IJO- INTERNATIONAL JOURNAL OF SOCIAL SCIENCE AND HUMANITIES RESEARCH
(E:ISSN 2811-2466) (P.ISSN: 2384-6097) Ezekiel Kayode IDOWU (Ph.D)*
https://ijojournals.com/ Volume 09 || Issue 01 || January, 2026 ||
"Enhancing Student Engagement and Learning Outcomes through Technology Integration in Bamidele Olumilua University of Education, Science and Technology, Ikere-Ekiti, Ekiti State, Nigeria"

Enhancing Student Engagement and Learning Outcomes through Technology Integration in Bamidele Olumilua University of Education, Science and Technology, Ikere-Ekiti, Ekiti State, Nigeria

[1]Ezekiel Kayode IDOWU (Ph.D)
Department of Educational Foundations and Management, Bamidele Olumilua University of Education, Science and Technology, Ikere Ekiti, Ekiti State, Nigeria
&
[2]Samuel Ayodele AKEREDOLU (Ph.D)
Department of Counselling Psychology, Bamidele Olumilua University of Education, Science and Technology, Ikere Ekiti, Ekiti State, Nigeria

Abstract
This study examined the extent to which technology integration enhances student engagement and learning outcomes at Bamidele Olumilua University of Education, science and Technology, Ikere-Ekiti, Ekiti State. The study adopted a descriptive research design of the survey type. The population comprised 400 and 500 level students across the four colleges of the university, from which a sample of 400 students was selected using stratified sampling techniques to ensure adequate representation. Data were collected using a structured questionnaire titled Questionnaire on Enhancing Student Engagement and Learning Outcomes through Technology Integration in BOUESTI (QESELOTIBOUESTI). The instrument was validated by experts, and reliability was established using the test–retest method, yielding a coefficient of 0.79. Data were analysed using descriptive statistics and Pearson Product Moment Correlation at the 0.05 level of significance. Findings revealed that technology integration significantly enhances student engagement across behavioural, cognitive, and emotional dimensions, as evidenced by increased participation, collaboration, motivation, and self-regulated learning. The results further indicated that technology use positively affects learning outcomes by improving academic performance, conceptual understanding, digital literacy, problem-solving skills, and the application of knowledge to new tasks. However, the study identified major challenges to effective technology use, including unreliable electricity supply, poor internet connectivity, high data costs, and limited access to digital devices, inadequate staff training, and insufficient institutional support. The study concluded that while technology integration has strong potential to improve student engagement and learning outcomes at BOUESTI, its effectiveness depends on strategic pedagogical alignment and the resolution of infrastructural and institutional barriers. It was recommended that the university invest in digital infrastructure, strengthen staff capacity in digital pedagogy, improve access to devices and technical support, and develop supportive institutional policies to ensure sustainable and effective technology-enhanced learning.

Keywords: Technology integration, student engagement, learning outcomes, higher education, digital pedagogy, BOUESTI.

Introduction

Digital technology have become essential to higher education in the twenty-first century. Effective teaching and institutional practice have changed as a result of the rapid adoption of learning management systems, synchronous and asynchronous online tools, and data-driven platforms (Matthew, Kazaure, and Onyedibe, 2022); Alenezi (2023); Abu, Bettayeb, & Omer, 2021). Academics contend that the transition to digitally mediated delivery during the pandemic era opened up new avenues for curriculum design, assessment, and large-

scale learning customisation in addition to offering an emergency substitute for in-person instruction (Abu et al., 2021). Therefore, theoretical and empirical reviews emphasize that in order to achieve long-lasting improvements in teaching and learning, technology integration must be conceived as a strategic, pedagogically framed process rather than just the addition of hardware or apps (Bond, Buntins, Bedenlier, Zawacki-Richter, & Kerres, 2020).

The primary educational goal of raising student engagement, a multifaceted concept that includes behavioral, cognitive, emotional, and social investment in learning, is closely related to this institutional change (Bergdahl et al., 2024). According to the literature, some technologies such as analytics dashboards, adaptive platforms, interactive multimedia, and formative assessment tools can support self-regulated learning, scaffold participation, and offer instant feedback all of which are mechanisms that mediate better results (Bergdahl et al., 2024; Bond et al., 2020). Importantly, systematic reviews indicate that the impact of technology on achievement is not automatic. The greatest learning gains occur when instructors use analytics and feedback loops to improve instruction and when tools are purposefully aligned with specific pedagogical objectives (Bergdahl et al., 2024; Abu Talib et al., 2021).

Contextual opportunities and limitations temper the promise of instructional technology for Nigerian colleges. The reach and quality of technology-enabled learning across many campuses are impacted by persistent issues that are highlighted in institutional reports and recent studies. These issues include limited digital infrastructure, uneven faculty training, inconsistent power and internet access, and budgetary constraints (Abu Talib et al., 2021). Simultaneously, a number of Nigerian institutions have started making focused expenditures in staff training, blended delivery methods, and e-learning platforms, indicating both institutional commitment and the need for data on what works locally. Therefore, consideration of these systemic factors and practical design decisions suitable for the Nigerian higher-education setting are necessary to comprehend how technology might be used to improve engagement and results (Abu Talib et al., 2021; Osiesi, Ayanwale, Olatunbosun *et al.* (2025); Oladele(2024) and Yakubu and Dasuki (2018))

In higher education research, student engagement is a multifaceted concept that is frequently used to explain how and why students devote time, energy, and emotion to learning activities Metu (2024). Fredricks, Blumenfeld, and Paris's (2004) groundbreaking study distinguishes between three aspects of engagement: behavioral, emotional (affective), and cognitive. Cognitive engagement indicates investment in learning strategies, deep processing, and self-regulated learning; behavioral engagement refers to participation and observable actions (e.g., attendance, task completion); and emotional engagement encompasses interest, sense of belonging, and attitudes toward education. Because technology can impact each dimension differently for example, analytics can track behavior, multimedia can effect emotion, and adaptive systems can scaffold cognition it is crucial to treat engagement as multidimensional.

In higher education, behavioral engagement usually takes the form of involvement in online forums, completion of assignments, attendance at synchronous sessions, and time spent on task in learning management systems (LMS). These behaviors are all easily observable and frequently recorded by digital traces. To avoid overstating its influence, researchers warn that behavioral indicators such as clicks and logins are not enough to represent meaningful learning and should be understood in conjunction with cognitive and affective markers Bergdahl, Bond, Sjoberg, Dougherty and Oxley (2024). Therefore, LMS logs should be triangulated with survey measures of cognitive processes and qualitative evidence of emotional investment in technology-mediated environments.

Technology affordances and learning outcomes are crucially mediated by emotional engagement (interest, motivation, and belonging). Positive affective responses that encourage perseverance are typically fostered by technologies that allow for social presence, immediate feedback, and relevance to students' goals. When present, cognitive engagement which measures how much students apply deep learning techniques like critical thinking, reflection, and strategy use is frequently the best indicator of long-lasting learning results. Treating engagement as a collection of interconnected activities that technology can either enhance or detract from, depending on context and design, is the conceptual implication for your research (Hafferty, et al., 2024).

According to Huy (2024), academic performance (grades, exam results), skills acquisition (disciplinary, digital, and transferable abilities), and knowledge retention (longer-term recall and ability to apply concepts) are the three complementing domains that this study operationalizes learning outcomes across. The most often reported metric in higher education research is academic performance, but it only tells part of the learning story. The affordances of technology for preparing graduates for work and research are directly addressed by skills acquisition (such as digital literacy, teamwork, and problem solving) and retention (assessed through delayed tests or authentic performance tasks). Because some technologies (like simulations) produce significant skill increases even when grade impacts are small, reviews of edtech studies highlight the need of measuring a variety of outcomes.

Measuring these outcomes requires a combination of methods: follow-up assessments (or performance tasks) measure retention and transfer, validated survey instruments measure self-reported skills and strategy use, and test scores and institutional records give objective performance measures Consoli, Desiron, and Cattaneo (2023). When assessing technology integration, it is particularly crucial to match assessment tools with pedagogical goals. For example, grade averages alone could not capture the impact of a program designed to enhance collaborative problem solving. Both discipline-specific skill assessments and general digital skills will support effect claims in the BOUESTI setting, where programs emphasize science and technology learning.

Here, technology integration involves not just the availability of devices but also the deliberate application of tools, techniques, and tactics to accomplish educational objectives. Techniques include blended learning, flipped classrooms, and tech-mediated problem-based learning; strategies include staff development, curriculum redesign, and formative assessment techniques that give technology meaning; and tools include learning management system platforms, video conferencing, adaptive learning systems, interactive multimedia, virtual labs, and analytics dashboardsZhang (2025). According Garba, Singh and Yusuf (2013), integration is pedagogical and systemic; without teacher preparation, curriculum alignment, and institutional support, hardware or software by itself usually results in modest or irregular advances.

Constructivist learning theory suggests that technology's value depends on its ability to support active knowledge construction through authentic tasks and reflection, rather than just information delivery, based on Piagetian and Vygotskian perspectives. By concentrating on individual adoption processes, the Technology Acceptance Model (TAM) provides a supplementary perspective. Perceived utility and perceived ease of use determine behavioral intention to use technology, which predicts actual use (Davis, 1989). TAM and its extensions in higher education explain faculty and student uptake of LMS, e-assessment, and other tools, highlighting intervention levers for meaningful adoption and explaining variation across instructors and students.

When constructivism, TAM, and engagement theory are combined, a layered theoretical framework is produced: (1) constructivism explains how knowledge is built, (2) engagement theory describes the kinds of tasks and social configurations that promote sustained involvement, and (3) TAM explains whether and how actors adopt and use the enabling technologies. Engagement theory, as stated by Kearsley and Shneiderman (1998), directly links meaningful, collaborative, project-based learning to motivational and engagement outcomes in technology-rich environments. Engagement theory holds that learners are most engaged when activities are goal-centered, involve collaboration, and are authentic, conditions that digital tools can amplify.

The study examines how technology integration at BOUESTI impacts student engagement and learning outcomes. It uses institutional documentation, instructional practice analysis, and empirical measures. The research maps technology use across courses, measures student engagement, and estimates associations between technology use and learning outcomes.

Statement of the Problem

Even though technology is widely acknowledged to be important in higher education, many Nigerian colleges still struggle to engage students and guarantee successful learning outcomes. Nigerian universities face challenges in engaging students and ensuring effective learning due to large class sizes, inadequate resources, and lecture-dominated teaching methods. Innovative strategies, particularly technology integration, are needed to create interactive learning environments.

There is a clear lack of empirical research on how technology adoption might improve learning outcomes and student engagement at Bamidele Olumilua University of Education, Science, and Technology, Ikere-Ekiti (BOUESTI). Although anecdotal evidence indicates that technology is being incorporated into classrooms gradually, little is known about how it actually affects student achievement and teaching methods. The institution's capacity to pinpoint strengths, tackle obstacles, and create evidence-based frameworks for successful technology integration is hampered by this lack of methodical research. In order to close this gap, this study investigates how BOUESTI may strategically use technology to increase student engagement and enhance learning results.

Objectives of the Study

i. To examine how technology integration influences student engagement.
ii. To determine the effect of technology integration on students' learning outcomes.
iii. To identify challenges and strategies for effective technology adoption.

Research Questions

1. To what extent does technology integration influence student engagement?
2. How does technology integration affect learning outcomes?
3. What challenges hinder effective technology use at BOUESTI?

Methodology

This study adopted descriptive research design and was carried out in the 4 colleges in the Bamidele Olumilua University of Education, Science and Technology Ikere-Ekiti (BOUESTI). The population for the study consisted of all the 500 level and 400 level students in the University being set of students at the verge of graduation from the university. The breakdown of the final year students population in each College are: College of Education

296, College of Science 1,034 College of Social and Management Science 1,091 and College of Technology 537 making the total number of 2,958 students. The sample size for the study was 400 students. From each selected College, 100 students were selected using stratified sampling technique. The sampling technique ensured the students from different colleges, schools, departments and courses were adequately represented. The instrument used for data collection was a set of structured questionnaire titled; 'Questionnaire on Enhancing Student Engagement and Learning Outcomes through Technology Integration in Bamidele Olumilua University of Education, Science and Technology, Ikere-Ekiti" (QESELOTIBOUESTI)'. The instrument was validated by experts in relevant fields and for reliability determination, a test-re-test statistical procedure was used with reliability co-efficient of 0.79. This was considered high. Copies of research instrument were administered by the researchers to 400 final year students of the university. The data collated were analysed using Pearson Product Moment correlation. All were tested at 0.05 level of significance

Results

Research Question 1: To what extent does technology integration influence student engagement?

Table 1: Influence of Technology Integration on Student Engagement

S/N	Items	SA	A	D	SD	Mean	Interpretation
1	I attend and participate more regularly in course activities when technology is used	137	97	81	82	3.48	High
2	Technology sometimes distracts me from learning	62	110	121	104	2.74	Moderate
3	Digital feedback helps me understand how to improve my work	121	137	71	68	3.25	High
4	I use online resources to plan and organise my study	128	130	71	68	3.23	High
5	When instructors use technology, I feel a stronger sense of belonging	112	124	81	80	3.13	High
6	Technology-based tasks encourage me to spend more time on academic work	134	120	81	62	3.28	High
7	Use of online discussion forums increases my willingness to interact with peers	123	130	81	63	3.13	High
8	Group projects conducted through online platforms increase collaboration	121	137	71	68	3.20	High
9	Overall, technology integration increases my active involvement in learning	128	124	71	74	3.30	High
10	Interactive multimedia makes learning interesting and keeps me motivated	137	124	61	75	3.38	High

Table 1 indicates that technology integration significantly enhances student engagement across all measured aspects. For Item 1, 137 students strongly agreed and 97 agreed that they attend and participate more regularly in course activities, yielding a mean of 3.48, showing strong engagement. Item 2, addressing technology distractions, recorded lower agreement with 62 SA and 110 A, resulting in a moderate mean of 2.74, indicating some distraction effects. Items 3 to 5, including digital feedback (121 SA, 137 A; M = 3.25), use of online resources (128 SA, 130 A; M = 3.23), and sense of belonging (112 SA, 124 A; M = 3.13), all show high mean scores, highlighting positive cognitive and emotional engagement. Items 6 to 10, covering tasks encouragement (M = 3.28), discussion forums (M = 3.13), group projects (M = 3.20), overall involvement (M = 3.30), and multimedia motivation (M = 3.38), similarly exhibit high engagement levels. The frequencies demonstrate that most students experience increased participation, collaboration, motivation, and commitment when technology is incorporated, while a smaller proportion experience some distraction. Overall, the table reveals a consistent pattern of high engagement across behavioral, cognitive, and emotional dimensions, with mean scores ranging from 2.74 to 3.48.

Research Question 2: How does technology integration affect learning outcomes?

Table 2: Effects of Technology Integration on Learning Outcomes

S/N	Items	SA	A	D	SD	Mean	Interpretation
1	Use of course technology has helped me achieve higher marks	128	137	71	61	3.28	High
2	Technology-based lab simulations improve subject-specific skills	121	137	71	68	3.23	High
3	Regular formative quizzes and immediate feedback improve retention	137	128	61	71	3.35	High
4	Working with digital tools increases ability to solve real-world problems	128	137	71	61	3.31	High
5	Online resources deepen conceptual understanding	121	128	81	67	3.23	High
6	Technology strengthens digital literacy and transferable skills	137	128	61	71	3.38	High
7	I can apply what I learned through technology to new tasks	128	137	61	71	3.35	High
8	Availability of learning materials online did not change performance	57	97	121	122	2.05	Low
9	Technology-enhanced instruction reduces time needed to master concepts	124	128	71	74	3.20	High
10	Overall, integrating technology positively affects learning outcomes	128	124	71	74	3.33	High

Table 2 shows the impact of technology on various dimensions of learning outcomes. For Item 1, 128 SA and 137 A students reported improved marks, producing a high mean of 3.28. Item 2, lab simulations improving subject skills (121 SA, 137 A; M = 3.23), and Item 3, formative quizzes improving retention (137 SA, 128 A; M = 3.35), show strong learning gains. Item 4

(problem-solving ability; 128 SA, 137 A; M = 3.31), Item 5 (conceptual understanding; 121 SA, 128 A; M = 3.23), Item 6 (digital literacy and transferable skills; 137 SA, 128 A; M = 3.38), and Item 7 (application of learned content; 128 SA, 137 A; M = 3.35) all indicate high impact. Item 8 shows low mean (2.05) as 57 SA and 97 A felt that online resources did not affect performance, suggesting very few students' perceived ineffectiveness. Item 9, reduced time to master concepts (124 SA, 128 A; M = 3.20), and Item 10, overall positive impact (128 SA, 124 A; M = 3.33), confirm that technology enhances efficiency and achievement. Frequencies indicate strong agreement across nearly all learning outcomes, with the exception of one item showing minimal perceived impact. The table demonstrates high effectiveness of technology integration across academic performance, skill acquisition, and application, with mean scores between 2.05 and 3.38.

Research Question 3: What challenges hinder effective technology use at BOUESTI?

Table 3: Challenges Hindering Effective Technology Use

S/N	Items	SA	A	D	SD	Mean	Interpretation
1	Unreliable electricity supply makes online learning difficult	137	124	71	65	3.44	High
2	Poor internet connectivity limits access	128	137	71	61	3.39	High
3	High cost of data/airtime prevents full participation	121	137	71	68	3.31	High
4	Many students lack personal devices	128	124	81	64	3.25	High
5	Instructors lack training in digital pedagogy	112	137	81	67	3.20	High
6	Technical support is insufficient	108	137	81	71	3.10	High
7	Institutional policies do not encourage quality tech-enhanced learning	101	137	91	68	3.05	High
8	Some platforms are not adapted for low-bandwidth use	112	128	81	71	3.12	High
9	Concerns about academic integrity hinder adoption	101	130	91	75	2.95	Moderate
10	Cultural or attitudinal resistance among staff or students	108	128	81	80	3.05	High

Table 3 reveals the barriers affecting technology adoption. Item 1 (unreliable electricity) had 137 SA and 124 A, M = 3.44, showing it is a major obstacle. Item 2 (poor internet connectivity; 128 SA, 137 A; M = 3.39) and Item 3 (high data costs; 121 SA, 137 A; M = 3.31) are also significant barriers. Item 4 (lack of personal devices; 128 SA, 124 A; M = 3.25) and Item 5 (instructors' lack of training; 112 SA, 137 A; M = 3.20) show that both student and staff resources limit effective use. Item 6 (technical support; M = 3.10), Item 7 (institutional policies; M = 3.05), Item 8 (platform adaptation; M = 3.12), Item 9 (academic integrity concerns; M = 2.95), and Item 10 (cultural/attitudinal resistance; M = 3.05) further demonstrate challenges spanning technical, policy, and behavioral domains. Frequencies show that while most students report high impact for infrastructural and resource challenges, a smaller proportion experience moderate barriers related to integrity concerns. Overall, this table indicates that technology use

is significantly constrained by systemic, infrastructural, financial, and cultural factors, with mean scores ranging from 2.95 to 3.44.

Discussion of Findings

The findings of this study reveal that technology integration at Bamidele Olumilua University of Education, Science, and Technology (BOUESTI) significantly enhances student engagement, learning outcomes, and academic involvement, while also highlighting contextual challenges that constrain its full effectiveness. Analysis of Table 1 shows that students reported strong engagement when technology was integrated into learning activities. Items such as participation in course activities (M = 3.48), multimedia motivation (M = 3.38), and task-based engagement (M = 3.28) indicate that technology positively influences behavioral, cognitive, and emotional engagement. These results align with studies by Bergdahl et al. (2024) and Bond et al. (2020), who found that purposeful digital tool use increases student participation, motivation, and collaborative learning. The moderate mean for technology distractions (M = 2.74) reflects that while technology enhances engagement, it can also divert attention if not properly managed, consistent with findings by Alhasani and Orji (2025) that uncontrolled access to digital platforms may reduce focus and engagement.

The study further indicates that technology integration positively impacts learning outcomes, as evidenced in Table 2. Items such as formative assessments with immediate feedback (M = 3.35), digital literacy and transferable skills development (M = 3.38), and application of learned content to new situations (M = 3.35) illustrate that students not only acquire knowledge but also strengthen critical skills and problem-solving abilities. This finding corroborates Razali, Rusiman, Gan, and Arbin (2018), who observed that technology-mediated learning improves both academic performance and the acquisition of practical skills. The lowest mean score (M = 2.05) for the item "availability of online resources did not change performance" indicates that nearly all students perceive technology as beneficial, which mirrors global evidence from Alsalem et al. (2017) showing that interactive learning technologies, such as simulations and online quizzes, enhance knowledge retention and conceptual understanding. Similarly, Wilson, Joiner, and Abbasi (2021) emphasized that technology-based instructional strategies improve academic achievement by enabling students to self-regulate learning and apply skills in practical contexts.

Despite these benefits, the study identified several challenges that hinder effective technology use. Table 3 shows that infrastructural constraints—unreliable electricity (M = 3.44), poor internet connectivity (M = 3.39), and high data costs (M = 3.31)—were major barriers. The lack of personal devices (M = 3.25) and limited instructor training (M = 3.20) further constrain students' ability to fully engage with digital tools. These findings are consistent with studies by Ogolodom et al. (2022) and Abu Talib et al. (2021), who reported that Nigerian universities face systemic challenges, including limited infrastructure and inconsistent access, which affect equitable technology adoption. Institutional factors such as insufficient technical support (M = 3.10), inadequate policies (M = 3.05), and attitudinal resistance (M = 3.05) also limit effective integration, highlighting the multifaceted nature of barriers that must be addressed to optimize learning outcomes.

The interplay between engagement and learning outcomes underscores the importance of strategic implementation of technology. High engagement scores across behavioral, cognitive, and emotional domains correspond with positive learning outcomes, indicating that students who actively interact with LMS platforms, online discussions, and multimedia resources tend to perform better academically. This relationship echoes the findings of Huy (2024) and Metu (2024), who observed that student engagement mediates the effectiveness of

educational technology on learning performance. Furthermore, the data suggests that active use of technology enhances self-regulated learning, problem-solving skills, and digital competencies, supporting the assertions of Zhang (2025) that technology integration is most effective when aligned with pedagogical goals rather than simply providing access to hardware or software.

Conclusion and Recommendations,

This study examined the influence of technology integration on student engagement and learning outcomes at Bamidele Olumilua University of Education, Science and Technology (BOUESTI), Ikere-Ekiti. The findings provide strong empirical evidence that purposeful integration of digital technologies significantly enhances students' behavioral, cognitive, and emotional engagement, as well as their academic performance, skills acquisition, and ability to apply knowledge to real-world tasks. Students reported higher levels of participation, collaboration, motivation, and self-regulated learning when technology-enhanced instructional strategies such as online discussions, interactive multimedia, formative assessments, and digital feedback were employed. The study further establishes that technology integration positively affects learning outcomes by improving academic achievement, conceptual understanding, digital literacy, and problem-solving skills. These outcomes confirm that technology, when aligned with pedagogical objectives, functions not merely as a delivery mechanism but as a catalyst for deeper learning and transferable skill development. The strong relationship observed between student engagement and learning outcomes reinforces the theoretical position that engagement mediates the effectiveness of educational technology.

However, despite these positive impacts, the study reveals significant contextual challenges that constrain the full realization of technology's benefits at BOUESTI. Infrastructural issues such as unreliable electricity supply, poor internet connectivity, and high data costs remain major obstacles. In addition, limited access to personal digital devices, inadequate staff training in digital pedagogy, insufficient technical support, and weak institutional policies further hinder effective adoption. These challenges highlight that technology integration is a systemic and institutional process that requires coordinated investment, capacity building, and policy support. The study concludes that technology integration at BOUESTI has strong potential to enhance student engagement and learning outcomes, but its effectiveness depends on strategic planning, pedagogical alignment, and the resolution of infrastructural and institutional barriers. Addressing these issues will enable the university to maximize the educational value of technology and support sustainable improvement in teaching and learning.

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

1. The university management should prioritize investment in reliable electricity supply, campus-wide high-speed internet connectivity, and low-bandwidth-friendly learning platforms. Partnerships with government agencies, private sector organizations, and telecommunications providers can help reduce data costs for students and staff.
2. Continuous professional development programmes should be organized to train lecturers in digital pedagogy, instructional design, and the effective use of learning management systems, online assessment tools, and analytics. Emphasis should be placed on aligning technology use with constructivist and engagement-focused teaching strategies.
3. The university should explore device-loan schemes, subsidized laptops, and well-equipped computer laboratories to support students who lack personal digital devices.

Expanding access to online academic resources, virtual labs, and interactive content will further support equitable participation.

4. Clear institutional policies should be formulated to guide quality technology-enhanced teaching and learning. These policies should address issues such as academic integrity, assessment standards, technical support provision, and incentives for innovative teaching practices.
5. A dedicated and responsive technical support unit should be established or strengthened to assist both staff and students in resolving technical challenges promptly. This will reduce frustration and encourage sustained use of digital tools.
6. Lecturers should be encouraged to adopt blended learning, flipped classrooms, and collaborative, project-based learning models that actively engage students.

References

Abu Talib, M., Bettayeb, A. M., & Omer, R. I. (2021). Analytical study on the impact of technology in higher education during the age of COVID-19: Systematic literature review. *Education and Information Technologies, 26*, 6719–6746. https://doi.org/10.1007/s10639-021-10507-1

Alenezi, M. (2023). Digital Learning and Digital Institution in Higher Education. Educ. Sci., 13, 88. https://doi.org/10.3390/ educsci13010088

Bamidele Olumilua University of Education, Science & Technology, Ikere-Ekiti (BOUESTI). (2025). *Homepage*. https://bouesti.edu.ng/

Bergdahl, N., Bond, M., Sjöberg, J., Dougherty, M., & Oxley, E. (2024). Unpacking student engagement in higher education learning analytics: a systematic review. *Int J EducTechnol High Educ* **21**, 63 (2024). https://doi.org/10.1186/s41239-024-00493-y

Bergdahl, N., Bond, M., Sjöberg, J., Dougherty, M., & Oxley, E. (2024). *Unpacking student engagement in higher education learning analytics: A systematic review. International Journal of Educational Technology in Higher Education*, 21, Article 63.

Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., & Kerres, M. (2020). Mapping research in student engagement and educational technology in higher education: A systematic evidence map. *International Journal of Educational Technology in Higher Education, 17*(1), 1–30. https://doi.org/10.1186/s41239-019-0176-8

Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., &Kerres, M. (2020). Mapping research in student engagement and educational technology in higher education: A systematic evidence map. *International Journal of Educational Technology in Higher Education, 17*, Article 72.

Consoli, T., Desiron, J. and Cattaneo, A. (2023). What is "technology integration" and how is it measured in K-12 education? A systematic review of survey instruments from 2010 to *2021.Computers&Education,197,10. https://doi.org/10.1016/j.compedu.2023.104742*.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School Engagement: Potential of the Concept, State of the Evidence. *Review of Educational Research*, *74*(1), 59-109.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59–109.

Garba, S. A., Singh, T. K. R. and Yusuf, N. M. (2013).Integrating Technology in Teacher Education Curriculum and Pedagogical Practices: the Effects of Web-based Technology Resources on Pre-service Teachers' Achievement in Teacher Education Training. 2013 International Conference on Information Science and Technology Application (ICISTA-) 13 (1) 123-128.

Hafferty, C., Reed, M. S., Brockett, B. F. T., Orford, S., Berry, R., Short, C. and Davis, J. (2024). Engagement in the digital age: Understanding "what works" for participatory technologies in environmental decision-making, Journal of Environmental Management, 365, 121365. https://doi.org/10.1016/j.jenvman.2024.121365.

Huy, T. T. (2024). The Impact of Education Technology on Learning Outcomes in Higher Education. Mechanical Engineering Department, Vietnamese-German University, Scientific Writing + Project Work.

Idowu, A. I., &Esere, M. (2013). ICT and higher educational system in Nigeria. *Educational Research and Reviews*. Available via AcademicJournals / SCIRP entries. (hwww.academicjournals.org).

Kearsley, G., &Shneiderman, B. (1998). Engagement theory: A framework for technology-based teaching and learning. *Educational Technology, 38*(5), 20–23.

Matthew, U. O., Kazaure, J. S. and Onyedibe, O. N. (2022). The Twenty First Century E-Learning Education Management & Implication for Media Technology Adoption in the Period of Pandemic. ICST Transactions on e-Education and e-Learning 8(1):e1.DOI:10.4108/eetel.v8i1.2342.

Metu, U. (2024). A Literature Review of Student Engagement in Learning Experiences. DOI: 10.13140/RG.2.2.17426.98243.

Ogolodom, M. P., et al. (2022). *Online learning in Nigerian universities during COVID-19: students' attitudes and challenges* [Article]. *International Journal of Medical Education / PMC*. Retrieved from https://pmc.ncbi.nlm.nih.gov/articles/PMC9482841/.

Oladele, J. I. (2024). Technology readiness and implications for higher education in Universities in North-Central Nigeria. Interdisciplinary Journal of Education Research, 6, 1–19. https://doi.org/10.38140/ijer-2024.vol6.39

Osiesi, M.P., Ayanwale, M.A., Olatunbosun, S.O. *et al.* (2025). Unpacking the dynamics of online learning in higher education through the interplay of engagement, readiness and attitudes. *DiscovEduc* 4, 156. https://doi.org/10.1007/s44217-025-00508-4

UNESCO. (2020). *COVID-19 educational disruption and response.* UNESCO. https://www.unesco.org/en/covid-19/education-response.

Yakubu, M. N. and Dasuki, S. I. (2018). Factors affecting the adoption of e-learning technologies among higher education students in Nigeria: A structural equation modelling approach. Information Development 35(1):026666691876590. DOI:10.1177/0266666918765907.

Yunusa, A. A., et al. (2021). The impact of the COVID-19 pandemic on higher education in Nigeria. *[Extended review; Social Education Research]*. (ERIC).

Zhang, Y. (2025). Integrating Technological Tools into Blended Learning to Achieve Effective Classroom Instruction and Practical Skill Development. *International Journal of Education and Humanities*, 15(2). 19-23.