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Assessment of Technological Advancement on Classroom learning Engagement among Public Secondary School Students in Ijebu-ode Local Government Area of Ogun State, Nigeria

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Abstract

The study was an assessment of technological advancement on classroom learning engagement among public secondary school students in Ijebu-ode Local Government Area of Ogun State, Nigeria. A descriptive research design of survey type was used. The population for this study comprised public secondary school students in Ijebu Ode local government, Ogun State. Out of 13 public secondary schools in Ijebu-ode local government area, a simple random sampling technique was used in selecting 4 representing 31%. This technique gave equal chance for the all 13 schools to be included in the sample size. Sample size was 182 students. Researcher developed questionnaire; titled: Technological Advancement and Students Learning Engagement Questionnaire (TASLEQ) was used for data collection with reliability 0.81. Mean and standard deviation were used for analyzing research questions. The findings of the study showed among others that there was medium level of students learning engagement in secondary school. Lack of funds from the government side, inadequate infrastructure development in school, resistance to change on the part of teachers, cybersecurity concerns and insufficiency skills on the part of teachers and students were among the issues confronting technological advancement in students learning engagement. It was concluded that the provisions of adequate resources for technological advancement installment in school and provisions of infrastructure development in school are needed for students learning engagement. The study recommended that policy makers and educational stakeholders to prioritize the integration of technology in curriculum development and teacher training programs.

Keywords: Technological Advancement, Teacher, Learning Engagement.

Introduction

Student learning engagement refers to the degree of attention, curiosity, interest, and passion students show when learning, encompassing their motivation and active participation in the learning process. Student engagement is about how actively and meaningfully students participate in their learning, encompassing their emotional, behavioral, and cognitive involvement. The dimension of student learning engagement could take the forms cognitive, affective and behavioural engagements. Cognitive engagement involves students' intellectual effort, strategic thinking, and willingness to tackle challenging ideas. Affective engagement refers to students' emotions, feelings, and attitudes towards learning, the subject matter, and the learning environment as well as behavioral



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engagement: includes observable behaviors like participation in class, effort, persistence, and concentration. Shaurya (2024) believed that the notion of student engagement is multifaceted, encompassing components of learning that are cognitive, emotional, and behavioral. Because it can provide immersive, interactive learning experiences that accommodate a variety of learning preferences and styles, technology has the potential to increase student engagement. Students can actively participate in the learning process through multimedia presentations, gamified learning exercises, and collaborative online tools. This increases their motivation, interest, and involvement in academic assignments. The introduction of technology has brought about a profound change in the educational environment. Technology may help create a more engaging learning environment, interactive tools, simulations, and multimedia materials can turn passive learning into an active experience. Kumar and Akram (2019) stated that the beneficial effects on a number of student engagement characteristics, such as social, behavioral, reflective, and cognitive. As noted by Shaurya (2024), technology offers content through visuals, audio, and kinesthetic exercises to accommodate a variety of learning styles and that online platforms encourage students to collaborate and learn from one another by facilitating communication.

Technological advancement is an important part of students' lives. Incorporating technology into the classroom has proved to be beneficial yet also has some drawbacks. Technology has helped student willingness and engagement and allows for the enhancements of learning (Kaite, et al 2021). The need for engagement means that the best types of learning will be those that involve choices that the student can make and learning where there are meaningful contexts where the student is engaged. Technological advancement can also improve learning results by giving users access to a multitude of resources and information outside the usual classroom lecture and textbook boundaries. With the internet acting as a massive knowledge base, students may perform research, go in-depth with topics, and obtain educational materials catered to their specific learning requirements. Furthermore, tailored learning environments and adaptive learning technology can accommodate each student's individual learning styles and aptitudes, enabling differentiated instruction and enhanced academic outcomes. Notwithstanding the possible advantages, there are drawbacks and issues to take into account when analyzing how technology affects learning outcomes and student engagement. Technological obstacles, information overload, and digital diversions are a few problems that might prevent students from learning effectively and from making academic progress. Furthermore, discrepancies in students' access to technology and level of digital literacy can deepen the digital gap and worsen already-existing inequities, creating problems for educational equity. Given these intricacies, it is imperative to carry out thorough study in order to comprehend the subtleties of technology's impact on learning outcomes and student engagement (Kumar & Akram, 2019). Interestingly, technology integration in education plays a pivotal role in transforming traditional teaching and learning approaches, offering myriad of benefits to both educators and students. This integration enhances the learning experience by facilitating interactive, personalized, and engaging instruction (Ally, 2020). One significant advantage of technology integration is its ability to cater for diverse learning styles and individual student needs (Bingimlas, 2022). Through multimedia resources, interactive simulations, and adaptive learning platforms, technology provides opportunities for differentiated instruction, allowing educators to tailor lessons to the unique requirements of each student. Furthermore, technology advancement integration fosters the development of critical 21st-century skills, such as digital literacy, problem-solving, collaboration, and creativity (Puentedura, 2021). By leveraging on digital tools and online resources, students



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acquire the technical proficiencies necessary for success in today's digital age while honing essential skills for lifelong learning engagement (Gyamfi & Mensah, 2021).

Moreover, technology-enhanced learning environments promote active engagement and student-centered approaches, shifting the role of educators from disseminators of information to facilitators of inquiry-based learning. Interactive whiteboards, educational software, and online collaboration platforms empower students to take ownership of their learning, fostering independence, curiosity, and intrinsic motivation (Gyamfi & Mensah, 2021). Furthermore, technology integration expands access to educational opportunities, breaking down geographical barriers and enabling remote learning experiences (Hodges et al., 2020). Particularly in contexts with limited resources or infrastructure challenges, digital tools and online platforms provide avenues for equitable access to quality education, bridging the gap between urban and rural communities (Gyamfi & Mensah, 2021). Hence, technology advancement integration in education offers numerous benefits, including catering for diverse learning needs, fostering 21st century skills development, promoting active engagement, and expanding access to educational opportunities. In the Nigerian education system, the integration of technology advancement faces numerous challenges and barriers that hinder its effective implementation. Infrastructure limitations pose significant obstacles, including inadequate access to electricity, limited internet connectivity, and insufficient hardware and software resources (Uzodinma et al 2024). Additionally, the digital divide exacerbates disparities in technology access and usage, particularly among different socioeconomic groups and between urban and rural areas (Nwachukwu, 2018). Socioeconomic disparities and gender inequalities persist, with girls often having less access to technology resources and opportunities compared to boys. Limited teacher capacity and training are significant barriers, as many educators lack the necessary skills and support to effectively integrate technology into their teaching practices (Aluko, 2024). Resistance to change and traditional teaching practices further inhibit technology adoption among teachers.

Curriculum misalignment and pedagogical challenges hinder the integration of technology advancement into instructional practices, with inadequate integration of technology-related competencies into the curriculum and resistance to pedagogical shifts (Agunbiade, 2018). Financial constraints, including limited budget allocations and high costs of technology, pose significant barriers to technology integration initiatives (Uduji & Okolo-Obasi, 2022). Cultural perceptions of technology, language barriers, and policy inconsistencies further complicate technology integration efforts. Addressing these challenges requires comprehensive strategies that address infrastructure limitations, provide adequate teacher training and support, align curriculum and pedagogy with technology integration goals, secure sufficient funding, and address cultural and societal factors that influence technology adoption in education. The current state of technology integration in the Nigerian education system reflects both progress and persistent challenges. Recent efforts have aimed at leveraging on digital tools and resources to enhance teaching and learning experiences. Initiatives include the establishment of computer labs, provision of digital textbooks, and the adoption of online learning platforms. Government policies have also been developed to support technology integration, aiming to narrow the digital gap and equip pupils with essential skills for the modern world. However, significant hurdles remain, such as inadequate infrastructure, limited access to technology and internet connectivity, and a shortage of trained educators proficient in technology use. Disparities in technology access across regions and socioeconomic groups exacerbate existing inequalities. Addressing these challenges requires sustained investment in technology infrastructure, comprehensive teacher training programs, and the development of locally relevant digital content. Additionally, promoting digital literacy and responsible technology use is



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crucial for ensuring equitable access and maximizing the potential impact of technology integration on educational outcomes in Nigeria.

Statement of the Problem

In the context of education in Nigeria, there exists a pressing need to evaluate the effectiveness of integrating technology advancement to enhance learning engagement. This assessment is crucial due to the growing emphasis on leveraging technological tools and resources to improve educational practices. However, despite concerted efforts to integrate technology into teaching and learning processes, there remains a significant gap in understanding its impact and the specific challenges encountered within the Nigerian educational landscape. Key issues such as inadequate infrastructure, limited access to technology resources, insufficient teacher training, and disparities in technology adoption among different regions and socioeconomic groups, and the necessity to align technology integration with curriculum objectives pose formidable barriers. These challenges collectively impede the realization of the full potential of technology advancement to elevate learning engagement for students in secondary school education in Nigeria. Addressing these obstacles is paramount to harnessing the benefits of technological advancement integration and improvement in students learning engagement. Hence, the study examined the influence of technological advancement on students learning engagement.

Objectives of the Study

The main objective of the study was to examine the influence of technological advancement on students learning engagement. Specifically, the study sought to:

1. determine the level of students learning engagement in secondary school;
2. ascertain the issues confronting technological advancement in students learning engagement;
3. identify strategies towards resolving issues facing technological advancement in students learning engagement;
4. find out the role of technological advancement towards enhancing students learning engagement.

Research Questions

The following research questions guided this study:

1. To what level are students learning engagement in secondary school?
2. What are the issues confronting technological advancement in students learning engagement?
3. What are the strategies towards resolving issues facing technological advancement in students learning engagement?
4. What are the role of technological advancement towards enhancing students learning engagement?

Research Method

The study adopted a descriptive research design of survey type. This design is considered very appropriate because the researcher intended to collect data from the selected respondents to provide answer to the study objectives. The population for this study comprised public secondary school students in Ijebu Ode local government, Ogun State. However, a total of 13 public secondary schools were in Ijebu-Ode local government areas. Out of 13 public secondary schools in Ijebu-ode local government area, a simple random sampling technique will be used in selecting 4 representing 31%. This technique will give equal chance for the all 13 schools to be included in the sample size. Those schools selected are Ijebu-Muslim College, Luba Comprehensive High School, Adeola Odutola College and Ijebu-ode Grammar School. From Ijebu-Muslim College 41 teachers were selected, from Luba Comprehensive High School 49 teachers were selected, from Adeola Odutola College 51 teachers were selected and from Ijebu-ode Grammar School 41 selected were selected using stratified



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sampling technique. Sample size was there 182 teachers. The study used researcher developed questionnaire; titled: Technological Advancement and Students Learning Engagement Questionnaire (TASLEQ). The questionnaire (TASLEQ) requested responses on a four (4) – point scale format which will be a modification of 5-point Likert scale. The responses rating scales are as follows: Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The questionnaire divided into two sections A and B. Section A focus on demographic characteristics of the respondents, while section B focused on the related items on the level of students learning engagement; issues confronting technological advancement in students learning engagement; strategies towards resolving issues facing technological advancement in students learning engagement and the role of technological advancement towards enhancing students learning engagement. The initial draft of the instrument was subjected to face and contents validity by experts from the department of Educational Technology. All the issues raised were duly attended to in order to ensure its content, construct, and criterion validity. To ensure the reliability of the instrument, a test-retest reliability of the instrument was carried out. The copies of the instrument were administered to a sample of 20 teachers in a separate school outside the geographical scope of the study. The purpose is determined the stability and consistency of the instruments. Pearson Product Moment Correlation (PPMC) was used to determine the level of reliability coefficient which yielded 0.81 as reliability coefficient. Data were collected using the validated instrument. Introduction letter was presented to the authority of the selected public secondary schools seeking their permission to administer the questionnaire. The researcher personally administered the questionnaire with the help of 3 research assistants to the respondents. The researcher ensured that respondents are adequately briefed on the content and procedure for filling the questionnaire. Enough time was given to the respondents to respond to each item in the questionnaire. Mean and standard deviation were used for analyzing research questions. Any mean score of 2.5 and above regarded as agree while any one below 2.5 regarded as disagreed.

Presentation of Results

Research Question 1: To what level are students learning engagement in secondary school?

Table 1: Mean and standard deviation responses on the level are students learning engagement in secondary school

Items	Mean	SD
My students always present in during teaching.	2.68	.905
Students participated in classroom discussion.	2.95	.849
Students always asked questions from me.	3.02	.699
Most of the students failed to asked questions in classroom.	3.22	.704
Students are immersed in work that has clear meaning and immediate value to them.	3.16	.677
Average Mean	3.01	

Source: Field Survey, 2025

Table 1 revealed that average mean was 3.01 which greater that bench mark mean value 2.50. This implied that there was medium level of students learning engagement in secondary school.

Research Question 2:

What are the issues confronting technological advancement in students learning engagement?

Table 2: Mean and standard deviation responses on the issues confronting technological advancement in students learning engagement

Items	Mean	SD
Lack of funds from the government side.	2.77	.887
Inadequate infrastructure development in school.	2.59	.906
Resistance to change on the part of teachers.	2.75	.905

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Cybersecurity concerns	2.65	.899
Insufficiency skills on the part of teachers and students.	2.83	.875
Average Mean	2.72	

Source: Field Survey, 2025

Table 2 showed that average mean was 2.72 which greater that bench mark mean value 2.50. This implied that lack of funds from the government side, inadequate infrastructure development in school, resistance to change on the part of teachers, cybersecurity concerns and insufficiency skills on the part of teachers and students were among the issues confronting technological advancement in students learning engagement.

Research Question 3: What are the strategies towards resolving issues facing technological advancement in students learning engagement?

Table 3: Mean and standard deviation responses on the strategies towards resolving issues facing technological advancement in students learning engagement

Items	Mean	SD
Provisions of adequate resources for technological advancement installment in school.	2.83	.953
Provisions of infrastructure development in school	2.91	.904
Training for teachers on the need for technological advancement integration in education.	2.85	.999
Provisions of ant cybersecurity treats.	3.11	.888
Provision of motivation technique such as scholarship for students with higher learning engagement.	2.92	.832
Average Mean	2.92	

Source: Field Survey, 2025

Table 3 showed that average mean was 2.92 which greater than bench mark mean value 2.50. This suggested that provisions of adequate resources for technological advancement installment in school, provisions of infrastructure development in school, training for teachers on the need for technological advancement integration in education, provisions of ant cybersecurity treats, and provision of motivation technique such as scholarship for students with higher learning engagement were among the strategies towards resolving issues facing technological advancement in students learning engagement.

Research Question 4: What are the role of technological advancement towards enhancing students learning engagement?

Table 4: Mean and standard deviation responses on the role of technological advancement towards enhancing students learning engagement

Items	Mean	SD
Providing interactive and personalized learning experiences.	3.23	.772
Fostering collaboration	3.16	.794
Offering access to a vast array of resources	3.06	.755
Ultimately preparing students for the digital age	3.28	.775
Foster student engagement for auditory and visual learners.	2.99	.720
Average Mean	3.14	

Source: Field Survey, 2025

Table 4 showed that average mean was 3.14 which greater than bench mark mean value 2.50. The implications of these results were that providing interactive and personalized learning experiences, fostering collaboration, offering access to a vast array of resources, preparing students for the digital age and foster student engagement for auditory and visual learners were among the role of technological advancement towards enhancing students learning engagement.



Discussion of Findings

The findings of the study revealed that there was medium level of students learning engagement in secondary school. These findings correlate with Ghanbaripour et al. (2024) whose findings revealed that these technologies significantly enhance student engagement by providing immersive and interactive learning experiences that bridge the gap between theoretical knowledge and practical application. Furthermore, their use is shown to improve learning outcomes by facilitating a deeper understanding of complex concepts and increasing student motivation. In terms of employability, the integration of digital tools into education equips students with the requisite skills that are increasingly demanded in the modern workplace. However, the study also identifies several challenges, including high costs, limited resources, and the need for extensive faculty training, which act as barriers to the effective implementation of these technologies. Juan (2024) found that these tools, ranging from interactive apps to online platforms and virtual simulations, have been found to enhance student motivation and participation. Study demonstrated that students using digital tools showed increased levels of attentiveness and active participation compared to traditional classroom settings. This engagement often stems from the interactive nature of digital tools, which allow for personalized learning experiences tailored to individual student needs and interests. Furthermore, digital learning tools foster collaborative learning environments by facilitating peer interaction. and group projects, as highlighted in a meta-analysis by Johnson and Lee (2019). This collaborative aspect not only improves social skills but also encourages students to take ownership of their learning process. Additionally, digital tools provide immediate feedback mechanisms through quizzes, assessments, and real-time analytics, enabling teachers to gauge student comprehension and adjust instructional strategies accordingly.

The findings also showed that lack of funds from the government side, inadequate infrastructure development in school, resistance to change on the part of teachers, cybersecurity concerns and insufficiency skills on the part of teachers and students were among the issues confronting technological advancement in students learning engagement. These findings correlate with Shaurya (2024) looks at the possible advantages of technology, such as enhanced capacity for knowledge retention, critical thinking, and problem-solving. The initiative also recognizes the difficulties that come with integrating technology, including the digital divide, potential diversions, and the requirement for well-thought-out educational tactics. Through the examination of these variables, the study hopes to offer insightful guidance to teachers who are looking to use technology to improve learning outcomes and increase student engagement. Uzodinma et al. (2024) findings of the study revealed a notable positive correlation between technology integration and learning outcomes among pupils in childhood and primary education, emphasizing technology's potential to enrich educational effectiveness in these contexts. Moreover, the findings of the study also identified discrepancies in the extent of technology integration across schools, highlighting the necessity for tailored interventions to mitigate inequalities and narrow the digital gap among pupils.

The findings further indicated that the provisions of adequate resources for technological advancement installment in school, provisions of infrastructure development in school, training for teachers on the need for technological advancement integration in education, provisions of ant cybersecurity treats, and provision of motivation technique such as scholarship for students with higher learning engagement were among the strategies towards resolving issues facing technological



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advancement in students learning engagement. These findings were in agreement with George and Ige (2022) showed that ICT tools were available but not adequate for academic engagement. In addition, the available ICT tools were not used frequently and coupled with the inadequacy of the tools, its effect was not felt much. It was also found that use of the available ICT tools influenced the lecturers to introduce new innovation in teaching, which in turn facilitates smooth delivery of instructions and saves time and energy. Respondents also identified the challenges facing the use of ICT tools to include inadequate funding to procure ICT infrastructure and modern ICT tools, lack of supervision, unstable network and power supply and lack of policy on ICT use in the university system. Kaite et al. (2021) findings showed that more training for teachers and students are necessary to better implement technology in the classroom. Usman (2021) revealed a positive perception of technology integration among educators, with high mean scores indicating strong understanding and favourable attitudes towards technology-integrated curriculum resources. However, variability exists in specific beliefs and practices, highlighting the need for targeted professional development and policy support. Moreover, while students perceive technology integration positively for aspects like assignment completion and curiosity, there are lower ratings for making learning exciting and connecting to subjects. The study underscores the significance of addressing socioeconomic, cultural, and infrastructural factors in promoting effective technology integration and recommends investments in infrastructure, comprehensive professional development, clear policy frameworks, collaborative partnerships, and ongoing research to enhance technology-enhanced education in Sokoto State. Chuchan (2018) revealed the existence of significant relationship between students' academic performance and their computer literacy as well as students' technology utilization and their family income. Data showed that student's academic performance is highly influenced by the teacher's effective teaching and by the teacher's computer literacy nor by their competence in technology. Grade 7 students of private and public schools utilize technology the least while fourth year students utilize technology the most. No significant difference was found on self-efficacy among year levels.

Smith and Johnson (2019) findings from the study indicated a significant increase in student engagement levels among those using digital simulations, as evidenced by higher participation rates and increased interest in the subject matter. Students expressed enthusiasm for the interactive nature of the simulations, which allowed them to visualize complex concepts and experiment with different scenarios. This engagement translated into improved learning outcomes and a deeper understanding of physics principles. Jones (2020) revealed a notable increase in student motivation and engagement in the gamified group, leading to improved learning outcomes and deeper understanding of mathematical concepts. Students reported enjoying the competitive elements, immediate feedback, and rewards incorporated into the gamified platform, which incentivized active participation and problem-solving. Garcia and Martinez (2018) observed that the use of mobile learning apps increased student engagement through interactive exercises, personalized learning experiences, and immediate feedback mechanisms. Students appreciated the flexibility and accessibility of mobile apps, allowing them to learn at their own pace and engage with multimedia content that catered to different learning styles. Furthermore, the gamification elements embedded within some apps enhanced motivation and sustained interest in language learning.

Finally, the findings depicted that providing interactive and personalized learning experiences, fostering collaboration, offering access to a vast array of resources, preparing students for the digital age and foster student engagement for auditory and visual learners were among the role of



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technological advancement towards enhancing students learning engagement. These findings corroborate with Miller and Anderson (2022) found that students using VR simulations exhibited higher levels of engagement, curiosity, and retention of biological concepts compared to those using traditional methods. The immersive and interactive nature of VR simulations allowed students to explore complex biological phenomena in a controlled yet realistic environment, fostering curiosity and deeper understanding. Students reported feeling more motivated to learn and participate actively in laboratory activities when using VR simulations. Brown and White (2021) observed that online collaborative tools facilitated communication, teamwork, and active participation, leading to increased student engagement and higher-quality project outcomes. Students appreciated the real-time collaboration features, which allowed them to work together seamlessly, share resources, and provide feedback to peers. Anderson and Clark (2023) found that digital annotation tools improved student engagement by encouraging active reading, critical thinking, and collaborative discussions among peers. Students appreciated the ability to annotate texts digitally, which facilitated deeper comprehension, analysis, and reflection on literary themes and characters.

Conclusion

The study examined the influence of technological advancement on students learning engagement, the following conclusions were drawn based on the findings of the study that there was medium level of students learning engagement in secondary school; lack of funds from the government side, inadequate infrastructure development in school, resistance to change on the part of teachers, cybersecurity concerns and insufficiency skills on the part of teachers and students were among the issues confronting technological advancement in students learning engagement; provisions of adequate resources for technological advancement installment in school, provisions of infrastructure development in school, training for teachers on the need for technological advancement integration in education, provisions of ant cybersecurity treats, and provision of motivation technique such as scholarship for students with higher learning engagement were among the strategies towards resolving issues facing technological advancement in students learning engagement and providing interactive and personalized learning experiences, fostering collaboration, offering access to a vast array of resources, preparing students for the digital age and foster student engagement for auditory and visual learners were among the role of technological advancement towards enhancing students learning engagement.

Recommendations

Based on the findings of the study, the following recommendations are provided:

1. Policymakers and educational stakeholders to prioritize the integration of technology in curriculum development and teacher training programs.
2. The study recommended that the university administrators should liaise with TETFUND to provide ICT infrastructures such as modern ICT tools, broadband access that will facilitate speedy internet access as well as alternative power supply to resolve the challenges of unstable power supply for enhanced academic engagement.
3. Furthermore, school administrators should sensitize and encourage teachers to use tutorial hours for effective academic engagement where necessary to resolve the challenge of limited hours allocated to courses.
4. Integrating interactive digital tools into curricula to enhance student engagement, particularly in complex topics where visualization aids comprehension and concept retention.



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5. Gamified platforms to enhance student engagement, especially for topics that students may find challenging or abstract, as the gamification elements were found to increase intrinsic motivation and sustained interest in learning engagement.

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