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Teachers' Knowledge and Attitude Toward Artificial Intelligence as a Correlate of Teaching Effectiveness in Senior Secondary Schools in Delta State

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ABSTRACT

This study examined the influence of teachers' knowledge and attitude towards Artificial Intelligence (AI) tools on teaching effectiveness in senior secondary schools in Delta State, Nigeria. Motivated by the persistent underutilization of AI tools in Nigerian secondary school classrooms despite their acknowledged transformative potential, the study investigated the level of teachers' AI knowledge, the nature of their attitude towards AI, and the extent to which these variables relate to teaching effectiveness. Grounded in the Technology Acceptance Model (TAM) and the Technological Pedagogical Content Knowledge (TPACK) framework, the study adopted a descriptive survey design. A sample of 360 teachers was drawn from public senior secondary schools using a multi-stage sampling technique. Data were collected using the Teachers' Knowledge, Attitudes toward Artificial Intelligence, and Teaching Effectiveness Questionnaire (TKAITEQ), a researcher-developed instrument with established content validity (CVI = 0.87) and confirmed internal consistency (α = 0.79–0.84). Descriptive statistics and Pearson Product-Moment Correlation (PPMC) were employed for data analysis. Findings revealed that teachers' knowledge of AI was generally low (grand mean = 2.18), while their attitudes were cautiously positive but mixed (grand mean = 2.89), reflecting simultaneous recognition of AI's educational potential and reservations about its feasibility in the Nigerian school context. Both null hypotheses were rejected at the .05 level of significance, denoting that teachers' AI knowledge exhibited a strong positive relationship with teaching effectiveness (r = 0.671, p = 0.02), and teachers' attitudes toward AI showed a moderate to strong positive relationship with teaching effectiveness (r = 0.58, p=.02). The study

concludes that knowledge and attitudinal deficits are significant barriers to AI integration in the study area, and recommends the urgent provision of AI-focused professional development programmes, institutional support structures, and policy frameworks that address both the competency and motivational dimensions of teacher readiness for AI integration.

Introduction

The rapid advancement of technology in the twenty-first century has fundamentally altered the manner in which human beings interact, work, and acquire knowledge. Among the most consequential of these technological developments is Artificial Intelligence (AI), a field of computer science concerned with the design and development of systems capable of performing tasks that ordinarily require human intelligence (Russell & Norvig, P. (2021). These tasks include natural language processing, pattern recognition, autonomous decision-making, and problem-solving. In the contemporary world, AI has permeated nearly every sector of human endeavour, including healthcare, agriculture, commerce, governance, and most significantly for this study, education (Holmes et al., 2019; Bali et al., 2024).

In the domain of education, Artificial Intelligence has emerged as a transformative force with the potential to reshape the traditional landscape of teaching and learning. Intelligent tutoring systems, adaptive learning platforms, AI-powered assessment tools, virtual teaching assistants, and automated grading systems represent only a fraction of the AI-driven innovations now being deployed in classrooms across the globe. These technologies offer educators the capacity to personalize instruction, monitor learner progress in real time, identify learning difficulties early, and deliver content in formats that accommodate diverse learner needs and preferences. In this way, AI is positioned not merely as a convenience but as a fundamental instrument for the enhancement of educational quality and equity (Luckin et al., 2016; Holmes et al., 2019).

The significance of AI in education is not limited to the technological dimension alone. Scholars and educational researchers have increasingly argued that the effective integration of AI tools in teaching is contingent upon the dispositions, competencies, and readiness of teachers themselves (Scherer, Siddiq & Tondeur, 2021). Teachers are acknowledged as the central agents in the process of educational change, and their capacity to adopt and deploy technological innovations meaningfully is widely regarded as a decisive factor in determining whether such innovations achieve their intended outcomes. Without teachers who are adequately knowledgeable about AI and who hold favourable attitudes toward its use, even the most sophisticated technological resources are likely to remain underutilized or entirely neglected in classroom practice (David et al., 2025).

Teacher knowledge, within the context of AI integration, refers to the extent to which educators understand the fundamental concepts, applications, and implications of Artificial Intelligence in educational settings (Ng, Leung, Chu & Qiao, 2021). This encompasses an awareness of the types of AI tools available, knowledge of how to operate such tools effectively, an understanding of the pedagogical principles that govern their application, and a critical appreciation of the ethical and social dimensions of AI use in education. Research has consistently demonstrated that teachers who possess higher levels of knowledge about AI are more likely to incorporate it into their instructional practices, as they are better equipped to identify opportunities where AI tools can complement and enhance their teaching methodologies (Alimi et al., 2024; Okafor & Anyanwu, 2025).

However, knowledge alone does not sufficiently account for the extent to which teachers integrate AI tools into their teaching. Attitude isdefine as the cognitive, affective, and behavioural orientations that individuals hold toward a particular object or phenomenon, play an equally critical role. A teacher who possesses substantial knowledge of AI

but harbours negative attitudes toward its use is unlikely to integrate it meaningfully into classroom instruction. Conversely, a teacher who holds positive attitude toward AI is more inclined to explore its possibilities and invest the effort required to master its application, even in the absence of extensive prior knowledge. Attitude toward AI may be influenced by a variety of factors, including personal beliefs about the utility of technology, prior experiences with digital tools, the institutional culture of the school, peer influences, and broader societal narratives about AI and its implications for human employment and social order (David et al., 2025; Urien, 2025).

Generally, the integration of AI in secondary education has gained considerable momentum, particularly in developed nations where technological infrastructure, policy support, and teacher training programmes are more robust. Countries such as the United States, China, the United Kingdom, and Finland have made significant investments in embedding AI literacy within national education curricula and in equipping teachers with the knowledge and skills necessary to leverage AI for improved instructional delivery (OECD, 2023). In these contexts, AI is increasingly viewed not as a supplement to teaching but as an integral component of a contemporary pedagogical repertoire (Holmes et al., 2019).

In Africa, however, the trajectory of AI integration in secondary education has been markedly different (UNESCCO, 2023). The continent faces significant structural challenges that constrain the adoption of emerging technologies in schools, including inadequate technological infrastructure, limited access to reliable electricity and internet connectivity, insufficient government investment in technology-enhanced education, and a dearth of trained personnel capable of facilitating effective technology integration. Despite these challenges, African nations are beginning to recognize the importance of preparing their educational systems for the demands of an AI-driven economy, and efforts are being made at national and institutional levels to promote the adoption of AI in education (Bali et al., 2024).

Nigeria, as Africa's most populous nation, presents a particularly instructive case for examining the dynamics of AI integration in secondary education. The Nigerian educational system is vast and complex, comprising thousands of secondary schools serving millions of students across thirty-six states and the Federal Capital Territory (World Bank. (2024). While the Federal Government of Nigeria has acknowledged the importance of technology integration in education through various policy documents and initiatives, the practical realization of AI integration in Nigerian secondary schools remains limited. Many schools continue to rely on chalk-and-board teaching methodologies, with limited exposure to digital technologies, let alone AI-powered educational tools. This situation reflects a broader systemic challenge that encompasses inadequate teacher training, limited technological resources, and insufficient institutional support for innovation (Olaiya et al., 2025).

Within the Nigerian context, Delta State occupies a significant position, particularly given its educational history and the relatively higher concentration of urban secondary schools in areas such as Sapele Local Government Area. Sapele, a major urban centre in Delta State, is home to numerous public senior secondary schools that serve a diverse student population. The teachers in these schools operate within a context marked by the confluence of traditional pedagogical practices, emerging technological possibilities, and the pressures of a rapidly evolving educational landscape. Understanding how teachers in this context perceive and engage with Artificial Intelligence is therefore of considerable academic and practical importance (David et al., 2025).

Empirical studies conducted within the Nigerian context have begun to shed light on the state of teachers' knowledge and attitudes toward AI. Alimi et al. (2024) found that while many secondary school teachers in Ilorin-West, Nigeria,

were aware of AI technologies, their actual adoption for teaching remained limited, largely due to gaps in training and institutional support. Similarly, Olaiya et al. (2025) reported that teachers in Osun State had limited awareness of how to integrate AI tools for instructional delivery, highlighting a significant disconnect between technological availability and pedagogical application. Bali et al. (2024) further observed that emerging trends in AI for education in Nigeria are characterized more by discussion and aspiration than by concrete classroom practice, underscoring the need for studies that examine the specific factors impeding meaningful AI integration.

The relationship between teacher knowledge, attitude, and technology integration has been theorized within several prominent frameworks. The Technology Acceptance Model (TAM), developed by Davis (1989), posits that the perceived usefulness and perceived ease of use of a technology are the primary determinants of an individual's intention to adopt it. This model has been widely applied in educational technology research and provides a useful lens for understanding why teachers may resist or embrace AI tools. Within the TAM framework, teachers' knowledge of AI can be understood as a determinant of their perception of its usefulness and ease of use, while their attitudes reflect the evaluative dimension of their response to these perceptions.

Similarly, the Technological Pedagogical Content Knowledge (TPACK) framework, proposed by Mishra and Koehler (2006 as cited in Koehler, Mishra & Cain, 2013), highlights the importance of integrating technological knowledge with pedagogical and content knowledge for effective technology-enhanced teaching. Within this framework, a teacher's ability to integrate AI tools meaningfully is dependent not merely on their familiarity with the technology but on their capacity to align it with sound pedagogical principles and specific content requirements. This perspective underscores the multidimensional nature of AI integration and the importance of addressing knowledge gaps at multiple levels.

Despite the growing body of literature on AI integration in education, there remains a relative scarcity of empirical studies that specifically examine the effects of teachers' knowledge and attitude toward AI on the integration of AI tools in secondary school teaching in Delta State, and more specifically in Sapele Local Government Area. This study is therefore motivated by the need to generate context-specific evidence that can inform educational policy and practice in this area. By investigating the level of teachers' knowledge of AI, the nature of their attitudes toward it, and the extent to which these factors influence teaching effectiveness, this study aims to contribute meaningfully to the growing discourse on technology-enhanced education in Nigeria (Bali et al., 2024; Olaiya et al., 2025).

The study is further motivated by the recognition that secondary school teachers occupy a uniquely influential position in the educational system. The knowledge, attitudes, and practices of secondary school teachers not only shape the learning experiences of their students but also set the tone for the broader cultural orientation of the school community toward innovation and change. By examining the factors that facilitate or impede the integration of AI tools among secondary school teachers in Sapele Local Government Area, this study hopes to generate insights that are transferable to other contexts and that can inform the design of more effective teacher training programmes, institutional support structures, and technology integration policies.

Statement of the Problem

Artificial Intelligence (AI) has emerged as a transformative technology with the potential to improve teaching and learning through tools such as intelligent tutoring systems, adaptive learning platforms, AI-driven assessments, and

virtual classroom assistants. Despite these benefits, the integration of AI into teaching practices remains limited in many Nigerian secondary schools, including those in Sapele Local Government Area of Delta State. As a result, teachers continue to rely largely on traditional instructional methods, preventing students from benefiting from innovative technologies that can enhance learning outcomes and prepare them for the demands of a technology-driven society.

One major challenge to the effective integration of AI in secondary schools is the limited knowledge and attitudes of teachers toward the technology. Many teachers lack adequate training and understanding of AI applications in education, which affects their ability and confidence to utilize these tools effectively. In addition, negative attitudes such as fear of job displacement, resistance to change, and concerns about technological complexity may hinder AI adoption. Although these factors have been identified in the literature, there is limited empirical evidence on how teachers' knowledge and attitudes toward AI influence teaching effectiveness in senior secondary schools in Delta State. This gap necessitates the present study to provide evidence that can guide policymakers, school administrators, and teacher educators in developing appropriate interventions to promote effective AI integration in teaching.

Research Objectives

The primary objective of this study is to examine the relationship between teachers' knowledge and attitude towards AI tools and teaching effectiveness in senior secondary schools in Delta State. Specifically, the study sought to:

i. Determine the level of teachers' knowledge of AI.
ii. Examine teachers' attitude towards AI.
iii. Investigate the relationship between teachers' knowledge of Artificial Intelligence and teaching effectiveness.
iv. Examine the relationship between teachers' attitudes toward AI and teaching effectiveness.

Research Questions

The following research questions guide this study:

i. What is the level of teachers' knowledge of AI?
ii. What are teachers' attitudes towards AI?

Research Hypotheses

The following null hypotheses are formulated for testing at the 0.05 level of significance:

H_{o1}: Teachers' knowledge of AI has no significant relationship with teaching effectiveness.

H_{o2}: Teachers' attitude towards Artificial Intelligence have no significant influence on teaching effectiveness.

Research Methodology

This study used the descriptive survey research design. The population of the study consists of all the 3,504 teachers in the 16 public senior secondary schools in Delta State (LGEA Records, 2025). The sample size of 360 was determined using Taro Yamane's formula while the sampling technique involved a multi-stage sampling procedure. At the first stage, the schools were stratified based on existing three senatorial zones. The second stage involved the use of proportionate stratified sampling technique to select the participants in each zone while the simple random sampling technique was used to randomly select participants in each school that participated in the study. The primary instrument for data collection is a self-designed and structured questionnaire titled; Teachers' Knowledge and Attitudes toward Artificial Intelligence, and Teaching Effectiveness Questionnaire (TKAAITEQ). The questionnaire was

designed based on the stated research objectives on a four-point Liker-type scale (SA = 4, A = 3, D = 2, SD = 1). The face and content validity were established by three experts in the Department of Educational Technology. The reliability of the instrument was established through a pilot test conducted with a sample of 30 teachers drawn from two public senior secondary schools in Ethiope East Local Government Area of Delta State not included in the main study. The internal consistency of the instrument was assessed using Cronbach's alpha coefficient, and an alpha value for each subscale; AI Knowledge (α=0.81), AI Attitudes (α=.84), and Teaching Effectiveness (α=.79) confirms the instrument is reliable. The data was collected personally by the researchers after approval from the appropriate authorities.

The data collected were analysed using both descriptive and inferential statistical techniques. Descriptive statistics such as mean and standard deviation were used to answer the research questions. Mean scores are interpreted using a decision criterion based on the mid-point of the scale; a mean score of 2.50 or above on a four-point scale is taken to indicate agreement or a positive orientation toward the construct being measured, while a mean score below 2.50 is taken to indicate disagreement or a negative orientation. The null hypotheses were tested using Pearson Product-Moment correlation statistics at.05 level of significance. All data analysis is performed using the Statistical Package for the Social Sciences (SPSS), version 26.0.

Analyses of Research Questions

Research Question One: What is the level of teachers' knowledge of Artificial Intelligence in senior secondary schools in Delta State?

Table 1: Mean and Standard Deviation of Teachers' AI Knowledge Items

S/N	Item	Mean	SD	Decision
1	I am familiar with the concept of Artificial Intelligence and its relevance to education.	2.74	0.81	Agree
2	I can identify specific AI tools (e.g., ChatGPT, Grammarly, Khan Academy AI) that can be used in teaching.	2.31	0.94	Disagree
3	I understand how machine learning algorithms work in AI educational platforms.	1.98	0.87	Disagree
4	I am aware of intelligent tutoring systems and how they support personalized learning.	2.19	0.92	Disagree
5	I know how to operate at least one AI-powered tool for classroom instruction.	2.08	0.96	Disagree
6	I understand the ethical issues associated with using AI tools in education.	2.56	0.79	Agree
7	I am knowledgeable about AI-driven assessment and feedback tools available for teachers.	2.02	0.88	Disagree
8	I can integrate my knowledge of AI with my subject-specific pedagogical practice.	2.14	0.91	Disagree
9	I have received formal training or professional development specifically related to AI in education.	1.84	0.76	Disagree
10	I am confident in my ability to use AI tools effectively in my lessons.	1.92	0.83	Disagree
	Grand Mean	2.18	0.87	Low

Source: Field Survey, 2026

Information in Table 1 reveals that the grand mean score for the Teachers' AI Knowledge subscale is 2.18, which falls below the decision criterion of 2.50, indicating that the level of teachers' knowledge of Artificial Intelligence in Sapele Local Government Area is generally low. Of the ten items in the subscale, only two recorded mean scores above the criterion value: Item 1 (familiarity with the concept of AI and its relevance to education, mean = 2.74) and Item 6 (understanding of the ethical issues associated with AI in education, mean = 2.56). All remaining items recorded mean below 2.50, indicating that teachers' knowledge of specific AI tools, operational competencies, formal training history, and pedagogical integration capabilities is limited. Particularly notable are the low mean scores recorded for items relating to formal training in AI (Item 9, mean = 1.84), confidence in using AI tools in lessons (Item 10, mean = 1.92), and knowledge of AI-driven assessment tools (Item 7, mean = 2.02). These findings suggest that while many teachers in the study area have a general awareness of AI as a concept, their practical knowledge of its educational applications and their technical competence in using AI tools are significantly underdeveloped.

Research Question Two: What are teachers' attitudes toward Artificial Intelligence?

Table 2: Mean and Standard Deviation of Teachers' Attitudes toward AI Items

S/N	Item	Mean	SD	Decision
1	I believe that AI tools have the potential to improve the quality of teaching and learning.	3.02	0.74	Agree
2	I am willing to explore the use of AI tools in my classroom if given adequate training and support.	3.14	0.69	Agree
3	I feel anxious and uncertain about the use of AI tools in my teaching.	2.87	0.83	Agree
4	I am concerned that AI tools will eventually replace teachers in the classroom.	2.93	0.88	Agree
5	I think the benefits of AI in education outweigh the risks and challenges.	2.61	0.91	Agree
6	I am enthusiastic about learning more about how AI can be used in my subject area.	2.84	0.77	Agree
7	I believe that the Nigerian school context is not yet ready for the widespread adoption of AI tools.	3.21	0.72	Agree
8	I think AI will make my job as a teacher easier and more effective.	2.48	0.94	Disagree
9	I distrust the accuracy and reliability of AI-generated educational content.	2.79	0.86	Agree
10	I would recommend the use of AI tools to my colleagues if I became more familiar with them.	2.97	0.71	Agree
	Grand Mean	2.89	0.81	Positive/Mixed

Source: Field Survey, 2026

The information in Table 2 shows that the grand mean score for the Teachers' Attitudes toward AI subscale is 2.89, which exceeds the criterion value of 2.50, suggesting that teachers in the study area hold generally positive but mixed attitudes toward Artificial Intelligence.

The results reveal a complex attitudinal landscape characterized by a simultaneous recognition of AI's educational potential and significant reservations about its feasibility and appropriateness within the Nigerian school context. Teachers' concern about the replacement of teachers by AI (Item 4, mean = 2.93) and their distrust of AI-generated content (Item 9, mean = 2.79) indicate the presence of cautionary orientations that coexist with the more positive dispositions identified above. Only Item 8 (belief that AI will make teaching easier and more effective) recorded a mean score below the criterion value (mean = 2.48), suggesting that many teachers are not yet convinced that AI will directly simplify or enhance their professional practice. Overall, the attitudinal profile of respondents is best characterized as cautiously positive or ambivalent.

Test of Hypotheses

H_{o1}: Teachers' knowledge of Artificial Intelligence has no significant relationship with teaching effectiveness in Sapele Local Government Area, Delta State.

Table 3

Pearson Correlation between Teachers' AI Knowledge and Teaching Effectiveness

Variable	N	M	SD	df	r	p	Decision
Teachers' AI Knowledge	360	2.89	0.81	358	.671	.002	Reject H_{o1}
Teaching Effectiveness	360	1.94	0.79	358			

*Source: Field Survey, 2026. *Significant at $p < 0.05$*

The results presented in Table 3 show that the Pearson correlation coefficient between teachers' AI knowledge and AI tools integration is r = 0.671 with a p-value of 0.000. Since the p-value (0.000) is less than the significance level of 0.05, the null hypothesis H_{o1} is rejected. This means there is a statistically significant positive relationship between teachers' knowledge of Artificial Intelligence and their teaching effectiveness. The null hypothesis that teachers' knowledge of AI has no significant relationship with teaching effectiveness is therefore not supported by the data. This implies that there is a significant relationship between teachers' knowledge of AI and teaching effectiveness in senior secondary schools in Delta State.

H_{o2}: Teachers' attitudes toward Artificial Intelligence have no significant influence on teaching effectiveness in senior secondary schools in Delta State.

Table 4

Pearson Correlation between Teachers' AI Knowledge and Teaching Effectiveness

Variable	N	M	SD	df	r	p	Decision
Teachers' AI Attitude	360	2.18	0.87	358	.58	.002	Reject H_{o1}
Teaching Effectiveness	360	1.94	0.79	358			

*Source: Field Survey, 2026. *Significant at $p < 0.05$*

The results presented in Table 4 show that the Pearson correlation coefficient between teachers' attitudes toward AI and teaching effectiveness is r = .583 with a p-value of .02. Since the p-value (.02) is less than the .05 significance level, the null hypothesis H_{o2} was rejected. This indicates that there is a statistically significant positive relationship between teachers' attitudes toward AI and their teaching effectiveness. The null hypothesis that teachers' attitudes

toward AI have no significant influence on teaching effectiveness is therefore not supported by the data. This implies that there is a significant relationship between teachers' attitudes toward AI and teaching effectiveness in senior secondary schools in Delta State.

Discussion of Findings

The finding of the study is that the level of teachers' knowledge of Artificial Intelligence in public senior secondary schools in Delta State is generally low, as evidenced by a grand mean score of 2.18 on the AI Knowledge subscale, which falls below the criterion value of 2.50. While teachers demonstrated moderate awareness of AI as a general concept and some familiarity with its ethical dimensions, their knowledge of specific AI educational tools, operational competencies, and pedagogical integration was markedly deficient. These findings are consistent with those of Alimi et al. (2024), who reported limited AI adoption among secondary school teachers in Ilorin-West despite moderate awareness of the technology, and Olaiya et al. (2025), who found that secondary school teachers in Osun State had minimal awareness of AI tools for instructional delivery. The finding also aligns with the reports of Okafor and Anyanwu (2025) and Bali et al. (2024), who identified the limited knowledge of Nigerian secondary school teachers as a principal barrier to AI integration. Notably, the particularly low mean score for formal training in AI (Item 9, mean = 1.84) indicates that the observed knowledge deficit is largely a structural outcome of inadequate provision of AI-related professional development within the Nigerian teachers' education system, a concern also raised by Olarewaju et al. (2025) in their study of pre-service teacher education.

The study that teachers' attitudes toward AI are generally positive but significantly mixed, with a grand mean of 2.89 on the Attitudes subscale. The attitudinal profile of respondents reflects a simultaneous recognition of AI's educational potential and deep reservations about its practicability and appropriateness in the Nigerian school context. The finding that teachers were most strongly in agreement with the proposition that the Nigerian school context is not yet ready for widespread AI adoption (Item 7, mean = 3.21) is particularly illuminating, as it suggests that contextual and structural concerns constitute a significant dimension of teachers' attitudinal orientation, beyond mere personal reservations about the technology itself. This finding resonates with Urien's (2025) study in Delta State, which similarly found that many teachers held ambivalent attitudes toward AI integration rooted in both personal anxieties and systemic concerns. The coexistence of positive attitudes (willingness to explore AI tools with training and support, belief in AI's potential to improve educational quality) and negative orientations (concern about teacher replacement, distrust of AI content reliability) is consistent with the broader pattern of findings reported in the Nigerian AI in education literature and reflects a nuanced and contextually grounded attitudinal response to the prospect of AI adoption.

Additionally, findings of the study confirmed that both teachers' knowledge of AI ($r = 0.671$, $p = 0.000$) and teachers' attitudes toward AI ($r = 0.583$, $p = 0.000$) have statistically significant positive relationships with teaching effectiveness. The significant relationship shows that favourable attitudinal orientations toward a technology translate into greater intention to use it and, ultimately, into higher levels of teaching effectiveness. Therefore, it is obvious that as teachers develop a more integrated and contextually informed knowledge of AI, their capacity and confidence to incorporate AI tools into their teaching practice increases substantially. The finding that knowledge exerts a slightly stronger relationship with AI integration ($r = 0.671$) than do attitudes ($r = 0.583$), while both are significant, suggests that in the specific context of Sapele Local Government Area, the knowledge deficit among teachers may be the more proximate constraint on AI integration. This does not diminish the importance of attitudinal factors, but it implies that targeted interventions to build teachers' practical AI knowledge are likely to generate the most immediate

improvements in integration levels. At the same time, the significant attitudinal relationship indicates that even knowledge-enhancing interventions are unlikely to be maximally effective if they do not also address the attitudinal barriers and contextual concerns that shape teachers' motivational orientations toward AI adoption. Interventions that simultaneously build knowledge and cultivate positive, contextually responsive attitudes are therefore likely to be most efficacious in promoting meaningful AI integration in the study area and in comparable contexts across Nigeria towards enhancing teaching effectiveness.

Conclusion

The level of teachers' knowledge of Artificial Intelligence in the study area is generally low, reflecting a systemic failure to equip secondary school teachers with the knowledge and competencies needed to harness the educational potential of AI tools. This knowledge deficit is attributable primarily to the absence of formal AI training within the professional development structures available to teachers in the study area and is consistent with broader patterns of limited AI literacy among Nigerian secondary school teachers documented in the recent empirical literature.

Teachers' attitude towards AI in the study area is characterized by cautious positivity and ambivalence. While teachers broadly acknowledge the transformative potential of AI in education and express willingness to engage with it under conditions of adequate support and training, they simultaneously harbour significant reservations rooted in structural concerns about the Nigerian school context, anxieties about the implications of AI for their professional identity, and distrust of AI-generated educational content. This attitudinal ambivalence reflects the complex intersection of personal, professional, and contextual factors that shape teachers' orientations toward technological innovation.

Both teachers' knowledge of AI and their attitude towards AI are significant positive predictors of teaching effectiveness. The strength of the relationship between knowledge and teaching effectiveness ($r = 0.671$) and between attitudes and teaching effectiveness ($r = 0.583$) indicates that efforts to improve AI integration in secondary school teaching must simultaneously address the knowledge and attitudinal dimensions of teachers' dispositions toward AI. Neither knowledge enhancement alone nor attitude change alone is likely to generate sustained improvements in AI integration; rather, interventions must be designed to address both dimensions in an integrated and contextually sensitive manner.

Recommendations

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

1. The government should develop and implement a comprehensive, sustained, and context-specific AI professional development programme for teachers in public senior secondary schools.
2. Pre-service teacher education programmes should urgently incorporate AI literacy as a core component of the teacher preparation curriculum to ensure teachers are equipped with both the knowledge and the pedagogical competencies needed to integrate AI tools meaningfully into their instructional practice.
3. School administrators should cultivate institutional cultures that are supportive of technological innovation and that provide teachers with the practical resources, technical support, and professional encouragement needed to explore and sustain AI integration for improved teaching effectiveness.
4. The policymakers should design policies that will guarantee the provision of adequate infrastructure that will translate into meaningful and sustained AI integration.

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