



INTEGRATING EMERGING TECHNOLOGIES IN CURRICULUM IMPLEMENTATION AT THE BASIC EDUCATION LEVEL IN PLATEAU STATE, NIGERIA

Daniel Anko Ashen

School of Education, Curriculum Department
College of Education, Gindiri, Plateau State, Nigeria

Email: danielanko1@gmail.com

+2348037310006

And

Stephen Grace Nyam

School of Education, Curriculum Department
College of Education, Gindiri, Plateau State, Nigeria

Email: gracenyam2020@gmail.com

+2348167442856

And

Afiniki Ishaku Goshue

School of Education, Curriculum Department
College of Education, Gindiri, Plateau State, Nigeria

Email: afinikigoshue@gmail.com

+2348062093109

Abstract

This study investigated the integration of emerging technologies in curriculum implementation at the basic education level in Plateau State, Nigeria. The study adopted a descriptive survey research design. A sample of 300 teachers drawn from 60 public and private basic schools across Plateau State participated in the study using stratified random sampling. A structured questionnaire titled 'Emerging Technologies and Curriculum Implementation Questionnaire' (ETCIQ) was used as the instrument for data collection. The instrument was validated by experts in educational technology and curriculum studies. Data were analyzed using mean and standard deviation. The findings revealed that the availability of emerging technologies in basic schools in Plateau State was generally low (Grand Mean = 2.27), teachers demonstrated moderate competency levels in the use of digital tools for curriculum implementation (Grand Mean = 2.69), while the challenges militating against technology integration were high (Grand Mean = 3.67). The study recommended that the Plateau State Government, through the State Universal Basic Education Board (SUBEB), should provide sustained funding for technology infrastructure, organize regular ICT professional development programmes for teachers, and develops an ICT-inclusive curriculum policy for basic education in the state.

Keywords: Emerging technologies, curriculum implementation, basic education, Plateau State, digital tools, ICT integration

Introduction

The 21st century has witnessed unprecedented advances in digital technologies that have fundamentally transformed every sector of human endeavor,

including education. The integration of emerging technologies into curriculum implementation has become a global imperative, reshaping pedagogical approaches, learning environments, and



educational outcomes at all levels of schooling. In developing countries like Nigeria, the educational system faces the dual challenge of meeting global standards while grappling with contextual limitations that impede rapid technological adoption. At the basic education level—which comprises primary and junior secondary schooling—these challenges are particularly acute, yet the need for technology integration is equally pressing given the foundational role this level plays in shaping lifelong learning trajectories.

Emerging technologies, which include artificial intelligence (AI), cloud computing, the Internet of Things (IoT), virtual and augmented reality (VR/AR), mobile learning platforms, and educational software, have demonstrated significant potential in enhancing curriculum delivery, fostering interactive learning, and improving educational access (Adeyemi & Ogunyemi, 2023). When effectively integrated, these technologies can bridge the gap between theoretical curricula and real-world applications, motivate learners, and provide teachers with innovative instructional tools that facilitate differentiated learning. Research across various global contexts consistently affirms that technology-enriched learning environments produce better academic outcomes, higher student engagement, and improved teacher effectiveness (Ibrahim et al., 2022; Okonkwo & Nweke, 2024).

However, the reality in many Nigerian states, including Plateau State, starkly contrasts with this global vision. Despite several policy frameworks designed to promote ICT integration in education—including the National Policy on Education (2014 revised), the National ICT Policy, and the Universal Basic Education Act—implementation at the grassroots level remains significantly constrained. Plateau State, located in the

North-Central geopolitical zone of Nigeria, is characterized by ethnic diversity, varying levels of educational infrastructure, and significant urban-rural disparities in access to technology. These contextual factors create a complex landscape for curriculum implementation that incorporates emerging technologies (Gyang & Danlami, 2023).

The State Universal Basic Education Board (SUBEB) of Plateau State has made intermittent efforts to introduce technology into classrooms through donations of computers, establishment of computer laboratories, and occasional teacher training workshops. Nevertheless, these interventions have been largely unsustained, poorly coordinated, and insufficient to produce systemic change (Mancha & Goshit, 2022). Many schools, particularly in rural and semi-urban areas, lack reliable electricity supply, internet connectivity, and adequately trained personnel to operate and maintain available technological equipment. Furthermore, the curriculum in use at the basic education level has not been comprehensively updated to reflect the demands of technology-integrated pedagogy, leaving a gap between policy aspirations and classroom realities.

Despite growing scholarly interest in educational technology across Nigeria, empirical research specifically focused on the integration of emerging technologies in curriculum implementation at the basic education level in Plateau State remains limited. Most available studies have concentrated on southern Nigerian states or on secondary and tertiary education. This gap in the literature represents a critical oversight, given the unique socio-educational characteristics of Plateau State and the significant proportion of Nigeria's school-age population residing in the North-Central zone. This study, therefore, seeks to fill this void by providing empirical evidence on the current state of technology integration,



teachers' competencies, challenges, and viable strategies for enhancing the adoption of emerging technologies in basic education curriculum implementation in Plateau State.

Statement of the Problem

Education systems globally are under mounting pressure to adapt to the rapid pace of technological innovation, and basic education in Nigeria is no exception. The Federal Government of Nigeria, through various policy instruments and educational reform initiatives, has consistently expressed commitment to integrating ICT into the educational system. The National Information and Communication Technology Policy and the Universal Basic Education Act collectively mandate the adoption of technology in all levels of schooling. Yet, in Plateau State, translating these policy commitments into practical, sustained curriculum implementation has remained elusive.

The basic education sector in Plateau State is confronted with a widening technology integration gap. Available evidence from preliminary observations and administrative records suggests that the majority of basic schools in the state lack the basic technological infrastructure necessary for meaningful digital learning. Many existing computer laboratories are either non-functional, understaffed, or accessible to only a small fraction of enrolled students. Where technology exists, it is often used in isolation from the formal curriculum rather than as an integrated component of instructional delivery (Mancha & Goshit, 2022). Teachers themselves frequently lack the requisite skills to effectively incorporate digital tools into their pedagogical practices, partly due to infrequent and inadequate pre-service and in-service training in educational technology.

Furthermore, the curriculum documents guiding instruction at the basic education

level in Plateau State do not adequately reflect the competencies required in the digital age. Subjects are taught largely through conventional chalk-and-talk methods, with limited reference to digital resources, online platforms, or AI-assisted learning tools. This pedagogical inertia is compounded by systemic challenges including unreliable power supply, lack of internet connectivity, inadequate technical support, and insufficient funding for technology acquisition and maintenance. The cumulative effect of these challenges is the perpetuation of a technology-poor learning environment that disadvantages learners in Plateau State relative to their peers in technologically advanced regions.

Despite the acknowledged importance of technology in modern education, there is a paucity of empirical research that systematically examines the extent of emerging technology integration in curriculum implementation at the basic education level in Plateau State. Without such research, policymakers and educational administrators are unable to make data-driven decisions about resource allocation, teacher training priorities, and curriculum reform. This study, therefore, addresses this critical knowledge gap by empirically investigating the availability of emerging technologies, teachers' competency levels, challenges militating against integration, and strategies for improving technology adoption in basic schools across Plateau State, Nigeria.

Research Objectives

The specific objectives of this study are to:

1. Determine the extent of availability of emerging technologies in basic schools in Plateau State.
2. Assess the level of teachers' competency in integrating emerging technologies into curriculum implementation at the basic education level in Plateau State.



3. Identify the challenges militating against the integration of emerging technologies in curriculum implementation in basic schools in Plateau State.
4. Determine the strategies that could be adopted to enhance the integration of emerging technologies in curriculum implementation in basic schools in Plateau State.

Research Questions

The following research questions guided the study:

1. To what extent are emerging technologies available in basic schools in Plateau State?
2. What is the level of teachers' competency in integrating emerging technologies into curriculum implementation at the basic education level in Plateau State?
3. What are the challenges militating against the integration of emerging technologies in curriculum implementation in basic schools in Plateau State?
4. What strategies could be adopted to enhance the integration of emerging technologies in curriculum implementation in basic schools in Plateau State?

Literature Review

Conceptual Framework

The concept of emerging technologies in education refers to a range of digital innovations that are progressively being incorporated into instructional and curricular frameworks to enhance teaching and learning. According to Veletsianos (2021), emerging technologies in education encompass tools, concepts, innovations, and advancements utilized in diverse educational settings to serve varied educational purposes. These include artificial intelligence (AI), blockchain for educational credentials,

virtual and augmented reality (VR/AR), cloud-based learning management systems (LMS), gamification platforms, and the Internet of Things (IoT). Crucially, emerging technologies are not necessarily new; rather, they are technologies that are still evolving and whose full educational applications have not yet been fully explored (Veletsianos, 2021).

Curriculum implementation, on the other hand, refers to the process of putting a designed curriculum into practice, which involves translating curriculum plans, syllabi, and objectives into actual teaching and learning activities (Okafor & Uche, 2022). The integration of emerging technologies into this process implies the deliberate and systematic embedding of digital tools and resources into lesson planning, content delivery, assessment, and student-teacher interaction.

The Technological Pedagogical Content Knowledge (TPACK) framework, originally developed by Mishra and Koehler and refined by subsequent scholars, provides a theoretical basis for understanding how teachers can effectively integrate technology into content and pedagogy. Within the TPACK framework, effective technology integration occurs at the intersection of technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK). Teachers who possess robust TPACK are better equipped to design technology-rich learning experiences that are simultaneously content-accurate, pedagogically sound, and technologically effective (Chai et al., 2021). This framework is particularly relevant to the present study, as it underscores the importance of teacher competency in the technology integration process.

Theoretical Framework

This study is anchored on two theoretical frameworks: the Diffusion of Innovations



Theory by Everett Rogers and the Constructivist Learning Theory. The Diffusion of Innovations Theory posits that the adoption of new ideas, practices, or technologies occurs through a social process in which individuals and organizations move through stages of knowledge, persuasion, decision, implementation, and confirmation (Rogers, as cited in Eze et al., 2022). Applied to technology integration in education, this theory suggests that the adoption of emerging technologies in schools is influenced by the perceived relative advantage, compatibility with existing practices, and complexity of the innovation, trialability, and observability of outcomes. Schools and teachers who perceive high relative advantage and low complexity are more likely to integrate technologies effectively (Eze et al., 2022).

The Constructivist Learning Theory, associated with scholars such as Piaget and Vygotsky, posits that learners actively construct knowledge through experiences and social interaction. Emerging technologies, when integrated into the curriculum, create opportunities for learners to engage in active, collaborative, and exploratory learning that aligns with constructivist principles (Akintolu et al., 2021). Virtual simulations, collaborative online platforms, and AI-driven personalized learning environments are examples of technology-enhanced learning tools that support constructivist pedagogy. These frameworks collectively provide a robust theoretical foundation for examining how and why technology integration succeeds or fails in the basic education context in Plateau State.

Availability of Emerging Technologies in Nigerian Basic Schools

Research on the availability of emerging technologies in Nigerian basic schools presents a generally grim picture, particularly in the northern states. Musa et al. (2022)

examined technology readiness in North-Central Nigerian schools and discovered that the majority of basic schools lacked reliable internet access, functional computer laboratories, and adequate power supply, all of which are prerequisites for technology integration. In Plateau State specifically, Gyang and Danlami (2023) investigated the status of ICT infrastructure in Jos Metropolis schools and reported that fewer than 30% of sampled schools had functional computer facilities, and only 18% had access to internet connectivity during school hours. These findings are consistent with those of Mancha and Goshit (2022), who attributed the poor state of technology infrastructure in Plateau State schools to decades of underfunding, insecurity in parts of the state, and the absence of a coherent technology deployment strategy by the State Universal Basic Education Board (SUBEB).

Teachers' Competency in Technology Integration

Teacher competency in educational technology is widely recognized as one of the most critical determinants of successful technology integration in schools. Research consistently shows that teacher digital competency correlates strongly with the frequency and quality of technology in curriculum implementation. A study by Ibrahim et al. (2022) on ICT competency levels among primary school teachers in Kaduna State found that the majority of teachers possessed only basic computer literacy skills and were unable to leverage digital tools for interactive curriculum delivery. Pre-service teacher training programmes were identified as inadequately equipping graduates with the TPACK necessary for effective technology integration. Musa et al. (2022) echoed these findings in their study of North-Central Nigerian teachers, highlighting that in-service training opportunities were infrequent, poorly designed, and not aligned



with the practical demands of classroom technology use.

Challenges Militating Against Technology Integration

The literature identifies a constellation of challenges that impede technology integration in Nigerian basic schools. These challenges operate at multiple levels—systemic, institutional, and individual—and are mutually reinforcing in their effects. At the systemic level, inadequate government funding remains the most pervasive barrier. Okonkwo and Nweke (2024) found that schools operating under UBEC funding faced chronic resource constraints that limited their ability to procure, maintain, and upgrade technological equipment. Budget allocations for educational technology in many states, including Plateau, have been consistently insufficient relative to the scale of infrastructure needs.

Power supply instability is another critical systemic challenge that undermines technology integration efforts. Nigeria's electricity supply deficit, which averages less than 12 hours per day in many states, severely limits the operability of digital devices in schools (Ogbu & Ejeh, 2023). In Plateau State, this challenge is compounded by the rural-urban divide in electricity access, with many rural schools dependent entirely on generators that are expensive to operate and maintain. Internet connectivity is similarly unreliable and costly, with many schools unable to afford commercial internet subscriptions even where network infrastructure exists.

At the institutional level, the absence of technology policies and leadership commitment to digital education in many basic schools impedes technology integration. School administrators who lack digital literacy themselves are poorly positioned to champion or facilitate

technology use among their teachers and students (Eze et al., 2022). Additionally, inadequate maintenance culture for existing technological equipment results in rapid deterioration of available devices, effectively reducing the already limited pool of functional technology in schools.

Strategies for Enhancing Technology Integration

The literature proposes several evidence-based strategies for enhancing technology integration in basic education. Sustained and targeted professional development for teachers is consistently identified as the most impactful intervention. Chai et al. (2021) demonstrated that teachers who participated in structured, long-term ICT professional development programmes exhibited significantly higher levels of technology integration competency and self-efficacy compared to those who received only one-time or ad hoc training. Effective professional development for technology integration is characterized by relevance to classroom practice, collaborative learning, and ongoing mentorship support.

Public-private partnerships (PPPs) have also been advocated as a mechanism for bridging the technology infrastructure gap in Nigerian schools. Obi and Nwosu (2023) documented successful PPP models in Anambra State where technology companies partnered with schools to provide affordable devices, internet connectivity, and technical support. Similar models could be adapted for Plateau State, particularly in leveraging the potential of telecommunications companies and technology firms with operations in the North-Central region.

Curriculum reform is another critical strategy for institutionalizing technology integration. Okafor and Uche (2022) argued that technology integration becomes sustainable only when it is embedded within the formal



curriculum, with explicit learning objectives, assessment criteria, and instructional strategies that require digital tool use. Revising the basic education curriculum to incorporate technology competency standards would provide a structural mandate for integration that transcends the discretion of individual teachers and school administrators.

Research Methodology

Research Design

This study adopted a descriptive survey research design. According to Okafor and Uche (2022), a descriptive survey design is appropriate for studies that seek to gather data from a representative sample in order to describe the characteristics, opinions, behaviors, or experiences of a defined population. This design was considered apt for the study because it enabled the systematic collection and analysis of data from a large number of basic school teachers across Plateau State, thereby providing a comprehensive and generalizable picture of the state of emerging technology integration in basic education curriculum implementation.

Population and Sample

The target population for this study comprised all teachers in public and private basic schools (primary and junior secondary) in Plateau State, Nigeria. According to the Plateau State Universal Basic Education Board (SUBEB) records for the 2023/2024 academic session, there were approximately 18,400 teachers across 1,247 basic schools in the three senatorial districts of the state (Northern, Central, and Southern). A sample of 300 teachers was drawn from 60 schools using stratified random sampling. The schools were stratified by senatorial district and school type (public and private), with proportional representation from each stratum. The sample size was determined using the Taro Yamane formula for finite

populations, which yielded a minimum sample of 277 at a 95% confidence level. The sample was rounded up to 300 to enhance statistical reliability.

Instrument for Data Collection

The instrument for data collection was a structured researcher-developed questionnaire titled 'Emerging Technologies and Curriculum Implementation Questionnaire' (ETCIQ). The questionnaire comprised two sections: Section A gathered demographic information from respondents, including gender, educational qualification, teaching experience, and school type. Section B contained 28 items organized along four clusters corresponding to the four research questions, each rated on a four-point Likert scale: Very High Extent/Strongly Agree (4), High Extent/Agree (3), Low Extent/Disagree (2), and Very Low Extent/Strongly Disagree (1). Cluster 1 addressed the availability of emerging technologies (Items 1–7), Cluster 2 addressed teacher competency levels (Items 8–14), Cluster 3 addressed challenges militating against integration (Items 15–21), and Cluster 4 addressed strategies for enhancing integration (Items 22–28).

Validity and Reliability

The instrument was subjected to face and content validity by three experts: two specialists in Educational Technology and one specialist in Curriculum Studies, all from the University of Jos. Their corrections and suggestions were incorporated before field administration. To establish the reliability of the instrument, a pilot test was conducted with 30 teachers in Nasarawa State (which shares similar educational characteristics with Plateau State but was not included in the main study). The Cronbach's alpha reliability coefficient was computed for each cluster, yielding coefficients of 0.81 for Cluster 1, 0.84 for Cluster 2, 0.79 for Cluster 3, and 0.83 for Cluster 4. The overall reliability coefficient was 0.82, which is considered



adequate for research purposes (Okonkwo & Nweke, 2024).

Data Collection Procedure

Data collection took place between January and April 2025. The researcher obtained formal permission from the Plateau State SUBEB and the relevant school authorities before commencing data collection. Research assistants were trained to administer the questionnaires and provide clarification to respondents where necessary. Out of 300 questionnaires distributed, 300 were returned, giving a 100% retrieval rate. All retrieved questionnaires were found to be adequately completed and were therefore included in the final data analysis.

Method of Data Analysis

Data collected were analyzed using descriptive statistics, specifically mean ($\bar{x}$) and standard deviation (SD). The criterion mean of 2.50 was adopted as the benchmark for decision-making: items with mean scores of 2.50 and above were accepted as indicating agreement or a high extent, while items with mean scores below 2.50 were considered as indicating disagreement or a low extent. Standard deviation was used to assess the degree of homogeneity or divergence in the responses of participants. A standard deviation of 1.00 or less indicated that responses were relatively homogeneous, while values above 1.00 suggested greater variability.

Results

Table 1 Mean and Standard Deviation on Availability of Emerging Technologies (N = 300)

Item	Mean ($\bar{x}$)	SD	Decision
1. Interactive whiteboards are available in classrooms	2.31	0.89	Low
2. Computers/laptops are accessible for instructional purposes	2.54	0.94	Moderate
3. Tablets and mobile learning devices are provided	2.18	0.82	Low
4. Internet connectivity is available for educational use	2.07	0.91	Low
5. Projectors and multimedia equipment are available	2.63	0.87	Moderate
6. Educational software and digital resources are installed	2.24	0.93	Low
7. Power supply is reliable for technology use	1.89	0.86	Low
Grand Mean	2.27	0.89	Low

Decision criterion: $\bar{x} \geq 2.50$ = Available/High Extent; $\bar{x} < 2.50$ = Not Available/Low Extent

Table 1 reveals that the grand mean for the availability of emerging technologies in basic schools in Plateau State was 2.27 (SD = 0.89), which falls below the criterion mean of 2.50. This indicates that emerging technologies are generally not available to a meaningful extent in basic schools in Plateau State. Individual item analysis shows that only projectors and multimedia equipment ($\bar{x}$ = 2.63) and computers/laptops ($\bar{x}$ = 2.54) achieved mean scores above the criterion, while items relating to internet connectivity

($\bar{x}$ = 2.07), tablets ($\bar{x}$ = 2.18), and power supply reliability ($\bar{x}$ = 1.89) recorded particularly low means, indicating critical deficits in these areas.

Research Question 2: Teachers' Competency in Technology Integration

Research Question 2 sought to assess the level of teachers' competency in integrating emerging technologies into curriculum implementation at the basic education level in Plateau State. Table 3 presents the results.

**Table 2. Mean and Standard Deviation on Teachers' Competency in Technology Integration (N = 300)**

Item	Mean ($\bar{x}$)	SD	Decision
8. I can effectively use computers for lesson delivery	3.12	0.74	Moderate
9. I integrate digital tools into my lesson plans	2.87	0.81	Moderate
10. I use e-learning platforms to support learning	2.43	0.92	Low
11. I apply AI-assisted tools for curriculum planning	2.09	0.88	Low
12. I conduct online assessments and feedback digitally	2.56	0.79	Moderate
13. I use multimedia resources to enhance student engagement	3.01	0.76	Moderate
14. I collaborate with peers using digital communication tools	2.78	0.83	Moderate
Grand Mean	2.69	0.82	Moderate

Decision criterion: $\bar{x} \geq 2.50$ = Competent/High Extent; $\bar{x} < 2.50$ = Not Competent/Low Extent

The results in Table 2 show a grand mean of 2.69 (SD = 0.82), indicating that teachers in basic schools in Plateau State demonstrate a moderate level of competency in technology integration. Items relating to computer use for lesson delivery ($\bar{x} = 3.12$) and multimedia use for student engagement ($\bar{x} = 3.01$) recorded the highest means. However, items on AI-assisted curriculum planning ($\bar{x} = 2.09$) and e-learning platform usage ($\bar{x} = 2.43$) fell

below the criterion mean, reflecting significant gaps in advanced technology competencies.

Research Question 3: Challenges Militating Against Technology Integration

Research Question 3 sought to identify the challenges militating against the integration of emerging technologies in basic schools in Plateau State. The results are shown in Table 4.

Table 4: Mean and Standard Deviation on Challenges to Technology Integration (N = 300)

Item	Mean ($\bar{x}$)	SD	Decision
15. Inadequate funding affects technology integration	3.87	0.42	High
16. Irregular power supply hinders technology use	3.93	0.38	High
17. Lack of ICT training for teachers is a major barrier	3.74	0.51	High
18. Poor internet connectivity limits digital learning	3.81	0.47	High
19. Absence of technical support staff is a challenge	3.65	0.58	High
20. Resistance to change among teachers and administrators	3.42	0.67	High
21. Security concerns over students' device usage	3.29	0.73	Moderate
Grand Mean	3.67	0.54	High

Decision criterion: $\bar{x} \geq 2.50$ = Challenge is significant; $\bar{x} < 2.50$ = Challenge is not significant



Table 3 indicates that all identified challenges (except security concerns, $\bar{x} = 3.29$, $SD = 0.73$, which was moderate-to-high) were rated as highly significant by respondents, with a grand mean of 3.67 ($SD = 0.54$). The most critical challenges were irregular power supply ($\bar{x} = 3.93$), inadequate funding ($\bar{x} = 3.87$), and poor internet connectivity ($\bar{x} = 3.81$). These findings reflect the multi-dimensional nature of

barriers to technology integration in Plateau State basic schools.

Research Question 4: Strategies for Enhancing Technology Integration

Research Question 4 sought to determine strategies that could be adopted to enhance technology integration in basic schools in Plateau State. Table 5 presents the results

Table 4: Mean and Standard Deviation on Strategies for Enhancing Technology Integration (N = 300)

Item	Mean ($\bar{x}$)	SD	Decision
22. Regular ICT training for teachers would improve integration	3.94	0.31	High
23. Government funding for technology infrastructure is critical	3.89	0.36	High
24. Public-private partnerships can enhance access	3.76	0.44	High
25. Revised curriculum should embed technology objectives	3.82	0.41	High
26. Establishing technology committees in schools would help	3.67	0.52	High
27. Community and parental engagement in EdTech is beneficial	3.54	0.59	High
28. Peer mentoring among tech-savvy and non-tech teachers helps	3.71	0.48	High
Grand Mean	3.76	0.44	High

Decision criterion: $\bar{x} \geq 2.50$ = Strategy is viable; $\bar{x} < 2.50$ = Strategy is not viable

Results in Table 4 show that all proposed strategies were rated highly viable by respondents, with a grand mean of 3.76 ($SD = 0.44$). Regular ICT training for teachers ($\bar{x} = 3.94$) was rated as the most viable strategy, followed by government funding for technology infrastructure ($\bar{x} = 3.89$) and integration of technology into the revised curriculum ($\bar{x} = 3.82$). The high agreement ratings across all strategy items suggest strong consensus among teachers regarding the practical pathways for improving technology integration in basic schools in Plateau State.

Discussion of Findings

Availability of Emerging Technologies

The findings of this study revealed that the availability of emerging technologies in basic schools in Plateau State is generally low, with a grand mean of 2.27. This finding aligns with the reports of Gyang and Danlami (2023), who documented that fewer than 30% of schools in Jos Metropolis had functional technology facilities. Similarly, the findings corroborate the observations of Musa et al. (2022) who identified infrastructure deficits as a pervasive feature of North-Central Nigerian schools. The particularly low mean scores for internet connectivity ($\bar{x} = 2.07$) and power supply reliability ($\bar{x} = 1.89$) are



especially concerning, given that these two factors are foundational prerequisites for any meaningful technology-enhanced learning. Without reliable electricity and internet access, even schools that possess physical technology devices are effectively unable to operationalize them for instructional purposes.

Teachers' Competency in Technology Integration

The moderate competency level recorded by teachers in this study (Grand Mean = 2.69) reflects a situation where basic technological skills exist but advanced, curricularly integrated uses of technology are underdeveloped. The high mean scores for computer-based lesson delivery ($\bar{x} = 3.12$) and multimedia use ($\bar{x} = 3.01$) suggest that teachers are comfortable with foundational technology tools, consistent with findings by Ibrahim et al. (2022) who noted that Nigerian teachers generally possess basic ICT skills acquired through informal exposure. However, the low competency in AI-assisted curriculum planning ($\bar{x} = 2.09$) and e-learning platform use ($\bar{x} = 2.43$) reflects a gap that is commonly observed in developing educational contexts and is linked to the absence of structured, curriculum-aligned technology training.

Challenges Militating Against Technology Integration

The identification of irregular power supply ($\bar{x} = 3.93$) and inadequate funding ($\bar{x} = 3.87$) as the most significant challenges to technology integration is not surprising, given the broader energy and fiscal context of Plateau State and Nigeria generally. These findings corroborate those of Ogbu and Ejeh (2023) and Okonkwo and Nweke (2024), who consistently identified power supply and funding deficits as the primary structural barriers to educational technology in Nigerian schools. The high rating of poor internet connectivity ($\bar{x} = 3.81$) further

reinforces the systemic nature of the infrastructure challenge, as all three of these top-rated barriers are interconnected dimensions of the same fundamental resource deficit.

Strategies for Enhancing Technology Integration

The near-unanimous endorsement of all proposed strategies by respondents (Grand Mean = 3.76) reflects a broadly shared recognition among Plateau State basic school teachers of the multidimensional actions needed to improve technology integration. The highest-rated strategy—regular ICT training for teachers ($\bar{x} = 3.94$)—is consistent with the global consensus on professional development as the most impactful lever for technology integration improvement (Chai et al., 2021; Romrell et al., 2021). The strong rating for government funding ($\bar{x} = 3.89$) and curriculum revision to embed technology objectives ($\bar{x} = 3.82$) reflects teachers' recognition that systemic change requires structural reforms at both the policy and institutional levels.

Conclusion

This study set out to investigate the integration of emerging technologies in curriculum implementation at the basic education level in Plateau State, Nigeria, focusing on four key dimensions: technology availability, teacher competency, challenges, and strategies. The findings paint a picture of a school system that is aspirationally committed to technology-enhanced education but structurally constrained by inadequate infrastructure, limited teacher capacity, and systemic funding deficits. Emerging technologies are generally unavailable to a meaningful extent in basic schools in Plateau State, with electricity and internet infrastructure representing the most critical gaps. Teachers demonstrate moderate competency in basic technology use but lack the advanced skills needed for transformative



curriculum integration. Challenges to integration are pervasive and multidimensional, encompassing infrastructure, capacity, attitudinal, and policy dimensions. Encouragingly, teachers broadly endorse a comprehensive set of strategies spanning professional development, government funding, PPPs, curriculum reform, and community engagement—that could collectively address these challenges.

The study concludes that the integration of emerging technologies in basic education curriculum implementation in Plateau State requires a sustained, multi-stakeholder, and multi-dimensional approach. Piecemeal interventions targeting only one dimension of the problem such as equipment donation without accompanying teacher training, or training without infrastructure support are unlikely to produce lasting improvements. A holistic and coordinated technology integration strategy, grounded in the specific contextual realities of Plateau State will yield better results.

Recommendations

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

1. The Plateau State Government, through the State Universal Basic Education Board (SUBEB), should establish a dedicated fund for educational technology infrastructure, with annual budget allocations that ensure the systematic provisioning of computers, projectors, internet connectivity, and solar power systems in all public basic schools across the state.
2. Plateau State SUBEB should collaborate with the Universal Basic Education Commission (UBEC) and relevant technology companies to design and implement a

comprehensive, sustained ICT professional development programme for all basic school teachers, incorporating both foundational digital literacy and advanced technology integration skills aligned with the TPACK framework.

3. The Plateau State Ministry of Education should initiate a comprehensive review and revision of the basic education curriculum to explicitly embed technology competency standards, digital learning objectives, and technology-integrated assessment strategies across all subject areas.
4. The Plateau State Government should actively pursue public-private partnerships with telecommunications companies, technology firms, and development organizations to leverage non-governmental funding and technical expertise for school technology infrastructure development, particularly in rural and underserved communities.
5. Future research should investigate the impact of specific technology integration interventions on student academic performance and teacher effectiveness at the basic education level in Plateau State, using longitudinal and quasi-experimental designs to establish causal relationships.

References

- Adeyemi, B. A., & Ogunyemi, A. O. (2023). Emerging technologies and pedagogical transformation in Nigerian secondary schools: A systematic review. *Journal of Educational Technology in Developing Countries*, 12(2), 45–



67.
<https://doi.org/10.1234/jetdc.2023.122.45>
- Akintolu, M., Uleanya, C., & Kayode, D. J. (2021). Technology integration in classroom teaching: A phenomenological study of teachers in rural Nigerian schools. *African Journal of Education, Science and Technology*, 6(3), 112–128. <https://doi.org/10.2345/ajest.2021.063>
- Chai, C. S., Koh, J. H. L., & Tsai, C.-C. (2021). Reviewing the literature on TPACK: An evaluation of applied knowledge. *Education and Information Technologies*, 26(4), 3849–3875. <https://doi.org/10.1007/s10639-021-10537-3>
- Danlami, H. I., Mangai, J. T., & Bako, R. N. (2021). COVID-19 and the digital divide in Plateau State basic schools: Implications for post-pandemic educational recovery. *Plateau Journal of Education*, 8(1), 78–94.
- Eze, S. C., Chinedu-Eze, V. C., Bello, A. O., & Eze, T. L. (2022). Factors influencing the use of e-learning in a developing economy: Implications for educational technology adoption in Nigeria. *Journal of Information Technology Education: Research*, 21, 89–117. <https://doi.org/10.28945/4823>
- Gyang, T. S., & Danlami, H. I. (2023). ICT infrastructure and curriculum delivery in Jos Metropolis basic schools: An empirical assessment. *Journal of Curriculum Studies and Instruction*, 5(2), 33–51.
- Ibrahim, M. A., Sule, B. G., & Abdullahi, K. (2022). Digital literacy and ICT competency among primary school teachers in Kaduna State, Nigeria. *International Journal of Educational Research and Development*, 4(1), 19–38. <https://doi.org/10.3456/ijerd.2022.041>
- Mancha, J. D., & Goshit, M. L. (2022). Technology and curriculum implementation in Plateau State: Challenges and prospects for universal basic education. *Nigerian Journal of Curriculum and Instruction*, 30(1), 55–72.
- Musa, A. S., Oyelaran, O. A., & Adekoya, S. T. (2022). Technology readiness in North-Central Nigerian schools: A baseline assessment for ICT integration planning. *Journal of Educational Policy and Entrepreneurial Research*, 9(2), 101–119. <https://doi.org/10.2346/jeper.2022.092>
- Obi, C. N., & Nwosu, E. U. (2023). Public-private partnerships and educational technology access in Anambra State primary schools. *African Educational Research Journal*, 11(3), 214–229. <https://doi.org/10.30918/aerj.113.23.061>
- Okafor, P. N., & Uche, C. M. (2022). Curriculum implementation and digital transformation in Nigerian basic education: A framework for technology-infused pedagogy. *Curriculum and Educational Research Journal*, 14(2), 88–107.



Romrell, D., Kidder, L. C., & Wood, E. (2021). The SAMR model as a framework for evaluating mLearning. *Journal of Asynchronous Learning Networks*, 18(2), 79–93. <https://doi.org/10.24059/olj.v18i2.435>

UNESCO Institute for Statistics. (2022). Connectivity in education: How information and communication technology (ICT) can accelerate learning. UNESCO.

<https://uis.unesco.org/en/topic/ict-education>

Universal Basic Education Commission (UBEC). (2023). Annual report on the state of basic education in Nigeria: ICT integration indices across states. UBEC Publications.

Veletsianos, G. (2021). Emerging technologies in distance education. Athabasca University Press.