INFLUENCE OF EMERGING LEARNING TECHNOLOGIES ON ACADEMIC STAFF PEDAGOGICAL PRACTICES AND SUSTAINABILITY-ORIENTED TEACHING OUTCOMES IN NIGERIAN UNIVERSITIES

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Abstract

This study examined the influence of emerging learning technologies (ELTs) on academic staff pedagogical practices and sustainability-oriented teaching outcomes in Nigerian universities. A quantitative, correlational (non-experimental) survey design was adopted, with the population comprising academic staff from selected Nigerian universities. Using a multi-stage sampling technique, 274 academic staff were selected. Data were collected using a researchers-developed instrument titled Emerging Learning Technologies and Sustainability-Oriented Pedagogical Practices Scale (ELTSOPPS), which demonstrated adequate reliability (Cronbach's $\alpha = 0.79$) and validity through expert review. Descriptive and inferential statistics, including linear and multiple regression analyses, were employed at a 0.05 level of significance. The findings revealed that academic staff exhibited a moderate level of ELT adoption (M = 3.10, SD = 0.89) and pedagogical practice (M = 3.12, SD = 0.88). Results further indicated a statistically significant predictive relationship between ELT adoption and pedagogical practices, $F(1, 272) = 132.25$, $p < .001$, $R^2 = .468$, while institutional, technological, and socio-cultural factors significantly predicted ELT integration for sustainability-oriented pedagogy, $F(3, 270) = 57.10$, $p < .001$, $R^2 = .388$. These findings revealed the critical role of institutional and technological support in fostering sustainable pedagogical innovation. Practically, the study provides evidence-based guidance for university administrators on strengthening digital infrastructure and professional development, while theoretically; it extends existing models of technology integration by empirically linking ELT adoption to sustainability-oriented pedagogical outcomes in higher education.

Keywords: Emerging Learning Technologies, Pedagogical Practices, Sustainability-Oriented Teaching, University Academic Staff, Nigeria.

Introduction

The emergence of COVID-19 offered immense disruption in the teaching and learning process globally as a major shift triggered the employing of numerous instructional practices (blended, hybrid, and online) that facilitated and transformed pedagogical expectations (Bozkurt & Sharma, 2020). In anticipation to meet with the demands of technological advancements, several learning technologies have emerged to cater for seamless knowledge transfer. These technologies can provide for flexible, personalized and engaging learning experiences that effectively equip undergraduates' for complex and dynamic work in the social environments.

Emerging Learning Technologies (ELTs) refers to a dynamic range of cutting-edge digital tools and platforms that are reshaping the process of teaching and learning within modern educational systems. These technologies include applications of Artificial Intelligence (AI) in education, environments of Virtual and

Augmented Reality (VR/AR), Learning Analytics, resources for Open Educational Resources (OERs), adaptive learning systems and platforms for mobile learning. These technologies facilitate more engaging, tailored and data-informed educational experiences that cater to various learner needs and situations.

There is increasing focus on incorporating sustainability into education, indicating that curricula are being revamped to encompass topics like environmental consciousness, social accountability and technological ethics, while technology is being utilized to exemplify sustainable practices. Education for Sustainable Development (ESD) focuses on fostering knowledge, values and skills required for individuals to play an active role in creating a sustainable future. To accomplish this, ESD advocates transitioning from conventional teacher-focused teaching to student-centered methods that promote critical thinking, creativity and problem-solving skills. These methods involve learners in examining genuine sustainability issues via investigation, contemplation, and cross-disciplinary education (Nebue, et al., 2024). This transformation in pedagogy encourages experiential and participatory learning, where undergraduate not only absorb knowledge but actively construct and apply it within authentic contexts.

The leverage of ELTs by academic personnel can enable the creation of adaptable and stimulating learning spaces, encouraging active and hands-on learning and improved accessibility by overcoming conventional limitations of time and location. They are progressively acknowledged as essential elements in equipping students for the challenges of a knowledge-based, technology-enhanced and Education for Sustainable Development (ESD).
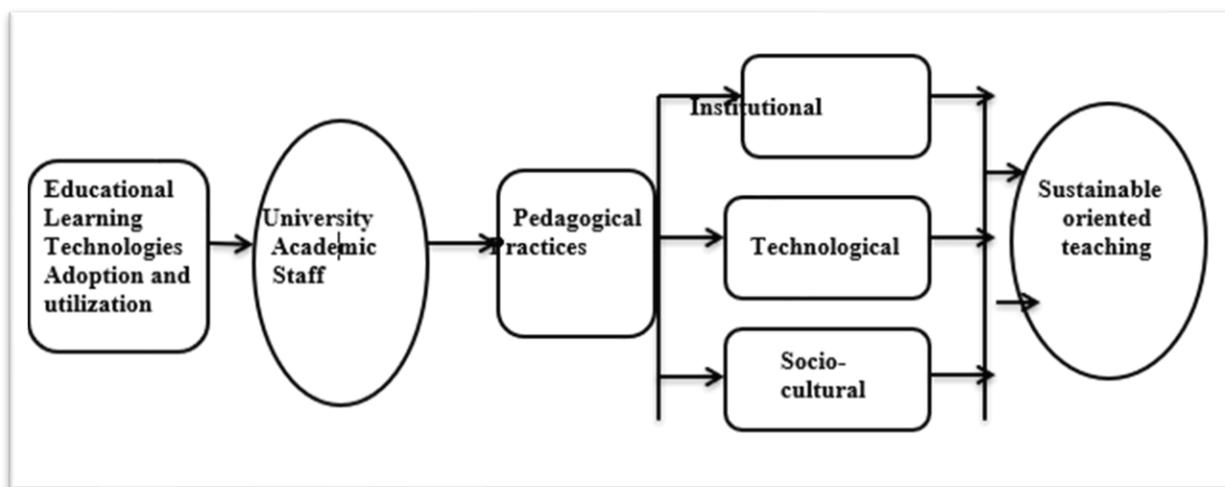

Figure 1: Relationship between Emerging Learning Technologies, Pedagogical Practices, and Sustainability-Oriented Teaching Outcomes in Nigerian Universities.

There is no gainsaying that the adoption of Educational Learning Technologies (ELT) by university academic staff when effectively synergized with pedagogical practices evidently foster sustainable oriented teaching outcomes. ELT adoption enhances instructional innovation, collaboration and accessibility, thereby enriching the teaching learning process which is obviously hinged on Diffusion of Innovation Theory. This theory explains how new ideas and technologies spread within a social system over time and provides a useful framework for understanding the adoption of Educational Learning Technologies (ELT) by university academic staff. In this context, academics move through stages of knowledge, persuasion, decision, implementation and confirmation as they evaluate ELT based on its perceived relative advantage, compatibility with existing pedagogical values, ease of use, trialability and observable benefits (Straub, 2020).

When ELT adoption aligns with effective pedagogical practices such as learner-centered instruction, active learning, collaboration, and formative assessment it enhances teaching effectiveness while promoting efficient use of resources, reduced reliance on physical materials, and inclusive access to education. This synergy supports sustainability-oriented outcomes by fostering long-term instructional innovation, improving educational quality, minimizing environmental impact through digitalization and building institutional capacity for resilient and future-ready higher education systems.

Several scholars (Bayaga, 2025; Oguntona & Ohiomah, 2024) have identified the following as key importance of the synergy between Emerging Learning Technologies (ELT) adoption and pedagogical practices on sustainability-oriented outcomes;

(i)   promotes innovative teaching and learning: The integration of ELTs encourages educators to adopt creative, learner-centered pedagogical approaches that enhance engagement, collaboration, and critical inquiry among students.
(ii)   fosters digital competence and lifelong learning: Combining technology use with effective pedagogy equips both lecturers and students with essential digital literacy skills necessary for continuous learning and adaptation in a technology-driven world.
(iii)   enhances quality and accessibility of education: The synergy ensures inclusive access to diverse learning resources through open educational platforms, thereby supporting equitable learning opportunities aligned with SDG 4 on quality education.
(iv)   encourages reflective and sustainable pedagogical change: ELT-supported pedagogical innovation promotes reflective teaching practices that integrate sustainability principles, such as ethical reasoning, environmental consciousness, and social responsibility.
(v)   drives institutional and societal transformation: By linking technology-enabled pedagogy with sustainability goals, universities can cultivate a culture of innovation and responsibility that extends beyond classrooms, contributing to broader social and environmental development.

With the above recognized potential of Emerging Learning Technologies to enhance pedagogical effectiveness and promote sustainability-oriented outcomes, the extent to which university academic staff effectively adopts and integrate these technologies within pedagogical practices remains uncertain, thereby necessitating an empirical investigation into this synergy in Nigerian universities.

Statement of the Problem

There is no gainsaying that Emerging Learning Technologies (ELTs) such as learning management systems, virtual learning environments, digital collaboration tools, simulations and data-driven instructional platforms are increasingly recognized as catalysts for innovative and sustainability-oriented pedagogy but their adoption among academic staff in Nigerian universities appears uneven and limited in scope. Teaching practices in many institutions still emphasize lecture dominated, content-driven approaches with minimal integration of ELTs to support active learning, formative feedback, collaborative knowledge construction and learner autonomy. The extent to which academic staff adopt ELTs in curriculum delivery, instructional design, assessment and student engagement remains unclear, creating a gap between the potential of ELTs and their actual pedagogical application in Nigerian higher education.

The limited integration of ELTs into teaching practices is influenced by a complex interplay of institutional, technological and socio-cultural factors that constrain sustainability-focused pedagogy. Inadequate digital infrastructure, limited access to reliable internet connectivity, insufficient professional development opportunities and weak institutional policies often hinder academic staff from effectively embedding ELTs into their pedagogical practices. Socio-cultural factors, including resistance to pedagogical change, perceptions of technology as supplementary rather than transformative and varying levels of digital

competence among lecturers, further impede meaningful adoption. As a result, sustainability-oriented teaching outcomes such as the development of critical thinking, ethical awareness and problem-solving skills related to sustainable development are inadequately supported through technology-enhanced learning environments. This situation provides a basis for empirical investigation into both the extent of ELT adoption and the factors affecting their use in promoting sustainable, student-centered pedagogy in Nigerian universities.

Aim and Objectives of the study

The study examined the influence of Emerging Learning Technologies (ELTs) on academic staff's pedagogical practices and sustainability-oriented teaching outcomes in Nigerian universities. Specifically, the objectives of the study are to;

   (i)   investigate the extent to which academic staff in Nigerian universities adopt of Emerging Learning Technologies (ELTs) in their teaching practices.
   (ii) explore the institutional, technological and socio-cultural factors affecting the adoption of ELTs for sustainability-focused pedagogy among university academic staff.

Research Questions

The following research questions were raised to guide the study.

   1.   What extent does academic staffs in Nigerian universities adopt Emerging Learning Technologies (ELTs) in their teaching practices?
   2.   What institutional, technological and socio-cultural factors affect the effective adoption of Emerging Learning Technologies (ELTs) for sustainability-focused pedagogy among university academic staff?

Hypotheses

The following hypotheses were tested at 0.05 level of significance.

Ho$_1$: There is no significant influence of the adoption and utilization of Emerging Learning Technologies (ELTs) on academic staff's pedagogical practices in Nigerian universities.

Ho$_2$: Institutional, technological, and socio-cultural factors do not significantly predict the adoption of Emerging Learning Technologies (ELTs) for sustainability-focused pedagogy in Nigerian universities.

Methodology

A quantitative, correlational (non-experimental) survey design was utilized for the study as it enabled the researchers to statistically examine the relationship between variables such as the use of Emerging Learning Technologies, pedagogical practices and sustainability-oriented teaching outcomes among academic staff. The population consisted of 61,358 academic staff in Nigerian universities (Statista, 2019) which includes both federal and state institutions that have adopted or are adopting ELTs. Participants include lecturers across all faculties and colleges.

A multi-stage sampling technique was employed to select a representative sample of 274 academic staff across federal and state universities. Multi-stage sampling is recommended for large and geographically dispersed populations because it enhances efficiency while maintaining representativeness (Creswell & Creswell, 2023). In the first stage, universities were stratified based on ownership into federal and state universities to ensure adequate representation of both categories. Proportional allocation was subsequently used to distribute the sample size between the two strata according to their respective academic staff populations, thereby reducing sampling bias and improving external validity (Etikan & Bala, 2021).

In the second stage, universities within each stratum were selected using Probability Proportional to Size (PPS) sampling, which gives institutions with larger staff populations a higher probability of selection (Lohr, 2021). Faculties within the selected universities were then stratified by academic discipline and departments were randomly selected from each faculty. In the final stage, individual academic staff were selected from the sampled departments using simple random or systematic sampling techniques based on the availability of staff lists. This multi-stage approach ensured broad institutional and disciplinary coverage and enhanced the generalizability of the study findings (Taherdoost, 2022).

A researchers' self-developed instrument for data collection used for the study was Emerging Learning Technologies and Sustainability-Oriented Pedagogical Practices Scale (ELTSOPPS). This research instrument consists of four sections A – D. Section was designed to obtain demographic and institutional information. Section B focused the level on university academic staff ELT adoption with the measurement scale in Table 1 below.

Table 1:

Showing 4-Point Scale for Level of Adoption of ELTs

Response Category	Description	Score	Mean Range	Interpretation
Low Adoption	The lecturer is aware of ELTs but rarely or never applies them in instructional activities. Use is minimal, unsystematic, or limited to basic functions (e.g., email or PowerPoint).	1	0.00 – 1.49	Low Adoption
Fair Adoption	The lecturer occasionally adopts ELTs such as learning management systems or virtual tools but applies them in a limited or experimental manner without strong pedagogical integration.	2	1.50 – 2.49	Fair Adoption
Moderate Adoption	The lecturer frequently uses several ELTs (e.g., AI tools, online discussion forums, learning analytics) and integrates them into lesson delivery and student engagement with moderate consistency.	3	2.50 – 3.49	Moderate Adoption
High Adoption	The lecturer consistently and strategically integrates multiple ELTs across teaching, assessment, and feedback processes, demonstrating reflective and sustainability-oriented pedagogical practices.	4	3.50 – 4.00	High Adoption

Section C was employed to elicit university academic staff pedagogical practices such as learner-centered, reflective and collaborative approaches while Section D provide information on Sustainability-oriented teaching outcomes which includes critical thinking, ethical awareness and global citizenship. The responses on the instrument for section C and D was measured using a 4-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (4) with a total of 45 item statements.

The Emerging Learning Technologies and Sustainability-Oriented Pedagogical Practices Scale (ELTSOPPS) was subjected to expert validation to ensure its suitability for the study. Two experts in Educational Technology and one expert in Measurement and Evaluation were engaged in the validation process. Content validity was established by requesting the experts to assess the relevance, adequacy and coverage of the scale items in relation to the constructs of emerging learning technologies and sustainability-oriented pedagogical practices, ensuring alignment with the study objectives. Face validity was determined through the experts' evaluation of the clarity, appropriateness of language and overall

appearance of the instrument to ascertain that the items were understandable and suitable for the target respondents. Construct validity was ensured by having the experts examine the logical structure of the scale, the appropriateness of item grouping under each construct and the consistency of items with their underlying theoretical dimensions. The experts' comments, corrections and suggestions were carefully incorporated, leading to the refinement and finalization of the ELTSOPPS for data collection.

The data for the study was analyzed using the descriptive statistics of frequency count, mean and standard deviation for research questions while the Linear Regression Analysis and Multiple Regression Analysis was employed to test the hypotheses at 0.05 level of significance.

Results

Research Question 1: What extent does academic staffs in Nigerian universities adopt Emerging Learning Technologies (ELTs) in their teaching practices?

Table 2:

Mean and Standard Deviation of Academic Staff's Level of Adoption of Emerging Learning Technologies (ELTs)

S/N	Questionnaire Item Statements	Mean ($\bar{x}$)	(SD)
1	I have adopted and consistently utilize digital learning management systems (such as Moodle, Canvas, Google Classroom) for instructional delivery.	3.21	0.83
2	I have adopted the use of artificial intelligence–based applications (e.g., ChatGPT, Grammarly, adaptive learning tools) to enhance student learning experiences.	2.98	0.92
3	I utilize virtual learning environments or digital simulations as part of my regular teaching practices.	2.87	0.95
4	I adopt and use learning analytics tools to monitor and improve students' engagement and performance.	2.76	0.97
5	I integrate multimedia instructional resources (videos, animations, podcasts) into my teaching for improved learning outcomes.	3.33	0.84
6	I have adopted online collaborative platforms (e.g., Microsoft Teams, Zoom, Padlet) to facilitate interactive teaching and group learning.	3.45	0.86
7	I regularly utilize digital assessment tools (e.g., Google Forms, Kahoot, online quizzes) for formative and summative evaluation.	3.18	0.88
8	I adopt and use ELTs to promote sustainability-related content and critical discussions in my teaching.	2.91	0.93
9	I frequently utilize blended or hybrid learning models that combine online and face-to-face teaching approaches.	3.27	0.81
10	I have adopted the use of ELTs to provide personalized feedback and individualized learning support to students.	3.12	0.89
11	I continuously explore and adopt new ELTs to enhance the quality and relevance of my teaching practices.	3.36	0.82
12	I participate in institutional or external training programs that enhance my ability to adopt and utilize ELTs effectively.	2.84	0.97
13	I design and implement lesson plans that integrate ELTs to achieve sustainability-oriented learning objectives.	2.95	0.94

S/N	Questionnaire Item Statements	Mean ($\bar{x}$)	(SD)
14	I collaborate with colleagues to share experiences and strategies for effective adoption and utilization of ELTs.	3.05	0.85
15	I adopt and utilize ELTs to develop students' higher-order skills such as critical thinking, creativity and global citizenship.	3.22	0.87
	Aggregate Mean ($\bar{x}$) and SD	**3.10**	**0.89**

Source: Researchers' field work, 2025.   Interpretation [$\bar{x}$ = 3.10. Moderate Adoption and Utilization]

The results in Table 2 indicate that university academic staff demonstrate a moderate level of adoption of Emerging Learning Technologies (ELTs), as reflected by the aggregate mean score of 3.10 (SD = 0.89). The highest adoption levels were observed in the use of online collaborative platforms (M = 3.45, SD = 0.86) and multimedia instructional resources (M = 3.33, SD = 0.84), suggesting a growing preference for interactive and media-rich teaching approaches. However, relatively lower means in areas such as learning analytics (M = 2.76, SD = 0.97) and sustainability-focused ELT integration (M = 2.91, SD = 0.93) reveal that deeper, data-driven, and sustainability-oriented applications of ELTs are still emerging among academic staff.

Research Question 2: What institutional, technological, and socio-cultural factors affect the effective integration of Emerging Learning Technologies (ELTs) for sustainability-focused pedagogy among university academic staff?

Table 3:

Institutional, Technological, and Socio-Cultural Factors Influencing the Effective Integration of Emerging Learning Technologies (ELTs) for Sustainability-Focused Pedagogy

S/N	Questionnaire Item Statements	Mean (M)	(SD)
	Institutional Factors		
1	My institution provides adequate digital infrastructure (stable internet, ICT facilities) to support ELT integration.	3.15	0.86
2	There is sufficient institutional support and policy backing for the use of ELTs in teaching and learning.	3.05	0.88
3	My institution organizes regular training and workshops that enhance lecturers' ELT competencies.	3.09	0.90
4	There are incentives or recognition systems that encourage lecturers to adopt and utilize ELTs in teaching.	2.94	0.93
5	Administrative leadership actively promotes the integration of ELTs for sustainability-focused teaching.	3.02	0.89
	Technological Factors		
6	The available ELT tools are reliable, user-friendly and compatible with course delivery needs.	3.17	0.85
7	Technical support services are readily available when challenges arise during ELT use.	3.08	0.91
8	I have adequate access to digital resources and software required for effective ELT utilization.	3.10	0.87
9	The cost of maintaining or subscribing to ELT tools does not hinder their use in my teaching.	2.89	0.92

S/N	Questionnaire Item Statements	Mean (M)	(SD)
10	Technological innovations in my institution align with sustainability and educational goals.	3.11	0.84
	Socio-Cultural Factors		
11	I receive adequate peer support and collaboration that encourage the adoption of ELTs.	3.13	0.86
12	The institutional culture values innovation and openness to technology-enhanced teaching.	3.22	0.83
13	Students in my classes are receptive to technology-supported learning methods.	3.28	0.82
14	I feel confident using ELTs despite socio-cultural or generational barriers to technology adoption.	3.04	0.88
15	The broader institutional and cultural environment promotes reflective and sustainable digital pedagogy.	3.12	0.85
	Aggregate Mean ($\bar{x}$) and SD	3.08	0.87

Source: Researchers' field work, 2025.   Interpretation [$\bar{x}$ = 3.12. Moderate Adoption and Utilization]

As shown in Table 3, university academic staff perceive a moderate level of influence of institutional, technological, and socio-cultural factors on the effective integration of Emerging Learning Technologies (M = 3.08, SD = 0.87, N = 274). The highest-rated factor was students' receptiveness to technology-supported learning (M = 3.28, SD = 0.82), followed by institutional culture valuing innovation (M = 3.22, SD = 0.83), suggesting that a positive social climate enhances ELT use. However, lower mean scores in areas such as incentives and maintenance costs (M = 2.94, SD = 0.93; M = 2.89, SD = 0.92) indicate that financial and motivational barriers still constrain broader and more effective ELT integration.

Ho₁: There is no significant influence of the adoption and utilization of Emerging Learning Technologies (ELTs) on academic staff's pedagogical practices in Nigerian universities.

Table 4:
Simple Linear Regression Analysis Showing the Influence of ELT Adoption and Utilization on Academic Staff's Pedagogical Practices

Predictor Variable	B(unstandardized)	Std. Error (B)	β(standardized)	T	P
Constant	1.432	0.184		7.78	< .001
ELT Adoption and Utilization	0.598	0.052	.684	11.50	< .001

Model Summary
R = .684, R² = .468, Adjusted R² = .466,
ANOVA
F(1, 272) = 132.25, p < .001

Source: Researchers' field work, 2025.

Table 4 showed a simple linear regression analysis was conducted to examine whether the adoption and utilization of Emerging Learning Technologies (ELTs) significantly influence academic staff's pedagogical practices in Nigerian universities. The results indicated a statistically significant predictive relationship between ELT adoption and pedagogical practices, $F(1, 272) = 132.25$, $p < .001$, with an R^2 value of .468.

This suggests that approximately 46.8% of the variance in pedagogical practices can be explained by the level of ELT adoption and utilization among academic staff. Therefore, the null hypothesis stating that ELT adoption and utilization have no significant influence on pedagogical practices was rejected.

Ho₂: Institutional, technological, and socio-cultural factors do not significantly predict the integration of Emerging Learning Technologies (ELTs) for sustainability-focused pedagogy in Nigerian universities.

Table 5

Multiple Linear Regression Predicting Integration of Emerging Learning Technologies (ELTs) for Sustainability-Focused Pedagogy from Institutional, Technological, and Socio-Cultural Factors

Predictors	B (Unstandardized)	Std. Error	β (Standardized)	T	P
(Constant)	1.42	0.38	—	3.74	< .001
Institutional Factors	0.28	0.07	.241	4.00	< .001
Technological Factors	0.33	0.06	.301	5.50	< .001
Socio-Cultural Factors	0.21	0.08	.162	2.63	.009

Model Summary

$R = .623$, $R^2 = .388$, Adjusted $R^2 = .382$, SE of estimate = 0.73

ANOVA

$F(3, 270) = 57.10$, $p < .001$

Source: Researchers' field work, 2025.

A multiple linear regression analysis as shown in Table 5 was conducted to examine whether institutional, technological, and socio-cultural factors significantly predicted the integration of Emerging Learning Technologies (ELTs) for sustainability-focused pedagogy among Nigerian university academic staff. The overall model was statistically significant, $F(3, 270) = 57.10$, $p < .001$, explaining approximately 38.8% of the variance in ELT integration ($R^2 = .388$). All three predictors made significant positive contributions: institutional factors ($\beta = .241$, $p < .001$), technological factors ($\beta = .301$, $p < .001$), and socio-cultural factors ($\beta = .162$, $p = .009$). This indicates that improvements in institutional support, technological infrastructure, and socio-cultural readiness collectively enhance ELT integration for sustainability-focused pedagogy. Therefore, the null hypothesis (Ho₂) is rejected.

Discussion of the Findings

The findings of this study revealed that the adoption of Emerging Learning Technologies (ELTs) significantly influenced university lecturers' pedagogical practices in Nigerian universities. This result suggests that as lecturers increasingly adopt ELTs such as artificial intelligence tools, learning management systems, and digital simulations, their teaching approaches become more learner-centered, reflective and collaborative. The result aligns with previous studies that emphasized the transformative role of technology in shaping instructional methods and fostering pedagogical innovation in higher education (Adarkwah, 2021). The finding further indicates that ELT adoption serves as a driver of pedagogical reorientation, supporting lecturers in creating more engaging and sustainability-focused learning environments.

The results from the multiple regression analysis demonstrated that institutional, technological, and socio-cultural factors significantly predicted the integration of ELTs for sustainability-focused pedagogy. Among these, technological factors had the strongest influence, highlighting the importance of reliable digital infrastructure, training, and technical support in enabling effective ELT integration. Institutional policies and incentives also played a vital role by shaping lecturers' motivation and readiness to adopt innovative teaching strategies. This finding corroborates earlier research that identified institutional leadership, access to resources and continuous professional development as key enablers of technology-enhanced teaching in developing contexts (Alebiosu & Ifeanyi, 2021).

Socio-cultural factors were also found to significantly influence ELT integration, indicating that attitudes, peer influence and perceived value of technology among colleagues shape lecturers' willingness to embrace sustainability-oriented pedagogical change. This suggests that a supportive academic culture that values experimentation and innovation can facilitate the diffusion of technology-based pedagogies (Rogers, 2003). In contexts like Nigeria, where cultural perceptions and hierarchical norms often mediate institutional behavior, promoting collective ownership of digital transformation may enhance sustainable technology use in education. The interplay between these factors suggests that both structural and cultural transformations are essential to foster meaningful ELT adoption.

The study's findings highlight the synergistic relationship between technology adoption, pedagogical innovation, and sustainability outcomes. The evidence suggests that for Nigerian universities to achieve sustainability-oriented education, emphasis must extend beyond mere technological provision to include comprehensive pedagogical training and institutional support systems. The findings contribute to the growing body of literature advocating for context-specific strategies in implementing digital and sustainability education reforms in the Global South (Creswell & Plano Clark, 2018). Thus, the integration of ELTs must be understood as both a technological and pedagogical process requiring policy commitment, infrastructural investment and a shift toward transformative teaching practices that prepare learners for global citizenship.

Conclusion

This study examined the influence of Emerging Learning Technologies (ELTs) on academic staff's pedagogical practices and sustainability-oriented teaching outcomes in Nigerian universities. The findings revealed that ELT adoption and utilization significantly enhance lecturers' pedagogical practices by promoting learner-centered, reflective, and collaborative approaches. Additionally, the use of ELTs was found to positively influence sustainability-oriented teaching outcomes such as critical thinking, ethical awareness and global citizenship. These outcomes affirm that the integration of digital technologies in higher education can foster transformative teaching practices that align with the goals of Education for Sustainable Development (ESD).

Institutional, technological, and socio-cultural factors were identified as significant predictors of effective ELT integration, highlighting the need for holistic strategies that combine infrastructural investment, supportive policies, and positive academic culture. The study concludes that sustainable technology adoption in Nigerian universities requires more than access to digital tools it demands institutional commitment to continuous professional development and pedagogical innovation.

Recommendations

The following recommendations were highlighted for the study.

1. Nigerian universities should provide continuous professional development programs to enhance lecturers' capacity for effective adoption and pedagogical use of Emerging Learning Technologies (ELTs).
2. Institutional leaders should invest in reliable digital infrastructure and supportive policies that facilitate sustainable technology integration in teaching and learning.
3. Academic departments should foster a collaborative culture that encourages knowledge sharing and peer mentoring to strengthen sustainability-oriented teaching practices.

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