



STUDENTS' LEARNING ENGAGEMENT UNDER TRADITIONAL AND TECHNOLOGY-BASED TEACHING APPROACHES IN SENIOR SECONDARY SCHOOLS IN SOKOTO METROPOLIS

DR. UMAR, AHMAD TAMBUWAL¹ AND BUHARI, SAFIYA²

¹Department of Curriculum and Instruction Shehu Shagari College of Education, Sokoto.

²Department of Islamic Studies, Shehu Shgari College of Education, Sokoto

*Corresponding author: ahmadtbw20@gmail.com

ABSTRACT

The study compared traditional and technology-based teaching approaches in relation to students' learning engagement in secondary schools in Sokoto Metropolis. Descriptive survey research design was adopted. The population comprised 526 senior secondary school students under the Sokoto State Ministry of Science and Technology, from which 96 students in one purposively selected secondary school participated through census sampling. Data were collected using the Teaching Approaches and Students' Learning Engagement Questionnaire (TASLEQ), a researcher-developed instrument with an overall Cronbach's Alpha reliability coefficient of 0.79. Descriptive statistics (mean and standard deviation) were used to answer the research questions, while an independent samples t-test was employed to test the hypothesis at the 0.05 level of significance. The findings revealed that students taught using the traditional teaching approach demonstrated a moderate level of learning engagement ($M = 2.69$, $SD = 1.01$), whereas those taught using the technology-based teaching approach exhibited a high level of learning engagement ($M = 3.57$, $SD = 0.89$). The hypothesis test further revealed a statistically significant difference between the two instructional approaches, $t(94) = 4.87$, $p < .001$, in favour of the technology-based teaching approach. The study concludes that technology-based teaching enhances students' participation, motivation, retention, and overall learning engagement more effectively than the traditional teaching approach. It therefore recommended greater integration of information and communication technology into classroom instruction through improved infrastructure, teacher capacity development, and curriculum implementation.

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INTRODUCTION

The rapid advancement of technology has reshaped educational delivery across all levels of learning. Globally, teaching and learning are increasingly shifting from teacher-centred instruction to learner centred and technology-based approaches that promote interaction, collaboration, creativity, and active knowledge construction. Technology supported instruction provides opportunities for personalized, collaborative, and flexible learning experiences when effectively integrated into classroom practice.



However, technology itself does not guarantee improved learning outcomes unless it is supported by sound pedagogy, adequate infrastructure, and competent teachers (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2023).

Traditional teaching refers to a teacher-centred instructional approach in which the teacher serves as the primary source of knowledge through lectures, demonstrations, and direct explanation, while students assume relatively passive roles during instruction (Hewapathirana & Almasri, 2024). Although this approach has remained the dominant instructional strategy in many educational systems, concerns have been raised regarding its limited capacity to promote critical thinking, collaboration, and active student participation. In contrast, technology-based teaching involves the purposeful integration of information and communication technologies, including computers, mobile devices, digital learning platforms, educational software, and internet based resources, to facilitate teaching and learning. technology-based instruction supports interactive, collaborative, and learner centred pedagogies that enhance students' participation and knowledge construction (Liu & Koehler, 2026).

Learning engagement refers to the degree of students' behavioural, emotional, and cognitive involvement in learning activities. It reflects the effort, attention, commitment, and persistence students invest in achieving educational goals and is widely recognized as a major predictor of academic success and positive learning outcomes (Fredricks et al., 2004; Reschly & Christenson, 2022). Contemporary educational research further demonstrates that technology enhanced learning environments can strengthen these dimensions of engagement when instructional activities are carefully designed and implemented. In many Nigerian secondary schools, however, traditional teaching methods characterized by teacher-centred instruction, chalk and talk delivery, and rote memorization remain dominant (Ogunyemi & Alade, 2021). While these approaches have historically formed the backbone of classroom teaching, concerns persist about their effectiveness in promoting deep understanding, creativity, critical thinking, and sustained learner engagement. Although many teachers recognize the educational value of information and communication technology, inadequate digital facilities, poor electricity supply, limited internet connectivity, and insufficient teacher competence continue to constrain effective classroom integration (Ajayi & Olowolagba, 2022).

Despite numerous curriculum reforms and teacher training initiatives, students' academic achievement remains a major concern in Nigerian secondary schools. Recent reports by the West African Examinations Council (WAEC, 2024) and the National Examinations Council (NECO, 2024) continue to reveal unsatisfactory performance in several core subjects. This situation has partly been attributed to the continued reliance on conventional lecture based methods that emphasize memorisation rather than conceptual understanding and active learner participation. Consequently, opportunities for students to develop critical thinking, problem solving, collaboration, and creativity remain limited.



Furthermore, the Nigerian education system continues to face challenges that hinder the effective adoption of innovative instructional approaches. Limited digital infrastructure, inadequate internet connectivity, unreliable electricity supply, and insufficient teacher preparedness remain significant barriers to technology integration in classroom instruction (Ajayi & Olowolagba, 2022). These constraints have slowed the implementation of the National Policy on Information and Communication Technology in Education and have limited the educational benefits associated with digital learning environments (Federal Ministry of Education, 2019).

This digital divide creates disparities between students in well-resourced urban schools and those in under resourced schools. Although national educational policies promote the integration of digital technologies into teaching and learning, implementation has remained uneven across Nigerian secondary schools. UNESCO (2023) further emphasized that meaningful technology integration requires not only access to digital resources but also teacher competence, curriculum alignment, and institutional support. Furthermore, previous studies in Nigeria have largely examined either the effectiveness of technology-based teaching or the limitations of traditional instructional approaches separately. Few studies have undertaken direct comparative analyses of students' learning engagement under both instructional approaches within the context of secondary schools in Sokoto Metropolis. This gap limits the availability of context specific evidence needed by policymakers, curriculum developers, and school administrators to make informed decisions regarding instructional improvement, teacher professional development, and investment in educational technology.

STATEMENT OF THE PROBLEM

Despite growing international evidence that technology based teaching enhances students' learning engagement, participation, and academic achievement, classroom instruction in many Nigerian secondary schools continues to rely predominantly on traditional teacher centred approaches (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2023). Although traditional teaching remains useful for introducing concepts and organizing classroom activities, excessive dependence on lecture based instruction often limits active student participation, critical thinking, collaboration, creativity, and problem solving, all of which are essential competencies for twenty first century learning (OECD, 2019).

The problem is particularly evident in many Nigerian public secondary schools where inadequate information and communication technology infrastructure, unreliable electricity supply, limited internet connectivity, insufficient digital learning resources, and inadequate teacher preparedness continue to constrain the effective integration of technology into classroom instruction (Federal Ministry of Education, 2019; UNESCO, 2023). Consequently, many teachers continue to rely primarily on



conventional instructional practices despite increasing recognition of the educational benefits associated with technology enhanced teaching and learning.

In Sokoto Metropolis, where secondary schools operate under varying levels of technological and instructional resources, there is limited empirical evidence directly comparing students' learning engagement under traditional and technology based teaching approaches. Most previous studies have examined either the effectiveness of technology based instruction or the limitations of traditional teaching independently, with little attention given to comparative investigations within the local educational context. Consequently, school administrators, curriculum planners, and policymakers have limited context specific evidence to guide decisions regarding instructional improvement, teacher professional development, and investments in educational technology.

Therefore, there is a need to undertake a comparative investigation of traditional and technology based teaching approaches with respect to students' learning engagement in secondary schools in Sokoto Metropolis. The findings of this study are expected to provide empirical evidence that will assist teachers, educational administrators, curriculum developers, and policymakers in identifying instructional approaches capable of improving students' learning engagement and enhancing the quality of secondary school education in Sokoto Metropolis.

RESEARCH QUESTIONS

The study sought to answer the following questions:

1. What is the level of students' learning engagement under the traditional teaching approach in secondary schools in Sokoto Metropolis?
2. What is the level of students' learning engagement under the technology based teaching approach in secondary schools in Sokoto Metropolis?
3. What difference exists in students' learning engagement under the traditional and technology based teaching approaches in secondary schools in Sokoto Metropolis?

OBJECTIVES OF THE STUDY

The study was guided by the following objectives:

1. Determine the level of students' learning engagement under the traditional teaching approach in secondary schools in Sokoto Metropolis.



2. Determine the level of students' learning engagement under the technology based teaching approach in secondary schools in Sokoto Metropolis.
3. Compare students' learning engagement under the traditional and technology based teaching approaches in secondary schools in Sokoto Metropolis.

RESEARCH HYPOTHESIS

The null hypothesis below was tested at 0.05 level of significance.

1. There is no significant difference in students' learning engagement under the traditional and technology-based teaching approaches in secondary schools in Sokoto Metropolis.

METHODOLOGY

The study adopted descriptive survey research design to compare the relationship between traditional and technology-based teaching approaches on students' academic achievement. The design was considered appropriate because it allowed the researcher to gather quantitative data from respondents without manipulating variables, thus facilitating an objective comparison of learning outcomes under the two instructional methods.

The population for the study comprised all senior secondary school students under the Sokoto State Ministry of Science and Technology, totaling 526 students (Sokoto State Ministry of Science and Technology [SSMST]). A total of 96 students participated in the study. Purposive sampling was used to select one secondary school that had the facilities and instructional practices required for comparing traditional and technology-based teaching approaches. The selected school was considered appropriate because it implemented both instructional approaches within the same learning environment, thereby providing a suitable setting for the study. All the 96 students in the selected school were included in the study through census sampling. The decision to involve all students was based on the relatively small and manageable sampling frame.

Data were collected using a structured questionnaire titled the *Teaching Approaches and Students' Learning Engagement Questionnaire (TASLEQ)*. The instrument was developed by the researchers and structured on a four-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (4). The questionnaire consisted of three sections. Section A elicited respondents' demographic information, including age, gender, and class level. Section B contained items measuring students' learning engagement under the traditional teaching approach, while Section C comprised items assessing students' learning engagement under the technology-based teaching approach. The face and content



validity of the instrument were established by three experts, comprising two specialists in Educational Measurement and Evaluation and one specialist in Instructional Technology. Their observations and recommendations were used to improve the clarity, relevance, and adequacy of the questionnaire items. To establish reliability, the instrument was pilot-tested using 20 Senior Secondary School students from a school outside the study area but with similar characteristics to the selected school. The data obtained were analyzed using Cronbach's Alpha, which produced an overall reliability coefficient of 0.79, indicating that the instrument possessed satisfactory internal consistency and was suitable for data collection.

Furthermore, data collection followed ethical and procedural standards. Formal approval was obtained from the Ministry of science and technology. Research and Ethics Committee, and permission was granted by the management of each participating school. Participation was voluntary, and respondents were assured of confidentiality and anonymity. Questionnaires were administered and retrieved within a two-week period under the supervision of trained research assistants. The data collected were analyzed using both descriptive and inferential statistics. Descriptive statistics, specifically mean and standard deviation, were used to answer the research questions by determining the level of students' learning engagement under the traditional and technology-based teaching approaches. To test the null hypothesis, an independent samples t-test was employed to determine whether there was a significant difference in the learning engagement of students exposed to the two teaching approaches. The T-test analysis was conducted using the Statistical Package for the Social Sciences (SPSS) at the 0.05 level of significance.

RESULTS

Research Question 1

What is the level of learning engagement of secondary school students taught using traditional teaching methods?

**Table 1: Learning Engagement of Secondary School Students under Traditional Teaching Method**

Item	Learning Engagement (Traditional)	Mean	SD	Remark
1	I actively participate in lessons	2.89	1.05	Moderate
2	Teacher motivates me to study	2.75	0.98	Moderate
3	I find class discussions engaging	2.67	0.92	Moderate
4	I enjoy solving problems in class	2.55	1.10	Moderate
5	I concentrate during lessons	2.80	1.02	Moderate
6	I remember most of what is taught in class	2.60	0.89	Moderate
7	I can apply class knowledge to real-life issues	2.70	1.12	Moderate
8	I perform well in tests	2.75	0.94	Moderate
9	I retain information for a long time	2.50	0.88	Moderate
10	I revise frequently after class	2.68	1.15	Moderate

Source: Field Survey (2026)

Table 1 shows that students taught using the traditional teaching method demonstrated a moderate level of learning engagement across all the measured indicators, with mean scores ranging from 2.50 to 2.89. Thus, the findings indicate that the traditional teaching approach moderately engaged students in learning.

Research Question 2

What is the level of learning engagement of secondary school students taught using technology-based teaching methods?

**Table 2: Learning Engagement of Sec. Sch Students under Technology-Based Teaching Method**

Item	Students Learning Engagement (Tech-Based)	Mean	SD	Remark
1	I actively participate in digital lessons	3.55	0.92	High
2	Online tools motivate me to study	3.60	0.89	High
3	I find e-learning platforms engaging	3.70	0.85	High
4	I enjoy solving problems with tech tools	3.50	0.95	High
5	I concentrate during online/digital lessons	3.40	0.88	High
6	I remember what I learn through digital resources	3.60	0.90	High
7	I can apply knowledge gained through tech to real life	3.65	0.87	High
8	I perform well in tests with digital support	3.50	0.91	High
9	I retain concepts better with online aids	3.55	0.89	High
10	I revise more frequently with online tools	3.70	0.82	High

Source: Field Survey (2026)

Table 2 indicates that secondary school students taught using technology-based teaching methods demonstrated a high level of learning engagement across all the measured indicators, with mean scores ranging from 3.40 to 3.70. Overall, the findings suggest that technology-based teaching methods effectively enhance students' engagement in learning.

Hypothesis Testing

There is no significant difference in learning engagement between students taught with traditional and technology-based methods.

Table 3: Independent Samples T-Test

Group	N	Mean	SD	T	df	p-value	Decision
Traditional	50	2.69	1.01	4.87	94	0.000	Reject H_0
Tech-Based	46	3.57	0.89				

Source: Field Survey (2026)

Table 3 shows a statistically significant difference in learning engagement between students taught using traditional and technology-based teaching approaches, $t(94) = 4.87$, $p < .001$. Students exposed to the technology-based teaching approach ($M = 3.57$, $SD = 0.89$) demonstrated higher learning engagement than those taught using the traditional teaching approach ($M = 2.69$, $SD = 1.01$). Therefore, the null hypothesis was rejected, indicating that technology-based teaching significantly improves students'

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learning engagement in secondary schools in Sokoto Metropolis.

DISCUSSION

The finding on Research Question One revealed that secondary school students taught using the traditional teaching method demonstrated a moderate level of learning engagement, with mean scores ranging from 2.50 to 2.89. This suggests that although the conventional teacher-centred approach enables students to participate in classroom activities, remain attentive, and achieve satisfactory learning outcomes, it may not adequately promote active participation, critical thinking, and sustained engagement. This finding is consistent with Hattie (2009), who argued that direct or teacher-led instruction remains effective for introducing concepts and maintaining classroom structure but is generally less effective than interactive instructional approaches in fostering deeper learning and learner engagement. Similarly, Mayer (2021) acknowledged that conventional teaching can facilitate learning where instruction is well organized, although students become more engaged when teaching incorporates active and meaningful learning experiences. However, the finding contrasts with the Organisation for Economic Co-operation and Development (OECD, 2015), which reported that learning environments relying predominantly on traditional instructional methods often provide fewer opportunities for student interaction, collaboration, and independent learning than technology-supported classrooms.

The finding on Research Question Two showed that secondary school students taught using technology-based teaching methods exhibited a high level of learning engagement, with mean scores ranging from 3.40 to 3.70. This indicates that technology-supported instruction enhanced students' participation, motivation, concentration, knowledge retention, and application of learning. The finding supports the Constructivist Learning Theory, which posits that learners construct knowledge more effectively through active interaction with learning resources and collaborative experiences. The finding agrees with Bond et al. (2020), who reported that digital learning environments significantly improve student engagement, participation, and motivation across educational settings. Similarly, Kayode and Govender (2022) found that effective integration of information and communication technology enhances students' motivation, classroom participation, and academic performance in Nigerian educational institutions. The finding is further supported by UNESCO (2023), which concluded that appropriately integrated educational technologies improve learner engagement and create richer learning experiences. Nevertheless, the finding differs from Tamim et al. (2011), who argued that technology alone does not automatically improve learning outcomes unless accompanied by effective pedagogy, teacher competence, and appropriate instructional design. Likewise, the OECD (2015) cautioned that the educational benefits of technology depend largely on how it is integrated into teaching rather than on the availability of technology itself.



The hypothesis test further revealed a statistically significant difference in learning engagement between students taught using traditional and technology-based teaching approaches, with students exposed to technology-based instruction recording significantly higher engagement than those taught through traditional methods. This finding provides empirical evidence that technology-based teaching approaches are more effective in promoting students' learning engagement in secondary schools in Sokoto Metropolis. The result corroborates the findings of Bond et al. (2020), UNESCO (2023), and Kayode and Govender (2022), all of whom reported that effective integration of digital technologies significantly enhances learners' participation, motivation, collaboration, and academic achievement. However, the finding should also be interpreted alongside the conclusions of Tamim et al. (2011) and the OECD (2015), who emphasized that the effectiveness of technology-based instruction depends on teachers' pedagogical competence, sound instructional design, and the availability of adequate ICT infrastructure rather than technology alone.

CONCLUSION

The study concludes that while both traditional and technology-based teaching approaches promote students' learning engagement in secondary schools in Sokoto Metropolis, technology-based teaching is more effective. Students taught through traditional methods demonstrated a moderate level of learning engagement, whereas those taught using technology-based methods exhibited a high level of engagement. The significant difference between the two approaches indicates that technology-based teaching enhances students' participation, motivation, retention, and overall learning engagement more effectively than the traditional approach.

RECOMMENDATIONS

Based on the findings, the following recommendations are proposed:

1. The Federal and State Ministries of Education should institutionalize the use of ICT in secondary school curricula. Curriculum planners should explicitly integrate technology-based instructional objectives to ensure that digital literacy becomes a core learning outcome.
2. The Ministry of Education, in collaboration with teacher training institutions, should organize regular professional development workshops for teachers on digital pedagogy, multimedia lesson design, and the effective use of online learning platforms such as Google Classroom and Microsoft Teams. Incentives should also be provided to encourage continuous professional development and digital skills acquisition.



3. Government and private stakeholders should invest in the provision of reliable ICT infrastructure, including computer laboratories, projectors, internet connectivity, and alternative power sources, particularly in secondary schools within densely populated areas of Sokoto Metropolis.
4. Secondary schools should adopt blended learning approaches that combine the strengths of traditional classroom instruction with technology-based learning. This will promote inclusive education by enabling students with limited access to digital resources to benefit from face-to-face instruction while gradually developing digital literacy and competence.

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