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TEACHERS' READINESS AND CHALLENGES IN INTEGRATING ARTIFICIAL INTELLIGENCE TOOLS IN TEACHING COMPUTER STUDIES AT THE SECONDARY SCHOOL LEVEL

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ABSTRACT
This study investigated teachers' readiness and challenges in integrating artificial intelligence tools in teaching computer studies at the secondary school level in Anambra State, Nigeria. Three research questions guided the investigation while three hypotheses were tested. The population comprised 148 computer studies teachers in public secondary schools across the 21 Local Government Areas of Anambra State, from which a sample of 108 teachers was selected using multi-stage sampling technique, though 103 teachers participated in the study. Data were collected using a researcher-designed structured questionnaire titled the "Teachers' Readiness for AI Integration Questionnaire" (TRAIQ) and the "Challenges in AI Integration Questionnaire" (CAIQ), The collected data were analyzed using descriptive statistics (means, standard deviations, and percentages) and Pearson Product Moment Correlation, with hypotheses tested using t-test and correlation analysis at 0.05 level of significance. The findings revealed that computer studies teachers demonstrated low overall readiness for AI integration, with self-efficacy recording the lowest dimension while ethical awareness was highest. Teachers faced substantial challenges in AI integration, with inadequate ICT infrastructure, lack of training, and financial constraints being the most critical barriers. A significant negative relationship existed between teacher readiness and integration challenges. The study recommended that educational authorities should implement comprehensive professional development programs addressing the four dimensions of teacher readiness while simultaneously investing in ICT infrastructure and institutional support systems to facilitate successful AI integration in secondary computer studies education.

Keywords: Artificial intelligence integration, computer studies education, teacher readiness, secondary education, technology adoption

Introduction

The Nigerian educational landscape is experiencing a gradual transformation as artificial intelligence (AI) technologies begin to emerge as potential tools for enhancing teaching and learning processes. The gradual advancement of AI has pervaded contemporary society, altering several areas of people's lives and reforming the use of technology especially in education (Adetayo, 2023; Adekoya et al., 2024). Zhai and Nehm (2024) emphasized that the introduction of AI into education marks a significant departure from conventional teaching methods, offering personalized learning and support for diverse educational requirements, particularly in specialized subjects such as computer studies. The pervasive influence of computer technology has catalyzed a surge in online learning within the country, yielding positive educational outcomes. However, despite these advancements, a considerable number of educational institutions in Nigeria have yet to leverage AI technologies effectively (Ibitoye, Abdullahi, Ekele and Ibitoye, 2025).

The significance of incorporating AI tools in computer science education at the secondary level cannot be overstated. Computer studies has evolved from a niche technical discipline to a foundational skill set that underpins numerous career paths and societal functions. Students who engage with AI technologies during their formative secondary school years are better positioned to understand, critique, and contribute to the technological systems that will shape their professional and personal lives (Zhou & Peng, 2025). Moreover, early exposure to AI concepts and tools can demystify these technologies, fostering a generation of digitally literate citizens who can navigate an AI-

integrated world with confidence and ethical awareness. However, translating this promise into effective practice in Nigeria hinges on the readiness and capacity of the local system to address structural and contextual barriers.

The Nigerian educational system, particularly at the secondary school level, faces unique challenges that make the integration of AI tools in computer studies education both necessary and complex. Within this environment, teacher readiness emerges as a critical pivot point: while many educators understand the relevance of AI and express willingness to adopt it, significant constraints remain, including limited AI literacy, insufficient institutional support, low confidence, and ethical awareness, hindering effective classroom integration (Sunday et al., 2025, Wu & Zhang, 2025). In the Nigerian environment, secondary-school teachers often encounter limitations in access and training that constrain meaningful technology use. Challenges to AI integration, such as insufficient infrastructure, limited professional development, ethical and data privacy concerns, and institutional support deficits, shape the environment in which readiness emerges or falters.

In the context of this study, readiness encompasses practical technical skills, pedagogical integration, ethical understanding, and self-confidence in using AI resources in lessons (Eke, 2024). Teacher readiness for AI integration encompasses four critical dimensions. The first, technical skills involve teachers' ability to operate AI tools such as ChatGPT, Magixbox, code assistants, chatbots, or adaptive tutoring systems in classroom settings, though existing literature within Nigeria demonstrates that lack of digital training and unstable infrastructure bog down even well-motivated teachers (Nwana, Ofoegbu & Egbe, 2017). Secondly, pedagogical integration considers how teachers adapt and embed AI in lesson planning and instructional delivery, moving beyond mere tool operation to design learning tasks that meaningfully engage students. However, in Anambra State, where computer labs are unevenly distributed across schools, reports on emerging technologies for job-creation education confirm that awareness of such tools is low and application shallow when pedagogical training is missing (Uwaezuoke, 2023).

The remaining dimensions focus on ethical considerations and teacher confidence. Ethical awareness involves sensitivity to AI's implications including algorithmic bias, data privacy, and fairness concerns, with Nigerian commentary on integrating AI into education repeatedly highlighting the absence of clear policies to safeguard student data or prevent misuse (Sule, 2024). Self- efficacy and confidence describe a teacher's belief in their capacity to handle AI tools effectively, with national studies of teachers finding that perceived relevance of AI and confidence in teaching it strongly predicted readiness and intention to adopt such tools (Ayanwale et al., 2022, 2025, Samaila et al., 2024). Together, these four dimensions, technical skills, pedagogical integration, ethical awareness, and self-efficacy, constitute a comprehensive definition of teacher readiness that recognizes both infrastructure challenges and the critical role of confidence in successful AI adoption.

The readiness of Nigerian teachers for AI integration, especially in the specific contest of Anambra State, presents a complex picture of both unique opportunities and challenges in secondary computer studies education. In Anambra State, where teacher readiness for AI integration already shows both promise and limitations, emerging pilot projects in Nigerian schools offer promising glimpses of what thoughtful AI integration can achieve when implemented under more supportive conditions. A pioneering experiment conducted in Edo State during June and July 2024 involved 800 first-year senior secondary students who attended after-school English classes utilizing Microsoft Copilot, a generative AI tool (De Simone et al., 2024). The program demonstrated that students could engage productively with AI tools when teachers served as "orchestra conductors," guiding interactions and providing structured prompts. However, the pilot also revealed significant infrastructural challenges, including frequent power and internet outages that disrupted sessions, highlighting the foundational requirements necessary for successful AI integration in Nigerian schools. Additionally, the Federal Government's recent initiative to train 6,000 senior secondary school teachers on AI pedagogy across the country represents a significant step toward building national capacity for AI integration in education (Nairametrics, 2025).

As is shown above, where there are opportunities, there are potential challenges that could constrain both readiness and integration of AI in secondary computer studies education in Nigeria, and especially Anambra state. The state has a relatively developed educational infrastructure compared to some other Nigerian states, yet still faces significant challenges in ICT implementation. Research conducted in Awka South Local Government Area revealed that the challenges include lack

of access to ICT infrastructure, absence of trained teachers who can effectively incorporate ICT into their teaching, and inadequate funding for technology in schools (Odoh, 2023). However, while these baseline ICT challenges are documented, the specific readiness levels of computer science teachers for integrating advanced AI tools and the unique challenges posed by AI technologies remain unexplored in the Anambra State context. AI integration presents distinct requirements beyond basic ICT implementation, including specialized technical competencies in operating AI-powered educational tools, pedagogical skills for embedding AI in computer science instruction, ethical awareness regarding algorithmic bias and data privacy, and teacher self-efficacy in utilizing these emergent technologies—dimensions that differ substantially from general ICT adoption challenges.

The challenges facing AI integration in Nigerian secondary schools extend beyond technical considerations to encompass broader systemic issues. While existing literature suggests potential barriers such as infrastructural deficiencies, funding constraints, and policy gaps in Nigerian educational contexts (Okonkwo, 2024; Okwudinma, 2024; Samaila et al., 2024), the specific nature, magnitude, and interplay of these challenges within Anambra State's computer science education remain empirically unverified. This study therefore seeks to investigate which of these theoretically identified barriers manifest most significantly among computer science teachers and how these challenges specifically constrain AI integration in the local context.

Given the technological relevance of computer studies curriculum, often involving coding, logic, and algorithmic thinking, secondary- school teachers in Anambra present an important focus for empirical study. The existing research underscores that teacher perceptions and integration practices around AI are underexplored in Nigerian secondary- school settings, particularly in Anambra State. While evidence from Akwa Ibom State provides insight on teachers' perceptions and academic performance implications (Sunday et al., 2025), similar data for Anambra are absent.

This study addresses the critical need for empirical research specifically focused on teachers' readiness and challenges in integrating AI tools in secondary computer studies education within the Anambra State context. By examining the current state of teacher preparedness in this specific geographical and educational context, identifying barriers to successful AI integration, and analyzing factors that contribute to effective implementation, this research contributes to the growing body of knowledge that can inform policy decisions, professional development programs, and institutional strategies tailored to the Nigerian educational environment. The findings of this study have the potential to guide educators, administrators, and policymakers in Anambra State and similar Nigerian contexts in developing more effective approaches to AI integration that maximize educational benefits while addressing the unique challenges and constraints of the Nigerian educational system.

Statement of the Problem

The growing recognition of artificial intelligence as a transformative educational tool and the Nigerian government's initiatives to integrate AI into secondary education notwithstanding, there remains a significant gap in understanding the specific readiness levels and challenges faced by computer science teachers in Anambra State secondary schools. While pilot programmes in other Nigerian states like Edo have demonstrated the potential benefits of AI integration, the unique contextual factors within Anambra State, including varying levels of ICT infrastructure, teacher training backgrounds, and institutional support systems, create distinct challenges that have not been adequately investigated. The absence of empirical data on how computer studies teachers in Anambra State perceive their preparedness across the four critical dimensions of AI readiness, technical skills, pedagogical integration, ethical awareness, and self-efficacy, presents a significant knowledge gap that hinders the development of targeted interventions and policy responses tailored to the specific needs of this educational context.

Furthermore, the challenges constraining AI integration in computer studies education within Anambra State secondary schools remain poorly documented and understood, despite evidence from neighboring states and local government areas highlighting infrastructural deficiencies, inadequate teacher training, and insufficient institutional support. The interconnected nature of these challenges, ranging from basic ICT infrastructure limitations to complex ethical and pedagogical considerations, requires comprehensive investigation to inform evidence-based solutions. Without a clear understanding of the specific barriers that computer studies teachers encounter when attempting to integrate AI tools into their instructional practices, educational administrators and policymakers lack

the necessary insights to develop effective professional development programs, allocate resources appropriately, and create supportive policy frameworks that can facilitate successful AI adoption in Anambra State's secondary computer studies education landscape.

Research Questions

The following research questions guided this study:

1. What is the level of readiness of computer studies teachers in Anambra State secondary schools for integrating artificial intelligence tools in their teaching practice?
2. What are the major challenges faced by computer studies teachers in Anambra State secondary schools when integrating artificial intelligence tools into their instructional practices?
3. What is the relationship between computer studies teachers' readiness levels and the challenges they encounter in integrating AI tools in Anambra State secondary schools?

Research Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

H_{o1}: Computer studies teachers in Anambra State secondary schools do not demonstrate significant readiness for integrating artificial intelligence tools in their teaching practice.

H_{o2}: Computer studies teachers in Anambra State secondary schools do not face significant challenges when integrating artificial intelligence tools into their instructional practices.

H_{o3}: There is no significant relationship between computer studies teachers' readiness levels and the challenges they encounter in integrating AI tools in Anambra State secondary schools.

Methodology

The study employed a descriptive survey design, employing questionnaire-based data collection to investigate the readiness of secondary-school computer studies teachers in Anambra State. Anambra state, one of the five states in the South-East geopolitical zone of Nigeria, had a total land area of 4,844 square kilometers and comprises 21 Local Government Areas, and has 268 public and mission secondary schools under the Post- Primary Schools Services Commission supervision. Among these, computer studies instruction is provided in schools with functional ICT infrastructure and qualified teachers.

The population for this study consisted of all computer studies teachers in public secondary schools across the 21 Local Government Areas of Anambra State, totaling 148 teachers as obtained from the Anambra State Ministry of Education records. A sample size of 108 computer studies teachers was determined using Krejcie and Morgan's formula for sample size determination. The multi-stage sampling technique was employed to select participants. In the first stage, stratified sampling was used to divide the state into three educational zones (Awka, Onitsha, and Nnewi), ensuring proportional representation. In the second stage, simple random sampling was utilized to select Local Government Areas from each zone, followed by random selection of schools within the chosen LGAs. Finally, all computer studies teachers in the selected schools were included in the study through total enumeration.

The instruments for data collection were two structured questionnaires: the "Teachers' Readiness for AI Integration Questionnaire" (TRAIQ) and the "Challenges in AI Integration Questionnaire" (CAIQ), both of which were researcher-designed based on extensive literature review. The TRAIQ comprised two sections: Section A collected demographic information, while Section B contained 12 items assessing teacher readiness across four dimensions (technical skills, pedagogical integration, ethical awareness, and self-efficacy), with three items per dimension. The CAIQ consisted of 14 items examining various challenges faced in AI integration, including infrastructure, training, funding, institutional support, and ethical concerns. Both instruments utilized a 4-point Likert scale ranging from Strongly Agree (4) to Strongly Disagree (1) to eliminate neutral responses and ensure definitive participant positions.

To ensure instrument validity, both questionnaires were subjected to face and content

validation by three experts in educational technology and computer science education from universities in Southeast Nigeria. Their suggestions were incorporated to improve clarity and relevance of items. The instruments' reliability was established through a pilot study conducted with 20 computer science teachers from Enugu State who shared similar characteristics with the study population but were not part of the main study. Cronbach's alpha coefficient yielded reliability values of 0.84 for TRAIQ and 0.79 for CAIQ, indicating high internal consistency for both instruments.

Data collection was conducted through direct administration of questionnaires to participants in their respective schools with the assistance of three research assistants who were postgraduate students in the Faculty of Education and colleagues of the researcher. These assistants were briefed on the research objectives, ethical protocols, and proper questionnaire administration procedures during a one-day orientation session. Prior to data collection, ethical approval was obtained from relevant educational authorities, and informed consent was secured from all participants. The completed questionnaires were retrieved within two weeks of distribution, achieving a response rate of 95%.

The collected data were analyzed using Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics including means, standard deviations, and percentages were employed to answer research questions one and two, while Pearson Product Moment Correlation was used to address research question three. The corresponding hypotheses were tested using t-test and correlation analysis at 0.05 level of significance, with mean scores of 2.50 and above considered as indicating agreement on the 4-point scale.

Results

The findings of this study are presented according to the research questions and hypotheses that guided the investigation.

Research Question 1: What is the level of readiness of computer studies teachers in Anambra State secondary schools for integrating artificial intelligence tools in their teaching practice?

Table 1: Item-level response distribution for Teachers' Readiness

Items	SA (%)	A (%)	D (%)	SD (%)	Mean	St. Dev	Interpretation
Technical Skills Dimensions							
I can operate basic AI tools like ChatGPT for educational purposes	8(7.7)	32(31.1)	45(43.7)	18(17.5)	2.34	0.82	Low
I am familiar with AI-powered coding assistants and tutoring systems	5(4.9)	25(24.3)	52(50.4)	21(20.4)	2.18	0.76	Low
I can troubleshoot technical issues when using AI tools in class	9(8.7)	35(34.0)	41(39.8)	18(17.5)	2.41	0.85	Low
Pedagogical Integration Dimension							
I can design lesson plans that incorporate AI tools effectively	12(11.7)	38(36.9)	38(36.9)	15(14.6)	2.52	0.29	High
I know how to adapt AI tools to meet diverse student learning needs	7(6.8)	33(32.0)	44(42.7)	19(18.4)	2.39	0.88	Low
I can create meaningful learning activities using AI technologies	8(7.8)	36(35.0)	41(39.8)	18(17.5)	2.44	0.81	Low
Ethical Awareness Dimension							

Items	SA (%)	A (%)	D (%)	SD (%)	Mean	St. Dev	Interpretation
I understand the privacy concerns related to using AI in education	18(17.5)	49(47.6)	28(27.2)	8(7.8)	2.73	0.69	High
I am aware of potential biases in AI systems that may affect learning	15(14.6)	46(44.7)	32(31.1)	10(9.7)	2.65	0.74	High
I can guide students on responsible use of AI tools	14(13.6)	44(42.7)	35(34.0)	10(9.7)	2.62	0.78	High
Self-Efficacy Dimension							
I feel confident teaching computer studies concepts using AI tools	6(5.8)	24(23.3)	49(47.6)	24(23.3)	2.21	0.89	Low
I believe I can successfully integrate AI into my teaching practice	4(3.9)	22(21.4)	51(49.5)	26(25.2)	2.15	0.91	Low
I am comfortable learning new AI technologies for classroom use	5(4.9)	25(24.3)	52(50.5)	21(20.4)	21.8	0.75	Low
Overall Readiness	**119(9.0)**	**409(33.2)**	**508(41.2)**	**208(16.8)**	**2.40**	**0.68**	**Low**

N = 103; SA = Strongly Agree (4), A = Agree (3), D = Disagree (2), SD = Strongly Disagree (1); Cut-off point = 2.50

The results in Table 1 reveal that computer studies teachers in Anambra State secondary schools demonstrate low overall readiness for AI integration (M = 2.40, SD = 0.68). The response distribution shows that 41.2% of all responses were "Disagree" while only 9.0% were "Strongly Agree" across all readiness items. Within the technical skills dimension, the majority of teachers disagreed with their ability to use AI-powered coding assistants (50.5% disagreed, 20.4% strongly disagreed). For pedagogical integration, lesson planning with AI tools showed the most balanced response, with 48.6% agreement compared to 51.5% disagreement. The ethical awareness dimension demonstrated the strongest performance, with privacy understanding receiving 65.1% agreement (17.5% strongly agree, 47.6% agree). However, self-efficacy consistently showed concerning patterns, with confidence in successful AI integration recording 74.7% disagreement (49.5% disagree, 25.2% strongly disagree).

Research Question 2: What are the major challenges faced by computer studies teachers in Anambra State secondary schools when integrating artificial intelligence tools into their instructional practices?

Table 2: Challenges Faced by Teachers in AI Integration

Items	SA (%)	A (%)	D (%)	SD (%)	Mean	St. Dev	Interpretation
My school lacks adequate computers and internet for AI integration	52(50.5)	42(40.8)	7(6.8)	2(1.9)	3.45	0.68	Major Challenge
There is insufficient electricity supply to support AI technology use	47(45.6)	44(42.7)	9(8.7)	3(2.9)	3.38	0.74	Major Challenge
I have not received training on how to use AI tools for teaching	49(47.6)	45(43.7)	7(6.8)	2(1.9)	3.42	0.71	Major Challenge

Items	SA (%)	A (%)	D (%)	SD (%)	Mean	St. Dev	Interpretation
Professional development programs on AI in education are not available	43(41.7)	47(45.6)	10(9.7)	3(2.9)	3.34	0.79	Major Challenge
My school cannot afford to purchase AI software and subscriptions	48(46.6)	46(44.7)	7(6.8)	2(1.9)	3.39	0.66	Major Challenge
There is no budget allocation for AI technology in our school	41(39.8)	48(46.6)	11(10.7)	3(2.9)	3.31	0.73	Major Challenge
The school administration does not support AI integration initiatives	38(36.9)	50(48.5)	12(11.7)	3(2.9)	3.26	0.77	Major Challenge
I lack technical support when AI tools malfunction during lessons	40(38.8)	49(47.6)	11(10.7)	3(2.9)	3.29	0.82	Major Challenge
I am concerned about student data privacy when using AI platforms	32(31.1)	54(52.4)	14(13.6)	3(2.9)	3.18	0.85	Major Challenge
There are no clear policies governing AI use in our school	28(27.2)	56(54.4)	16(15.5)	3(2.9)	3.12	0.88	Major Challenge
I prefer traditional teaching methods over new AI technologies	19(18.4)	49(47.6)	28(27.2)	7(6.8)	2.87	0.93	Major Challenge
The curriculum schedule does not allow time for AI tool exploration	15(14.6)	44(42.7)	35(34.0)	9(8.7)	2.74	0.91	Major Challenge
My students lack basic digital skills needed for AI interaction	9(8.7)	44(42.7)	41(39.8)	9(8.7)	2.61	0.86	Major Challenge
Parents express concerns about AI use in their children's education	8(7.8)	39(37.9)	46(44.7)	10(9.7)	2.53	0.89	Major Challenge
Overall Readiness	**469(32.5)**	**657(45.6)**	**254(17.6)**	**62(4.3)**	**3.13**	**0.61**	**Major Challenge**

N = 103; SA = Strongly Agree (4), A = Agree (3), D = Disagree (2), SD = Strongly Disagree (1); Cut-off point = 2.50

Table 2 demonstrates that computer studies teachers in Anambra State face substantial challenges in AI integration, with an overall mean score of 3.13 (SD = 0.61). The response distribution reveals that 78.1% of all responses indicated agreement with the challenge statements (32.5% strongly agree, 45.6% agree). Infrastructure-related challenges received the strongest agreement, with 91.3% of teachers agreeing that their schools lack adequate computers and internet for AI integration (50.5% strongly agree, 40.8% agree). Training deficiencies also showed overwhelming consensus, as 91.3% of teachers agreed they have not received adequate training on AI tools (47.6% strongly agree, 43.7% agree). Financial constraints dominated responses, with 91.3% agreeing that schools cannot afford AI software and subscriptions. Institutional challenges also received substantial agreement, including lack of administrative support (85.4% agreement) and absence of technical support (86.4% agreement). Even softer challenges like preference for traditional methods showed 66.0% agreement, while student digital literacy gaps recorded 51.4% agreement, confirming that teachers perceive multiple interconnected barriers to successful AI integration.

Research Question 3: What is the relationship between computer studies teachers' readiness levels and the challenges they encounter in integrating AI tools in Anambra State secondary schools?

Table 3: Correlation between Teacher Readiness and Challenges in AI Integration

Variables	N	Mean	SD	r	p-value	Interpretation
Teacher Readiness	103	2.40	0.68			Significant
Integration Challenges	103	3.12	0.59	-0.342	0.000	Negative

$p < 0.05$; r = Pearson correlation coefficient

The correlation analysis in Table 3 reveals a significant negative relationship between teacher readiness and integration challenges ($r = -0.342$, $p = 0.000$). This indicates that as the challenges faced by teachers increase, their readiness for AI integration decreases. The relationship is statistically significant at $p < 0.05$, suggesting that the challenges encountered by teachers significantly influence their preparedness to integrate AI tools in their teaching practice.

Hypothesis Testing

Hypothesis 1 (H_{01}): Computer studies teachers in Anambra State secondary schools do not demonstrate significant readiness for integrating artificial intelligence tools in their teaching practice.

Table 4: One-Sample t-test for Teacher Readiness

Variables	N	Observed Mean	Test value	t	df	p-value	Decision
Teacher Readiness	103	2.40	2.50	-1.495	102	0.138	Accept H_{o1}

Test value = 2.50 (cut-off point); $p < 0.05$

The one-sample t-test result in Table 4 shows that the observed mean readiness score ($M = 2.40$) is not significantly different from the test value of 2.50 ($t = -1.495$, $df = 102$, $p = 0.138$). Since $p > 0.05$, the null hypothesis is accepted, confirming that computer studies teachers in Anambra State secondary schools do not demonstrate significant readiness for integrating AI tools in their teaching practice.

Hypothesis 2 (H_{02}): Computer studies teachers in Anambra State secondary schools do not face significant challenges when integrating artificial intelligence tools into their instructional practices.

Table 5: One-Sample t-test for Integration Challenges

Variables	N	Observed Mean	Test value	t	df	p-value	Decision
Integration Challenges	103	3.12	2.50	10.647	102	0.000	Reject H_{o2}

Test value = 2.50 (cut-off point); $p < 0.05$

Table 5 indicates that the observed mean challenge score ($M = 3.12$) is significantly higher than the test value of 2.50 ($t = 10.647$, $df = 102$, $p = 0.000$). Since $p < 0.05$, the null hypothesis is rejected, confirming that computer studies teachers in Anambra State secondary schools face significant challenges when integrating AI tools into their instructional practices.

Hypothesis 3 (H_{03}): There is no significant relationship between computer studies teachers' readiness levels and the challenges they encounter in integrating AI tools in Anambra State secondary schools.

Table 6: Correlation Test for Hypothesis 3

Source of Variable `	r	p-value	Decision	Remark
Teacher Readiness			Reject H_{o3}	Significant negative Relationship
Integration Challenges	-0.342**	0.000		

**. Correlation is significant at the 0.05 level (2-tailed).

The correlation test in Table 6 shows a significant negative relationship between teacher

readiness and integration challenges ($r = -0.342$, $p = 0.000$). Since $p < 0.05$, the null hypothesis is rejected, indicating that there is a significant relationship between computer studies teachers' readiness levels and the challenges they encounter in integrating AI tools in Anambra State secondary schools.

Discussion of Findings

Teacher Readiness for AI Integration

The findings revealed that computer studies teachers in Anambra State secondary schools demonstrate low overall readiness for AI integration ($M = 2.40$), with the acceptance of hypothesis one confirming this inadequate preparedness. The response distribution showed concerning patterns, particularly in self-efficacy where 74.7% of teachers disagreed with their ability to successfully integrate AI into teaching practice, while technical skills also recorded substantial deficiencies with 70.9% disagreeing about their familiarity with AI-powered coding assistants. Interestingly, ethical awareness emerged as the strongest dimension, with 65.1% of teachers demonstrating understanding of privacy concerns related to AI use in education. These findings align with Sunday et al. (2025) who found that Nigerian teachers exhibit willingness to adopt AI but face significant constraints including limited AI literacy and low confidence levels. Similarly, Ayanwale et al. (2022) reported that perceived confidence in teaching AI strongly predicted readiness among Nigerian educators, corroborating the critical role of self-efficacy observed in this study. However, the relatively higher ethical awareness scores contrast with Sule's (2024) observation about the absence of clear policies to safeguard student data, suggesting that while teachers understand ethical implications, institutional frameworks remain inadequate.

Challenges in AI Integration

The study identified substantial challenges faced by computer studies teachers in AI integration, with an overall mean of 3.13 confirming the rejection of hypothesis two. Infrastructure-related barriers dominated the findings, with 91.3% of teachers agreeing that their schools lack adequate computers and internet connectivity for AI integration, while an equal percentage confirmed the absence of training on AI tools for teaching. Financial constraints also emerged prominently, as 91.3% of respondents agreed that schools cannot afford AI software and subscriptions, compounded by insufficient electricity supply (88.3% agreement) and lack of budget allocation for AI technology (86.4% agreement). These findings strongly corroborate Odoh's (2023) research in Awka South Local Government Area, which identified lack of ICT infrastructure, absence of trained teachers, and inadequate funding as primary barriers to technology integration in Anambra State schools. The results also align with Okonkwo's (2024) assertion that successful AI implementation requires increased government funding and comprehensive policy support, while supporting the broader challenges identified by Okwudinma (2024) and Samaila et al. (2024) regarding infrastructural deficiencies, professional development gaps, and resource constraints in Nigerian educational contexts.

Relationship Between Readiness and Challenges

The correlation analysis revealed a significant negative relationship between teacher readiness and integration challenges ($r = -0.342$, $p = 0.000$), leading to the rejection of hypothesis three and confirming that increased challenges correspond with decreased readiness levels. This finding suggests that the multiple barriers identified in the study environment directly inhibit teachers' preparedness to integrate AI tools effectively into their computer studies instruction. The relationship indicates that addressing the challenges through improved infrastructure, enhanced training programs, and increased institutional support could potentially elevate teacher readiness levels. This negative correlation aligns with the theoretical framework of technology adoption models, where external barriers significantly influence user acceptance and implementation intentions. The finding resonates with Eke's (2024) comprehensive definition of readiness, which encompasses technical skills, pedagogical integration, ethical understanding, and self-confidence, all of which can be constrained by systemic challenges. Furthermore, the relationship supports the interconnected nature of challenges identified by Okonkwo (2024), suggesting that successful AI integration requires holistic approaches that simultaneously address infrastructure, training, policy, and resource allocation issues rather than isolated interventions.

Conclusion

This study investigated teachers' readiness and challenges in integrating artificial intelligence tools in teaching computer studies at the secondary school level in Anambra State, Nigeria. The findings revealed that computer studies teachers demonstrate inadequate readiness for AI integration, particularly in technical skills, pedagogical integration, and self-efficacy dimensions, though they showed relatively better ethical awareness. The study identified substantial systemic challenges including inadequate ICT infrastructure, insufficient training programs, financial constraints, power supply issues, and lack of institutional support that significantly impede AI integration efforts. The significant negative correlation between readiness levels and integration challenges confirms that addressing systemic barriers is crucial for enhancing teacher preparedness. The research contributes valuable empirical evidence specific to the Nigerian educational context, highlighting the need for comprehensive interventions that simultaneously address infrastructure development, professional capacity building, policy formulation, and resource allocation to facilitate successful AI integration in secondary computer studies education.

Recommendations

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

1. The Anambra State Government and educational authorities should implement comprehensive professional development programs that address the four dimensions of teacher readiness, with particular emphasis on building technical skills, pedagogical integration competencies, and self-efficacy among computer studies teachers.
2. The State Secondary Education Board should prioritize addressing systemic challenges by investing in ICT infrastructure, ensuring stable power supply, providing adequate funding for AI technology acquisition, and establishing institutional support systems for successful AI integration.
3. Educational policymakers should develop holistic intervention strategies that simultaneously address both teacher readiness enhancement and challenge mitigation, recognizing the significant negative relationship between these factors in successful AI integration initiatives.

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