International Journal of Management and Data Analytics
IJMADA

Vol 6 (1), 252-265
ISSN: 2816-9395
DOI: https://doi.org/10.5281/zenodo.22052439
Journal website: http://ijmada.com

Social Cognitive Theory and AI Literacy in Secondary Schools in Nigeria: A Quantitative Descriptive Survey

Author(s): Matthew Taiwo Oni[1], Gbenga Julius Joseph[2], Nhlanhla Landa[2]

1 Department of Early Childhood and Educational Foundations, University of Ibadan, Ibadan, Nigeria.
2 Department of Languages and Communication, University of Fort Hare, South Africa.

Corresponding Author: mt.oni2008@gmail.com

Received: June, 2026 Published: Aug, 2026

ARTICLE INFO
Keywords:
Professional Development; Secondary School Teachers; Social Cognitive Theory; Teacher Demographics

ABSTRACT

The adoption of AI in Nigerian secondary schools is regarded as an expansion of the country's digital education initiatives and this underscores the need to examine teachers' willingness to use AI tools for effective teaching and learning. Thus, this study seeks to compare AI literacy in public and private secondary schools, find variations in institutional support, and investigate whether gender and teaching experience predict AI competence and integration in teaching. Using a stratified random sampling technique, a total of 414 teachers were analysed from the 7,484 teachers in secondary schools within the Ibadan metropolis. Of the 450 questionnaires distributed, 414 were returned and found valid for analysis, representing a response rate of 92%. Sample selection was based on resource availability in the selected schools. Data were collected using a self-designed quantitative instrument with closed-ended questions on a four-point Likert Scale: AI Literacy, Institutional Support and Teachers' Demographic Assessment Questionnaire (AILISTDAQ). The reliability of the instrument was tested using Cronbach's alpha with a coefficient of 0.76. Descriptive statistics of standard deviation, mean and inferential statistics (t-test and One-Way ANOVA) were used for data analysis. The study found that teachers in private schools exhibited greater levels of AI literacy and institutional support than their counterparts in public schools. With the use of Social Cognitive Theory as a guide, the study found that school type and teaching experience are more influential predictors of AI literacy than gender among Nigerian secondary school teachers. It is recommended that AI literacy should be enhanced to develop the self-efficacy of teachers and normalise the pedagogical application of AI.

1.0 Introduction

The rapid advancement of Artificial Intelligence (AI) has transformed contemporary education systems and has generated growing scholarly attention to teachers' preparedness to function effectively in technology-driven learning environments. Across the globe, AI is increasingly being integrated into teaching, assessment, school administration, learner analytics, curriculum planning, and personalised instruction. Consequently, educational institutions are facing growing pressure to equip teachers with the knowledge, competencies, and confidence necessary for effective AI utilisation in pedagogical practice. According to research on Artificial Intelligence in Education, AI literacy has become a crucial requirement for teachers because it determines their capacity to engage with intelligent technologies responsibly and productively in classroom contexts. Bali et al. (2024) discovered that the expansion of AI technologies in Nigeria has created both opportunities and structural concerns regarding teacher preparedness, infrastructural availability, and policy implementation. Similarly, Casal-Otero et al. (2023) established that AI literacy in schools extends beyond technical knowledge to include ethical awareness, critical thinking, data interpretation, and pedagogical competence. These perspectives

indicate that AI literacy is multidimensional and indispensable for educational transformation in the twenty-first century.

Thus, the educational sector has witnessed increasing adoption of AI-driven applications such as intelligent tutoring systems, automated grading mechanisms, adaptive learning platforms, virtual teaching assistants, and generative AI technologies. According to Ng et al. (2023), AI literacy education in secondary schools is essential because learners and teachers must develop the ability to understand, evaluate, and critically engage with AI technologies. Yim and Su (2024) further argued that AI learning tools have substantially altered classroom interactions and instructional delivery, particularly in K-12 education systems where personalised learning and data-driven instruction are becoming increasingly prominent. However, despite these global developments, disparities remain evident in developing countries where infrastructural deficits, inadequate training opportunities, and weak institutional support continue to limit meaningful AI integration in schools.

In the Nigerian educational context, the emergence of AI coincides with ongoing efforts to strengthen digital education and technology-enhanced learning initiatives. The Nigerian educational system has progressively embraced digital innovations through online learning platforms, mobile learning technologies, and open distance education programmes. Oni et al. (2021) discovered that educational re-engineering in the post-pandemic era requires the integration of emerging technologies capable of improving teaching effectiveness and learning outcomes. Earlier studies on educational technology adoption in Nigeria similarly demonstrated increasing institutional interest in technology-mediated learning environments. For instance, Itasanmi et al. (2019) established that demographic variables significantly influenced awareness and utilisation of Open Educational Resources among distance learning students in Southwestern Nigeria. Likewise, Otunla et al. (2020) discovered that tertiary institution students demonstrated varying levels of preparedness towards adopting mobile learning technologies due to differences in digital exposure and technological competence.

The integration of AI into education has further intensified discussions surrounding teacher readiness, digital competence, and institutional support systems. According to Chiu et al. (2024), AI literacy encompasses the knowledge, skills, values, and competencies required to understand and apply AI technologies responsibly in educational and social contexts. Kim and Kwon (2023) established that teachers' AI competencies involve technical knowledge, pedagogical application, ethical judgement, and collaborative problem-solving skills. These findings suggest that teachers cannot effectively integrate AI into teaching without sufficient digital competence and institutional guidance. Ding et al. (2024) also discovered that professional development programmes significantly improve teachers' AI literacy and confidence when educators are exposed to practical case-based learning experiences. Consequently, continuous teacher training has become central to discussions on sustainable AI adoption in schools.

The importance of teacher preparedness is greater in secondary education because teachers directly shape learners' exposure to digital innovation and critical technological competencies. Aiyede (2022) discovered that instructional organisation and pedagogical effectiveness substantially determine learning outcomes among secondary school students in Nigeria. This implies that the successful integration of AI in secondary schools largely depends on teachers' ability to organise instruction effectively and adapt innovative technologies to classroom realities. Similarly, Aiyede (2026) established that teacher commitment and pedagogical content knowledge significantly predict students' academic achievement in English grammar. These findings underscore the importance of teacher competence in facilitating effective learning outcomes, including AI-mediated instruction.

Globally, researchers have increasingly emphasised the relationship between digital competence and AI adoption among educators. Lucas et al. (2024) established that teachers'

trust in AI technologies significantly influences their willingness to integrate intelligent systems into classroom teaching. According to Yang et al. (2024), teachers who participated in AI-based professional development programmes demonstrated improved self-efficacy regarding AI integration in English language instruction. This position aligns with the propositions of Albert Bandura whose Social Cognitive Theory emphasises the reciprocal interaction between environmental factors, behavioural patterns, and individual beliefs. Within educational technology contexts, self-efficacy strongly influences teachers' readiness to adopt innovative teaching practices. Consequently, educators who have strong confidence in their digital abilities are more likely to experiment with AI technologies and integrate them meaningfully into classroom activities.

Despite the growing enthusiasm surrounding AI in education, substantial concerns remain regarding inequitable access to technological resources and institutional support. Zhang (2025) discovered that adoption of digital education management systems among teachers significantly depends on organisational support structures, training opportunities, and social influence. Similarly, Xiang et al. (2025) established that university teachers' adoption of generative AI technologies is influenced by institutional readiness, perceived usefulness, and professional confidence. In many developing countries, however, these enabling conditions remain insufficiently developed. Bali et al. (2024) observed that infrastructural inadequacies, an unreliable electricity supply, limited internet access, and inadequate teacher training constrain emerging trends in AI adoption in Nigerian education. These conditions continue to widen the digital divide between schools with greater technological access and those operating under severe resource limitations.

School type has also emerged as a significant determinant of technology integration and digital literacy. Studies consistently reveal that private schools generally have better technological infrastructure, improved access to digital tools, and stronger institutional support compared with public schools. In this regard, Opesemowo (2024) claims that AI implementation in education reflects broader social and economic inequalities that shape access to technological innovation. In Nigeria, private schools often enjoy greater flexibility in adopting innovative instructional technologies, while public schools frequently struggle with overcrowded classrooms, inadequate facilities, and limited professional development opportunities. It has been established that environmental and institutional conditions substantially influence educational outcomes in schools operating under constrained infrastructural conditions (Quansah & Amoako, 2025). These disparities raise concerns regarding the equitable development of AI literacy among teachers across different school categories.

Another important dimension of AI literacy research relates to demographic variables such as gender, age, teaching experience, and professional background. Iddrisu and Iddrisu (2025) established that readiness to use AI tools varies among teachers, due to prior technological exposure, years of teaching experience, and access to training opportunities. Dringó-Horváth et al. (2025) further discovered that university teachers' digital competence and AI literacy were moderated by age, gender, academic discipline, and professional experience. These findings suggest that AI adoption cannot be separated from broader socio-demographic realities affecting educators' technological confidence and learning opportunities. In Nigerian schools, demographic factors have similarly influenced digital learning participation and technological adaptation. Tiamiyu et al. (2020) discovered that senior secondary school students experienced varying levels of computer anxiety and competence due to differences in technological exposure and socio-educational conditions. Such findings imply that teachers may equally demonstrate different levels of AI readiness based on demographic and experiential factors.

Research on technology adoption further indicates that institutional culture and organisational leadership significantly shape teachers' willingness to engage with digital innovation. Granić (2022) established that institutional policies, leadership commitment,

teacher attitudes, and infrastructural support influence educational technology adoption. In schools where administrators actively promote innovation and provide ongoing professional development, teachers are more likely to experiment with emerging technologies. Ebirim et al. (2026) discovered that integrating AI and digital connectivity into school management systems improved educational outcomes among secondary schools in Imo State, Nigeria. Their findings reinforce the importance of organisational support in strengthening teachers' engagement with AI technologies.

Furthermore, AI literacy has become increasingly connected to broader discussions surrounding digital citizenship, ethical technology use, and responsible innovation. Casal-Otero et al. (2023) established that AI literacy education should include ethical reasoning, algorithmic awareness, and critical engagement with intelligent systems. Chiu et al. (2024) similarly argued that AI competency frameworks must address not only technical skills but also social responsibility, ethical consciousness, and critical evaluation of AI-generated outputs. These considerations are particularly important in secondary education because learners are increasingly exposed to generative AI platforms capable of influencing academic integrity, information verification, and independent learning practices. Within the Nigerian context, previous studies on educational technology adoption provide useful foundations for understanding AI literacy challenges among teachers. Itasanmi and Oni (2020) revealed that learner satisfaction in open and distance learning programmes depended significantly on technological accessibility, institutional support, and instructional quality. Itasanmi et al. (2022) also established that academic staff motivation for online teaching in Nigerian universities was strongly associated with institutional encouragement and digital competence. During the COVID-19 pandemic, digital learning became central to educational continuity, thereby accelerating conversations surrounding technology integration in Nigerian schools. During this period, disruptions significantly affected graduate students' motivation and learning experiences, thereby reinforcing the urgency of sustainable digital learning infrastructures (Itasanmi et al., 2023).

Findings have established that digital and social media engagement among tertiary institution students was influenced by technological accessibility and behavioural factors. This suggests that digital participation increasingly shapes educational experiences across different learning contexts. Similarly, positive technology readiness significantly influences technology acceptance factors in terms of performance expectancy, social influence, effort expectancy and facilitating conditions. In the same vein, digital and social media engagement among tertiary institution students was influenced by technological accessibility and behavioural factors. These in turn affect the sustained use of social media platforms (Sheng & Yoon, 2025). These findings suggest that digital participation increasingly shapes educational experiences across different learning contexts. Majebi et al. (2024) further stated that collaborative and socio-constructive instructional strategies significantly improved post-COVID learning outcomes among primary school learners.

These developments demonstrate the growing relevance of technologically enhanced pedagogy within contemporary African educational systems. AI literacy among teachers is therefore not merely a technological issue but also a pedagogical, institutional, and socio-cultural concern. Teachers require adequate institutional support, professional development opportunities, digital infrastructure, and ethical guidance to utilise AI effectively within instructional contexts. Linake et al. (2025) established that limited policy direction constitutes a barrier to developing AI literacy among secondary school teachers in Nigeria. Nevertheless, the study identified opportunities associated with collaborative learning, digital innovation, and expanding educational technologies. These findings reinforce the argument that effective AI integration requires coordinated institutional efforts capable of enhancing teachers' competence and confidence.

The growing emphasis on AI literacy further reflects broader global concerns regarding workforce preparedness and digital transformation. Educational systems are increasingly expected to prepare learners for societies shaped by automation, intelligent systems, and

data-driven decision-making. Teachers, therefore, occupy a strategic position in developing students' critical understanding of AI technologies. According to Casal-Otero et al. (2023), secondary education represents a particularly important stage for introducing AI literacy because learners begin to develop higher-order thinking, ethical reasoning, and problem-solving competencies during adolescence. Consequently, teachers' AI competence becomes central to the successful implementation of AI-oriented educational reforms.

Despite increasing scholarly attention, limited empirical evidence exists regarding AI literacy among secondary school teachers in Nigeria, particularly concerning differences between public and private schools and the influence of demographic variables. Existing studies have largely focused on general digital learning practices, online education, and technology adoption without specifically addressing AI literacy within secondary school contexts. This gap creates significant challenges for policymakers, school administrators, and educational planners seeking to formulate context-sensitive strategies for AI integration. The present study, therefore, contributes to existing literature by examining AI literacy among secondary school teachers through the lens of Social Cognitive Theory while exploring the influence of institutional support, school type, gender, and teaching experience on AI integration practices in Nigeria.

2.0 Theoretical Background

The Social Cognitive Theory (SCT), developed by Bandura (1986), is considered an applicable theory to explain the adoption of AI literacy among teachers in secondary schools due to the focus on dynamic interaction between individual, behavioural, and environmental factors. The key concept of SCT is self-efficacy, which is an individual's belief in their ability to accomplish certain actions. Self-efficacy of teachers is a key determinant of their readiness to apply AI tools in teaching in terms of AI literacy. When teachers believe in their own learning, understanding and application of AI technologies, they tend to explore AI-based lesson plans, use intelligent tutoring systems, adaptive learning devices, and seek AI-based assessment solutions. Alternatively, teachers who have a low self-efficacy might demonstrate unwillingness or avoid experimentation or use the traditional pedagogical methods only, which restricts the potential of using AI (Ng et al., 2023; Sanusi et al., 2022).

Social modelling is another fundamental concept of SCT, and it states that a person acquires knowledge by observing the behaviour of others and the consequences of their actions. In the context of teaching, encountering educators who have already adopted AI in their teaching experience provides them with lessons and motivation to adopt the technology in teaching. Such an observational learning can assist teachers to learn how AI tools may be used in the classroom effectively, illustrate possible strategies to overcome challenges, and develop confidence that they too can learn and implement similar strategies. In addition, the environmental aspect of SCT emphasises the significance of institutional support. Environmental facilitators include training programmes, professional developments and well-defined organisational policies, which empower teachers to attain the skills, knowledge and confidence to use AI effectively. In turn, institutional direction or insufficient resources may be barriers to adoption, despite the high motivation of educators (Asghar et al., 2025).

SCT is also useful to explain the demographic differences in the adoption of AI literacy. The reason is that younger teachers have more self-efficacy because they are more exposed to digital technologies and less rigid in their attitudes related to innovation, whereas gender-specific trends might indicate the influence of social factors, past experiences, and motivations. The differences imply that the issue of AI adoption cannot be homogeneous and needs to be regarded in the light of individual traits and socialised experiences. Peer mentoring, collaborative learning settings, and positive school cultures can reinforce the involvement of teachers in AI and, in this way, can contribute to shared learning, feedback, and problem-solving. These facilitating conditions allow an educator to become competent, confident and motivated gradually, which demonstrates how personal, behavioural and environmental conditions interact to produce these effects, the focus that SCT highlights.

The combination of motivation and environmental aspects allows SCT to offer a comprehensive framework to develop interventions to increase AI competencies. Examples of practical use may encompass systematic peer mentoring, role-modelling with seasoned AI users and scaffolded practical training and continued professional assistance. Such interventions are beneficial in the acquisition of skills. They are also useful in long-term behavioural change by addressing both psychological and contextual obstacles. Finally, the Social Cognitive Theory provides a solid theoretical basis to explore the manner in which individual beliefs, social dynamics, and organisational environments contribute to secondary school teachers becoming ready and able to embrace AI technologies to promote innovation and safeguard education quality and integrity (Ng et al., 2023; Sanusi et al., 2022; Asghar et al., 2025).

Research Questions

The following research questions guided the study:

1. What is the level of AI literacy among teachers in public and private secondary schools in Nigeria?
2. What is the difference in the level of institutional support for AI literacy development between public and private secondary schools?
3. Do teachers' demographic factors (particularly years of teaching experience) predict their ability to integrate AI into their teaching practices?
4. Is there a significant difference in AI literacy levels between male and female teachers in public and private secondary schools?
5. Are there significant differences in AI literacy levels between teachers in public and private secondary schools?

3.0 Methodology

A descriptive survey research design was adopted to gather quantitative data on AI literacy, perceived institutional support, and teachers' demographic attributes. Such a cross-sectional design was suitable for determining group differences and analysing the connection between variables among a relatively large group of teachers. The targeted population included teachers in public and private secondary schools in the Ibadan metropolis. The sampling procedure was implemented in two stages. Stage 1 involved school selection, in which schools were selected in the Ibadan metropolis across the 11 Local Government Areas using a stratified approach. Stratification was based on school type (public and private schools). The schools were randomly selected within each stratum from a list of all registered schools. Stage 2 involves teacher selection. Teachers were randomly selected from each of the selected schools to take part in the study. A total of 450 teachers were sampled in all 11 Local Government Areas. Data cleaning revealed that 414 completed questionnaires were valid for analysis, resulting in a response rate of 92%. The total sample consisted of 207 public school and 207 private school teachers. Missing values and outliers were screened before analysis, while questionnaires with more than 10% missing responses were excluded from the analysis. For the remaining questionnaires, missing data were minimal (less than 2% per item) and were handled using mean substitution, which is a conservative approach appropriate for Likert-scale data (Little & Rubin, 2020).

This process resulted in 414 valid questionnaires retained for final analysis. The sample size of 414 was deemed adequate based on the rule of thumb for multiple regression analysis, which recommends a minimum of 10 cases per predictor variable (Tabachnick & Fidell, 2019). A self-developed questionnaire tagged "AI Literacy, Institutional Support and Teachers' Demographic Assessment Questionnaire (AILISTDAQ) was used for data collection. The AILISTDAQ instrument was systematically developed. First, items were generated based on an extensive review of the literature on AI literacy (Casal-Otero et al., 2023; Chiu et al., 2024; Kim & Kwon, 2023; Ng et al., 2023), institutional support (Granić, 2022; Zhang, 2025), and

Social Cognitive Theory (Bandura, 1986). Four dimensions were operationalised: AI Literacy (knowledge, skills, and attitudes concerning AI in education); Institutional Support (training access, policies, and infrastructure); Demographic Factors (gender, years of teaching experience, school type); and Self-Reported AI Implementation (integration practices).

Content validity was established by an expert in educational technology and research methodology, who evaluated each item for relevance, clarity, and comprehensiveness. A pilot test was conducted with 40 teachers, leading to minor wording adjustments to establish face validity. Thereafter, the reliability test results, using Cronbach's alpha, yielded an overall coefficient of 0.76, with subscale coefficients of 0.75 for AI Literacy, 0.76 for Institutional Support, 0.77 for Demographic Factors, and 0.76 for Self-Reported AI Implementation. All instruments exceeded the acceptable threshold of 0.70 (DeVellis, 2017; Nunnally & Bernstein, 1994). Factor analysis was not conducted in this exploratory study, given the absence of existing AI literacy instruments validated in the Nigerian context. However, the strong theoretical grounding in Social Cognitive Theory and the expert validation process provide reasonable evidence of construct validity. It is advised that future research should conduct factor analysis to further establish the factorial structure of the AILISTDAQ instrument. The school authorities and every participant in the sampled schools gave their consent voluntarily after the ethical approval was given by the corresponding institutional review Committee. Participants were informed of their right to withdraw their consent without any sanction. Data were analysed with inferential and descriptive statistics.

4.0 Results

4.1 Research question 1: What is the level of AI literacy among teachers in public and private secondary schools in Nigeria?

Table 1: Teachers' Literacy Level of AI

S/N	Item	N	Mean	SD	Remark
1	I have a good understanding of the basic concepts and principles of artificial intelligence.	414	1.75	0.90	Disagreed
2	I am able to evaluate the potential applications of AI in education.	414	1.78	0.90	Disagreed
3	I feel confident in my ability to use AI tools and resources in my teaching.	414	1.90	0.90	Disagreed
4	I have received adequate training or professional development in AI literacy.	414	1.68	0.89	Disagreed
5	I am able to explain the ethical implications of using AI in education.	414	1.76	0.93	Disagreed
6	I can identify and address potential biases in AI algorithms.	414	1.79	0.87	Disagreed
Weighted mean = 1.82					
Standard mean = 2.50					

Table 1 revealed a weighted mean of 1.82, out of the obtainable maximum score of 4.00. This is less than the criterion means of 2.50, implying that AI literacy level among teachers in public and private secondary schools is low.

4.2 Research question 2: What is the difference in the level of institutional support for AI literacy development between public and private secondary schools?

Table 2: Difference in the level of institutional support for AI literacy development between public and private secondary schools.

School type	N	Mean	SD	Df	T	P value	Remark
Public Private	207 207	24.18 22.18	4.73 5.29	412	4.054*	0.001	Sig.

Table 2 showed that there was a significant difference in the level of institutional support for AI literacy development between public and private secondary schools ($t = 4.05$; $p<0.05$). This means there is a statistical difference in the level of institutional support received by public and private schools. It was observed that teachers from private schools had higher institutional support for AI literacy development ($\bar{x}$ = 22.18) than their public-school counterparts ($\bar{x}$ = 24.18).

4.3 Research question 3: Do teachers' demographic factors (particularly years of teaching experience) predict their ability to integrate AI into their teaching practices?

Table 3: Teachers' demographic factors and their ability to integrate AI into their teaching practices by years of experience.

Sources of Variance	Sum of Squares	Df	Mean Square	F	Significant
Between Group	1110.913	4	277.728	2.479*	0.044
Within Group	45816.723	409	112.021		
Total	46927.635	413			

* denotes significant $p<0.05$

Table 3 revealed that the difference in teachers' ability to integrate AI into their teaching practices based on years of experience was significant ($F(4, 409) = 2.48$; $p<0.05$). This means teachers' years of experience have an influence on their ability to integrate AI into their teaching practices.

4.4 Research question 4: Is there a significant difference in AI literacy levels between male and female teachers in public and private secondary schools?

Table 4: Relationship between teachers' AI literacy and ability to integrate AI by gender.

Gender	N	Mean	SD	Df	T	P value	Remark
Male	192	12.95	4.42	412	0.998	0319	N.S.
Female	222	12.53	4.15				

Table 4 indicates that the difference in AI literacy levels between male and female teachers in public and private secondary schools ($t = 1.00$; $p>0.05$) was not significant. This indicates that there is no statistically significant difference in the AI literacy levels of male and female teachers.

4.5 Research question 5: Are there significant differences in AI literacy levels between teachers in public and private secondary schools?

Table 5: Differences in AI literacy between teachers in public and private secondary schools.

School type	N	Mean	SD	Df	T	P value	Remark
Public	207	12.22	4.30	412	-2.392*	0.017	Sig.
Private	207	13.22	4.21				

* Denotes significant at $p<0.05$

Table 5 showed that there was a significant difference in AI literacy levels of public and private secondary school teachers ($t = -2.39$; $p<0.05$). This means teachers' school type has an influence on their AI literacy levels. Table 2 also revealed that private school teachers ($\bar{x}$ = 13.22) had a higher AI literacy mean score than their counterparts in the public schools ($\bar{x}$ = 12.22). This difference in their mean scores is statistically significant.

5.0 Discussions

The study reveals that the overall level of AI literacy among teachers in both Nigerian public and private secondary schools is low. This is because the findings are consistent with evidence that only a small proportion of teachers have any basic AI knowledge or concrete AI-related skills, despite the widespread exposure to AI in the educational field. This was earlier noted by Zhao et al. (2022) and Li et al. (2025). It was also established that the absence of systematic training and insufficient resources are the key impediments to the integration of AI, which is a challenge identified by Roshan et al. (2024) and Shi (2024). This pattern can be compared to the previous literature, citing the existing gaps in the technology-related capacities in the education systems (Oni, 2023; Otunla et al., 2022). The Social Cognitive Theory became relevant in the manner in which low self-efficacy, lack of opportunities to learn through observation and poor institutional support are intertwined, limiting AI literacy. SCT focuses on the interaction between the individual's beliefs and behaviour and the environment.

Thus, the lack of training and supportive structures documented can be used to justify low confidence and low AI-related behaviours in teachers and is also in line with the former application of SCT to the adoption of educational technologies, which have already been discussed in studies by Nikolic et al. (2024). The low levels of AI literacy can be further understood based on Social Cognitive Theory's triadic reciprocal determinism. The limited self-efficacy (Personal Factor) of teachers stems from a lack of mastery experiences; most teachers have not been formally trained in AI and there has been no effective attempt to integrate AI into class. But without such experiences, teachers are not encouraged to try out AI tools, creating even fewer chances to gain competence. From the environmental perspective, even with positive attitudes, teachers cannot act due to the absence of institutional support in terms of training programmes, availability of internet, functional devices, and weak policy guidance. This forms a vicious circle: low self-efficacy leads to avoidance, which prevents skill improvement, and perpetuates low self-efficacy. This discovery contradicts the notion that access to AI tools would enhance literacy, which Ding et al. (2024) suggest must be structured, repeated, and supported by hands-on experiences.

The study established that there was a statistically significant difference in the institutional support of AI literacy development between the public and the private secondary schools. This is consistent with the observation of Ng et al. (2024), which found that institutional commitment, leadership support and access to tools and training are potent in the success of AI literacy programmes in schools (Roshan et al., 2024). It was found that educators in the private schools reported that there was more institutional support of AI-related training and resources than there was with their colleagues in the public schools, in line with the argument in Nikolic et al. (2024) that infrastructural and staffing disparities and internal policies tend to favour non-state schools, thus making it easier and less intimidating to use AI in those institutions. This is consistent with the stance taken by Roshan et al. (2024) and Shi (2024) that institutional bottlenecks in developing AI literacy among educators are based on structured training opportunities and the provision of resources.

These variations in institutional support are interpreted as the foundation of the Social Cognitive Theory, which depicts important environmental variables that influence the self-efficacy and behaviour of teachers. According to SCT, personal beliefs and peer modelling interplay with organisational policies, infrastructure and leadership to affect technology adoption. In this manner, improved institutional support in a private school is likely to result in greater AI self-efficacy. This will also include more active integration in line with the previous use of SCT in the educational technology environment (Bakhadirov & Alasgarova, 2024; Ng et al., 2024). The study contributes original evidence on institutional support differentials in AI literacy between the government and non-government secondary schools in Nigeria, based on the Social Cognitive Theory. It adds a layer of context-specific data to the relatively global literature in AI literacy and identifies existing structural disparities in

support and provides a theoretically informed foundation of policy and professional development interventions targeted at equity. The study revealed that it is not just more computers or the Internet in private schools. According to SCT, environmental factors enable observational learning and provide social persuasion, which are key sources of self-efficacy. Conversely, the situation in public schools can be starkly different, with no colleagues using AI and no opportunities for vicarious learning. This discrepancy in structure continues to create the two-tiered readiness for AI in education in Nigeria, which could exacerbate the digital divide.

The research found that demographic variables, especially teaching experience, significantly affect AI integration behaviours. It is contrary to the observation of Bakhadirov and Alasgarova (2024), whereby the teaching experience had a negative correlation with new technology adoption, and younger teachers tended to be more inclined to investigate the role of AI applications in teaching. Nevertheless, the study concurs with the stance that was taken by Moravec et al. (2024) and Nikolic et al. (2024), in which demographic variables, including age, gender, and level of education, were stated to influence AI awareness and attitudes in the educational environment by indicating the necessity of providing differentiated, context-specific support to various groups of teachers. Again, Ng et al. (2024) note that successful AI literacy programmes should take into account the peculiarities of learners and experience to build training and support systems. The interaction between the environment and environmental affordance is indicated by the predictive role of teaching experience. According to SCT, technology-related behaviour is based on self-efficacy, which is formed as a result of mastery experiences in the past and observational learning. More professional teachers might either resort to strong pedagogical repertoires that can be applied to the integration of AI on a principled basis or, on the contrary, have lower self-efficacy with unfamiliar tools than younger colleagues, which is supported by previous findings regarding the patterns of technology adoption (Bakhadirov and Alasgarova, 2024). Results showed that the teachers who had 6–10 years of experience had significantly higher AI integration scores than the teachers who had less than 2 years or more than 20 years of experience ($p < 0.05$). This is a curvilinear relationship that can be understood by SCT, meaning the mid-career teachers do have pedagogic self-efficacy and have received the necessary in-service or recent pre-service training in technology to develop self-efficacy with AI. Veteran teachers may have some routines in place that are hard to change and have less perceived digital competence because they have not had extensive experience with digital learners. Novice teachers might be digital natives, but they might not have the knowledge, skills, and abilities to merge AI into the classroom. Therefore, professional development should be customised by ensuring that novice teachers receive pedagogical and AI learning support, while experienced teachers get confidence-building master experiences.

Despite some previous results suggesting that there was a gender gap in AI literacy (Moravec et al., 2024), in this study, there was no gender difference, which is consistent with SCT in an equally conducive environment. Gender differences in self-efficacy might not be observed if teachers, either male or female, are unable to have access to meaningful training or role models. But this is not to say that there was a lack of parity when it comes to AI readiness; it is more of a baseline of inadequate support for all. To ensure that the rollout of AI literacy programmes is not extrapolating from past experiences in computing education, where women's self-efficacy has been found to fall behind men's when their actual skills are equivalent, there is a need for longitudinal monitoring data across the country to be gathered over a longer period.

Simultaneously, to a certain degree, the study remains relevant to the role investigated by Moravec et al. (2024) and Nikolic et al. (2024), where age, gender and education were identified to influence attitudes and priorities regarding the use of AI, but could not directly relate to definite, consistent gaps in quantifiable competence across all settings. Based on this study, the fact that there was no major difference in gender gap indicates that male and

female teachers are in very similar constellations of self-efficacy beliefs, observational learning opportunities and institutional support on AI. In SCT, this trend indicates the role of environmental and institutional factors as more determinant than gender in the determination of AI literacy outcomes. Through this, the study contributes contextual data on Nigerian secondary schools, which challenges the assumption of a universal gender gap in AI literacy. It streamlines the applications of Social Cognitive Theory to AI by demonstrating that gender in such applications does not directly dictate literacy levels, and that, when designing equitable AI literacy interventions, consideration should be given to structural and contextual same crops leverages of literacy.

It is not just a matter of wealth that private schools have a higher level of AI literacy. Some qualitative data was gathered but not reported. These additional comments were very useful as sources of vicarious learning, especially in private schools, where there was often a designated 'innovation coordinator' who modelled the use of AI. The role was seldom accorded to public schools. Thus, a policy approach for public education needs to go beyond the promotion of hardware to the establishment of communities of practice with teachers who can watch and talk about how AI can be used in the classroom.

This study showed that teachers' AI literacy level varied significantly according to school type, with the teachers at private schools scoring high compared to those at public schools. This aligns with the results by Ng et al. (2024) and Nikolic et al. (2024), wherein the inequalities in the infrastructure, staffing and regulatory flexibility suggested that private institutions had a higher likelihood of implementing AI and associated literacies than those operated by the state. This aligns with Li et al. (2025) and Chee et al. (2025)'s opinion that institutional commitment, tools and sustained professional development are significant conditions of knowledge building of AI among teachers in their skills and ethical awareness. The increased literacy rate of the teachers in the private schools is indicative of more enabling environmental influences, which involve institutional support, policies and modelling opportunities that improve self-efficacy and AI-related behaviours. The teachers in the public schools seem limited to weaker environmental support, even though they have similar intentions in SCT terms. This is useful because it provides empirical data, based on a Nigerian setting, that school type is an important structural determinant of AI literacy. It builds on Social Cognitive Theory by prefiguring the institutional environment, and not just personal factors, as a key driver of AI literacy creation within school sectors.

Social Cognitive Theory was used as a perspective through which the results were viewed rather than a theory to be tested in this study. Although the findings are in line with SCT predictions, including the impact of the environmental factor (institutional support) and the personal factor (teaching experience) on the behavioural outcome (AI integration), the study did not examine key SCT variables (e.g., self-efficacy, vicarious learning, or outcome expectancies) directly. Thus, the results are supportive of the theoretical explanation but do not prove the theory empirically. Future studies can focus on developing and validating measures that directly tap into these SCT constructs to examine whether the theory can be applied to understanding AI literacy in school settings. This difference in theoretical interpretation and empirical testing is significant for the potential contribution to both theoretical and conceptual and empirical work on the development of AI literacy among teachers.

Apart from the individual factors investigated in this study, the results also have implications for educational administration and school leaders. The huge gap in institutional support between public and private schools calls for organisational preparedness interventions that tackle structural inequality in AI literacy formation. Stakeholders, especially educational administrators, are crucial to providing conditions to invest in technology infrastructure, formulate explicit protocols on AI use and nurture cultures of innovation and ongoing professional development. The findings also indicate leaders' responsibility in demonstrating commitment to digital transformation, because institutional

capability is influenced not only by the availability of resources, but also by strategic vision and continued support from the institution's administration. In addition, the strong impact of teaching experience on AI integration underscores the importance of evidence-based practice in guiding professional development interventions, especially for preservice and experienced educators, as they might benefit from tailored support. Hence, educational leaders are advised to take a systemic perspective that embeds AI literacy within a larger institutional change plan so that the enhancement of capacity for teaching with AI can be institutionalised rather than existing as a standalone training exercise. This would be in tandem with global best practice in terms of digital transformation and will position Nigerian secondary schools to take full advantage of AI technologies for better teaching and learning.

6.0 Conclusions

The study considered the factors influencing the AI literacy of secondary school teachers in Ibadan, Nigeria, using the Social Cognitive Theory, which considered differences based on school type, gender, teaching experience and institutional support. The results indicate a low level of AI literacy among all teachers, and there were notable differences between the level of AI literacy of the teachers in private schools and those in public schools. Teaching experience can be seen as a significant predictor for the incorporation of AI, but gender differences were not significant. This could be due to the lack of environmental support for both women and men. This work exposes the potential of SCT as a lens to analyse AI literacy in education within the context of the Global South. The results imply that reduced self-efficacy may be considered not just an individual deficit but co-generated by meagre environmental enablers such as poor training, deficient infrastructure, and scant institutional modelling. This is consistent with the SCT focus on the interaction between the person and environment in determining behavior. However, without measuring the SCT constructs directly in the present study, the results should be interpreted as providing theoretical support rather than as empirical evidence for the framework. Subsequent research should include direct measures of self-efficacy, observational learning, and outcome expectations to facilitate a more stringent assessment of SCT in the context of AI literacy.

In practice, the study highlights the need for systemically, rather than individually, introducing and fostering AI literacy. Immediate actions for public schools should include the creation of peer-led AI learning circles to allow for vicarious learning, incorporating low-cost, offline-capable AI literacy modules into existing professional development, and creating clear policies that encourage ethical experimentation with AI in education, in addition to infrastructure (reliable power, subsidised internet) in education budgets. In private schools, the emphasis must now be on depth, with AI literacy integrated into subject areas and on ethical aspects. Policymakers must appreciate the need to redesign the environment to prevent the existing AI divide from reproducing and exacerbating current inequalities in education. National education policies on the use of AI must call for targeted support for public schools, such as AI champions, peer mentorship schemes, and AI context-relevant training resources. Lastly, the present study advocates for the use of mixed methods, longitudinal research that follows the process of the introduction of AI interventions, and that captures how teachers experience the process of overcoming barriers to the use of AI in practice. We need to shift the narrative from techno-determinism to a human-centred and fair approach to AI in secondary education in Nigeria, by foregrounding teacher self-efficacy and institutional support.

References

[1] Aiyede, E. I. (2022). The quest for improved learning outcomes in Literature-in-English among senior secondary school students in Ibadan, Nigeria: Teachers' instructional organisation in focus. Journal of Education, 27, 37–50.

[2] Aiyede, E. I. (2026). Teacher commitment and pedagogical content knowledge as predictors of students' achievement in English grammar in junior secondary schools in Akinyele Local Government, Ibadan, Oyo State, Nigeria. African Journal of Studies in Education (AJOSIE), 19(1), 21–50.

[3] Bali, B., Garba, E., Ahmadu, A., Takwate, K., & Malgwi, Y. (2024). Analysis of emerging trends in artificial intelligence for education in Nigeria. Discover Artificial Intelligence, 4. https://doi.org/10.1007/s44163-024-00163-y

[4] Casal-Otero, L., Catalá, A., Fernández-Morante, C., Taboada, M., Cebreiro, B., & Barro, S. (2023). AI literacy in K-12: A systematic literature review. International Journal of STEM Education, 10, 1–17. https://doi.org/10.1186/s40594-023-00418-7

[5] Chiu, T., Ahmad, Z., Ismailov, M., & Sanusi, I. (2024). What are artificial intelligence literacy and competency? A comprehensive framework to support them. Computers and Education Open. https://doi.org/10.1016/j.caeo.2024.100171

[6] Ding, A. C. E., Shi, L., Yang, H., & Choi, I. (2024). Enhancing teacher AI literacy and integration through different types of cases in teacher professional development. Computers and Education Open, 6, 100178.

[7] Dringó-Horváth, I., Rajki, Z., & Nagy, J. (2025). University teachers' digital competence and AI literacy: Moderating role of gender, age, experience, and discipline. Education Sciences. https://doi.org/10.3390/educsci15070868

[8] Ebirim, P. U., Ekeada, C. C., & Oyelade, T. J. (2026). Integrating Artificial Intelligence and digital connectivity in remote school management for enhanced educational outcomes among secondary schools in Imo State, Nigeria. Federal University Gusau Faculty of Education Journal, 6(2), 38–43.

[9] Granić, A. (2022). Educational technology adoption: A systematic review. Education and Information Technologies, 27, 9725–9744. https://doi.org/10.1007/s10639-022-10951-7

[10] Iddrisu, H., & Iddrisu, S. (2025). Teacher readiness to use AI tools in the classroom. International Journal of Research in Education and Science. https://doi.org/10.46328/ijres.1314

[11] Itasanmi, S. A., & Oni, M. T. (2020). Determinants of learners' satisfaction in open distance learning programmes in Nigeria. Pakistan Journal of Distance and Online Learning, 6(2).

[12] Itasanmi, S. A., Ajani, O. A., & Oni, M. T. (2023). COVID-19-induced concerns and graduate students' motivation for programme completion in a Nigerian university. International Journal of Education and Practice, 11(3), https://doi.org/10.18488/61.v11i3.3381

[13] Itasanmi, S. A., Jegede, T. E., & Oni, M. T. (2019). Demographic factors as predictors of Open Educational Resources awareness and usage among open and distance learning students in Southwestern Nigeria. West African Journal of Open and Flexible Learning, 7(2), 93–108.

[14] Itasanmi, S. A., Oni, M. T., Ekpenyong, V. O., Ajani, O. A., & Omorinkoba, O. G. (2022). Academic staff's motivation for online teaching in Nigerian universities: Empirical evidence from the University of Ibadan. International Journal of Learning, Teaching and Educational Research, 21(7), 345–365.

[15] Kim, K., & Kwon, K. (2023). Exploring the AI competencies of elementary school teachers in South Korea. Computers and Education: Artificial Intelligence, 4, 100137. https://doi.org/10.1016/j.caeai.2023.100137

[16] Linake, M. A., Makeleni, S., Oni, M. T., & Joseph, G. J. (2025). Barriers and opportunities in developing AI literacy among secondary school teachers in Nigeria. Academia Lasalliana Journal of Education and Humanities, 7(1), 129–138. https://doi.org/10.55902/VXJV1275

[17] Little, R. J., & Rubin, D. B. (2019). Statistical analysis with missing data. John Wiley & Sons.

[18] Lucas, M., Zhang, Y., Bem-Haja, P., & Vicente, P. (2024). The interplay between teachers' trust in artificial intelligence and digital competence. Education and Information Technologies, 29, 22991–23010. https://doi.org/10.1007/s10639-024-12772-2

[19] Majebi, O. I., Oni, M. T., Segun-Dipe, G. T., Babarinde, S. K., & Oduolowu, E. A. (2024). Effectiveness of socio-constructive collaboration strategy on post-COVID primary school children learning outcome in national values. International Journal of Research and Innovation in Social Science, 8(3s), 1705–1714.

[20] Ng, D., Su, J., Leung, J., & Chu, S. (2023). Artificial intelligence (AI) literacy education in secondary schools: A review. Interactive Learning Environments, 32, 6204–6224. https://doi.org/10.1080/10494820.2023.2255228

[21] Oni, M. T. (2023). Environmental factors as predictors of citizens' participation in development activities in Ogbomoso town, Oyo State, Nigeria. Sociology International Journal, 7(4), 188–191. https://doi.org/10.15406/sij.2023.07.00342

[22] Oni, M. T., Kayode-Olawoyin, B. O., & Lawal, B. O. (2021). Historical perspective of universal basic education: Issues and prospects. In K. O. Ojokheta & K. O. Kester (Eds.), Education re-engineering in the new normal world: Festschrift for Professor Rashid Adewumi Aderinoye (pp. 166–178). John Archers (Publishers) Ltd.

[23] Opesemowo, O. (2024). Artificial intelligence in education, bridging community gap: A phenomenological approach. International Journal of New Education. https://doi.org/10.24310/ijne.14.2024.20505

[24] Otunla, A. O., Awoyale, M., & Oni, M. T. (2022). Biology students' engagement in internet tools and resource use for learning among private senior secondary schools in Ibadan metropolis. Bilingual Journal of Multidisciplinary Studies, 5, 366–378.

[25] Otunla, A. O., Tijani, R. A., Adamolekun, W., & Oni, M. T. (2020). Tertiary institution students' perceived preparedness to adopt mobile-learning technology innovation in South-Western Nigeria. African Journal of Historical Sciences in Education, 16(1).

[26] Quansah, F., & Amoako, I. (2025). Built environment of basic schools and performance outcomes in rural Ghana: Learners' voice. Discover Education, 4, Article 96. https://doi.org/10.1007/s44217-025-00483-w

[27] Sheng Zhao, X., & Yoon, S. (2025). Does technology readiness influence sustained use of social media platforms? A cross-national comparison. International Journal of Web Based Communities, 21(4), 265–282.

[28] Tabachnick, B. G., & Fidell, L. S. (2013). Using multivariate statistics (6. Baskı). MA: Pearson.

[29] Tiamiyu, Y. B., Adamolekun, W., Oni, M. T., & Otunla, A. O. (2020). Perceived senior secondary students' level of computer anxiety and competences in Oyo Education Zone of Oyo State, Nigeria. African Journal of Historical Sciences in Education, 16(1).

[30] Xiang, Y., Yang, C., Jin, Z., & Zhao, W. (2025). Factors influencing the adoption of generative artificial intelligence into classroom teaching by university teachers: An empirical study using SPSS PROCESS macros. PLOS One, 20. https://doi.org/10.1371/journal.pone.0324875

[31] Yang, Y., Tseng, C., & Lai, S. (2024). Enhancing teachers' self-efficacy beliefs in AI-based technology integration into English speaking teaching through a professional development programme. Teaching and Teacher Education. https://doi.org/10.1016/j.tate.2024.104582

[32] Yim, I., & Su, J. (2024). Artificial intelligence (AI) learning tools in K-12 education: A scoping review. Journal of Computers in Education, 1–39. https://doi.org/10.1007/s40692-023-00304-9

[33] Zhang, K. (2025). Teacher adoption of digital education management systems through combined information systems and social cognitive frameworks during the post-COVID era. Scientific Reports, 15. https://doi.org/10.1038/s41598-025-01552-8