desirable and achievable, contingent upon collaborative efforts from all stakeholders to create the necessary enabling conditions.

Recommendations

Based on the findings of this study, the following recommendations are proffered:

1. School management, in collaboration with ICT teachers, should organize awareness programs to solidify students' understanding of the importance and application of AI in learning.
2. School authorities should actively integrate practical sessions with AI tools and applications into the classroom to enhance students' hands-on experience and positive perception
3. Given the high level of student readiness, the government and educational policymakers should develop a clear framework for the phased implementation of AI for learning in basic schools.
4. Comprehensive training programs should be developed and implemented for teachers to build their capacity for the effective use and integration of AI tools in classroom instruction.
5. The government and school authorities should prioritize the provision of essential resources, including modern computers, reliable internet access, and relevant AI software, to facilitate effective adoption.

References

Adebayo, S., & Abdulhamid, S. (2021). Digital learning initiatives and challenges in Nigerian basic education. *Journal of Educational Technology and Policy*, *15*(2), 45–59.

Adelana, O. P., & Akinyemi, A. L. (2021). Artificial intelligence-based tutoring systems utilization for learning: A survey of senior secondary students' awareness and readiness in Ijebu-Ode, Ogun State. *Unizik Journal of Educational Research and Policy Studies*, *9*(2), 16–29. https://unijerps.org

Adigun, O. T., Tijani, F. A., Haihambo, C. K., & Enock, S. L. (2025, February). Understanding pre-service teachers' intention to adopt and use artificial intelligence in Nigerian inclusive classrooms. In *Frontiers in Education* (Vol. 10, p. 1519472). Frontiers Media SA.

AxonPark. (2024). *AI and adaptive learning platforms*. https://axonpark.com

Badamasi, Y., & Chinonso, P. (2025). The impact of AI-powered platforms on student motivation and performance in Abuja Municipal Area Council. *Journal of African Educational Research*, *12*(1), 55–68.

Edinoh, V., Musa, T., & Ibrahim, H. (2025). Barriers to artificial intelligence adoption in Nigerian schools. *International Journal of Educational Innovation*, *6*(2), 73–89.

Guanah, J. S., & Oribhabor, O. (2023). Knowledge and perception of the use of artificial intelligence among undergraduate students of Nnamdi Azikiwe University, Awka.

Idroes, G. M., Noviandy, T. R., Maulana, A., Irvanizam, I., Jalil, Z., Lensoni, L., ... & Idroes, R. (2023). Student perspectives on the role of artificial intelligence in education: A survey-based analysis. *Journal of Educational Management and Learning*, *1*(1), 8-15.

Khan, S. (2023). The future of learning with AI: Insights from Khan Academy. *Educational Leadership*, *81*(4), 14–19.

Luckin, R., Holmes, W., & Clark, D. (2016). *Intelligence unleashed: An argument for AI in education*. Pearson.

Ma, W., Adesope, O., Nesbit, J. C., & Liu, Q. (2014). Intelligent tutoring systems and learning outcomes: A meta-analysis. *Journal of Educational Psychology*, *106*(4), 901–918. https://doi.org/10.1037/a0037123

Nakic, J., Granic, A., & Glavinic, V. (2015). Anatomy of student models in adaptive learning systems: A systematic literature review of individual differences from 2001 to 2013. *Journal of Educational Computing Research*, *51*(4), 459–489.

Nugroho, R. A., & Trisusana, A. (2025). Students' challenges and solutions of using AI-based tools for academic writing. *Pubmedia Jurnal Pendidikan Bahasa Inggris*, *2*(2), 1–11. https://edu.pubmedia.id/index.php/jpbi

Okoye, C. C., Udenwa V. C., Chetuya, C. N., & Chineme A.C. (2024). Awareness and use of artificial intelligence tools for learning of English language among secondary school students in Awka South LGA, Anambra State. *Journal of Theoretical and Empirical Studies in Education*, *9*(2), 115–128. https://journals.unizik.edu.ng/jtese

Onyanabo, T. A. (2024). *Educational transformation in Nigeria through AI: Prospects and challenges*. University of Ibadan.

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

Zhang, K., & Lu, Y. (2021). The impact of artificial intelligence on education. *Frontiers in Psychology*, *12*, 1–8.