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MANAGING TEACHER CAPACITY FOR TECHNOLOGY-ENHANCED LEARNING: BRIDGING THE DIGITAL DIVIDE IN RURAL SECONDARY SCHOOLS IN NIGERIA

Dr. Scholastica Baridi Anor
Department of Educational Management,
Faculty of Education, Ignatius Ajuru University of Education, Port Harcourt, Rivers State.
ORCID ID: 0009-0000-8954-1628 scholarstica.anor@iaue.edu.ng
08069237282 scholasticaanor@gmail.com

Fatima Mohammed, PhD.
fatyymukhtar@gmail.com
Department of English
Yusuf Maitama Sule Federal University of Education, Kano
ORCID: 0009-0002-6020-2942

Dr Anthony Akajiaku Eme
emetony881@gmail.com
08064714881
ORCID No: 0009-0007-0180-6857

Abstract

This study investigated managing teacher capacity for technology-enhanced learning as a strategy for bridging the digital divide in rural secondary schools in Nigeria. A descriptive survey design was adopted. Data were collected from 400 rural secondary school teachers using a structured questionnaire and analysed using mean, standard deviation, Pearson Product Moment Correlation and ANOVA at 0.05 level of significance. Findings revealed that teachers possessed basic digital literacy but low digital pedagogical competence. Technology resources such as computers, internet and electricity were largely unavailable and poorly utilised. Continuous professional development and mentoring, as well as supportive school management, significantly improved teacher capacity. Challenges identified included poor electricity, high cost of data, and lack of training. The study concluded that bridging the digital divide requires building teacher capacity through training, mentoring and leadership, not merely providing devices. It recommended that government and school management organise regular school-based ICT training and provide solar-powered devices with affordable internet to rural schools.

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Keywords: Teacher Capacity, Technology-Enhanced Learning, Digital Divide, Rural Secondary Schools, Nigeria, Professional Development, Digital Literacy

Introduction

The twenty-first century has redefined the meaning of quality education across the globe, with technology-enhanced learning emerging as a central driver of access, equity and excellence in teaching and learning. In an era where knowledge is increasingly mediated through digital platforms, artificial intelligence, mobile learning and open educational resources, the capacity of the teacher has become more decisive than the availability of hardware alone. Technology-enhanced learning is no longer a supplementary option but a fundamental requirement for preparing learners for a knowledge-driven economy, for fostering critical thinking, creativity, collaboration and digital literacy, and for ensuring that no learner is left behind in the unfolding Fourth Industrial Revolution. Global education frameworks, particularly the United Nations Sustainable Development Goal Four, which calls for inclusive and equitable quality education and lifelong learning opportunities for all, and the UNESCO Education 2030 Agenda, have consistently emphasized that the effective integration of technology into pedagogy depends largely on the teacher as the facilitator, designer and manager of learning experiences (UNESCO, 2023). In many developed economies, substantial investments have been made not only in infrastructure but also in continuous professional development, digital pedagogy, instructional design and school leadership, thereby enabling teachers to move from mere users of technology to confident architects of technology-enhanced classrooms.

In Nigeria, the discourse on technology-enhanced learning has gained considerable momentum in the last decade, driven by national policies and reform initiatives that recognize the transformative potential of information and communication technology in education. The National Policy on Information and Communication Technology in Education of 2019, the National Digital Economy Policy and Strategy 2020-2030, and the Nigeria National Broadband Plan 2020-2025 all articulate a vision of a digitally literate citizenry and a technology-enabled education system (Federal Ministry of Education, 2019; Federal Ministry of Communications and Digital Economy, 2020). These policy frameworks were further reinforced by the experience of the COVID-19 pandemic, which exposed in stark terms the fragility of the Nigerian education system and the urgency of digital readiness. During the prolonged school closures of 2020, while learners in urban private schools transitioned relatively smoothly to online learning through Zoom, Google Classroom and WhatsApp platforms, millions of learners in rural public secondary schools were completely cut off from learning because their teachers lacked both the devices and the digital pedagogical competence to sustain teaching (Adedoyin & Soykan, 2020; Eze et al., 2021). The pandemic therefore served as a rude awakening that the digital divide in Nigeria is not merely a divide of infrastructure but fundamentally a divide of teacher capacity, institutional readiness and policy implementation.

The background to this study is rooted in the persistent rural-urban disparity that characterizes secondary education in Nigeria. Rural secondary schools, which constitute a substantial proportion of the over 30,000 secondary schools in the country, continue to operate under conditions of infrastructural deprivation, limited electricity supply, poor internet connectivity, inadequate funding and acute shortage of qualified teachers (National Bureau of Statistics, 2023). While urban schools in Lagos, Abuja, Port Harcourt and Kano are increasingly experimenting with smart classrooms, e-libraries, computer-based testing and blended learning, their rural counterparts in states such as Benue, Zamfara, Taraba, Ebonyi and parts of Borno still struggle with basic chalkboard teaching, overcrowded classrooms and absence of functional computer laboratories. The World Bank (2022) observed that less than forty percent of public secondary schools in Nigeria have access to functional computers for teaching, and an even smaller proportion have reliable internet connectivity, with rural schools disproportionately disadvantaged. This reality is compounded by the fact that many rural teachers were trained in pre-digital teacher education programmes that emphasized content mastery and traditional chalk-and-talk methods, with little or no exposure to digital pedagogy, learning management systems, multimedia instructional design or assessment analytics (Adu & Olatunde, 2023). Consequently, even where government or non-governmental organizations have donated computers, tablets or solar-powered learning devices to rural schools, such interventions have often remained underutilized, abandoned or diverted to administrative purposes because the teachers who are expected to deploy them lack the requisite confidence, competence and continuous support to do so.

The problem that this study interrogates is therefore both systemic and human. The central problem is that despite successive policy pronouncements on digital education and despite occasional donations of technological devices to rural schools, teacher capacity for technology-enhanced learning remains critically low, and the digital divide between rural and urban secondary schools in Nigeria continues to widen rather than narrow. This capacity deficit manifests in several interrelated dimensions that have been documented in recent empirical studies. Many rural secondary school teachers exhibit low levels of digital literacy, limited knowledge of pedagogical integration of technology, fear and resistance to technological change, and absence of ongoing mentoring and technical support (Oluwalola & Adebayo, 2024; Ibrahim et al., 2025). In addition, school management structures in rural areas often lack strategic plans for technology integration, budgets for maintenance and internet subscription, and mechanisms for monitoring and evaluating the use of technology in classroom instruction. Obizue & Obizue (2025) averred that it is a paradoxical situation for a country like Nigeria with one of the highest rates of mobile phone penetration and utilisation with youth digital engagement in Africa, to continue to produce secondary school leavers who are digitally illiterate, unable to compete in the global digital economy and ill-prepared for higher education where technology-enhanced learning is current reality. This paradox raises a fundamental research concern that transcends the mere provision of devices and compels attention to how

teacher capacity can be effectively managed, developed and sustained in rural contexts where the challenges are most acute.

The scope of this study is deliberately focused on rural public secondary schools in Nigeria, with particular attention to the management of teacher capacity as a lever for bridging the digital divide. The study is concerned not merely with whether teachers can operate a computer, but with whether they can design, deliver, assess and manage learning in a technology-enhanced environment in a pedagogically sound, ethically responsible and contextually relevant manner. It encompasses dimensions such as digital literacy and digital pedagogy, access to and utilization of digital instructional resources, continuous professional development and mentoring, school leadership and institutional support, as well as the socio-cultural and infrastructural factors that shape teachers' readiness to embrace technology. Geographically, the study draws on the experiences of rural secondary schools across the diverse geopolitical zones of Nigeria, recognizing that while the manifestations of the digital divide may differ from the rural communities of the North Central to those of the South East, the underlying capacity challenge is national in character. Conceptually, the study is anchored within the framework of technology-enhanced learning as an integrated system in which teacher competence, school management, policy environment and community support interact to produce learning outcomes. It therefore moves beyond a technocentric view of the digital divide to a more holistic, human-centred understanding that positions the teacher as the most critical variable in the equation.

The significance of this study is both theoretical and practical and extends to multiple stakeholders in the Nigerian education ecosystem. Theoretically, the study contributes to the growing body of literature on technology-enhanced learning in developing economies by shifting emphasis from infrastructure provision to capacity management, thereby enriching the discourse on the Technological Pedagogical Content Knowledge framework and its application in resource-constrained rural settings (Mishra & Koehler, 2020; Ogbonnaya & Awoniyi, 2024). It provides empirical evidence that can inform the refinement of teacher education curricula, professional development models and school management theories in Nigeria. Practically, the study is significant for policymakers at the Federal Ministry of Education, the National Commission for Colleges of Education, the Teachers Registration Council of Nigeria and State Ministries of Education, as it offers evidence-based insights into how policies on digital education can be translated from paper to classroom practice through targeted investment in teacher capacity. For school principals, proprietors and school-based management committees, the study provides a management framework for planning, supporting and evaluating technology integration in rural schools. For teachers themselves, the study is significant because it amplifies their voices, identifies their professional needs and advocates for continuous, context-sensitive and incentive-driven capacity development rather than one-off workshops that have historically failed to produce lasting change. For learners in rural communities, the ultimate significance lies in the promise of equity, that a child in a rural secondary school in Gboko, Gombe or Iseyin should have the same opportunity to learn with technology as a child in Lagos or Abuja, and should not be denied access to quality education

by reason of geography or socio-economic status. Finally, for development partners, non-governmental organizations and private sector actors interested in bridging the digital divide, the study offers a diagnostic and strategic roadmap for designing interventions that are sustainable, scalable and responsive to the realities of rural Nigeria, thereby aligning with the national aspiration for inclusive, resilient and future-ready education.

The specific objectives are;

1. To examine the level of digital literacy and digital pedagogical competence of teachers in rural secondary schools in Nigeria.

2. To assess the extent of availability and utilization of technology-enhanced learning resources in rural secondary schools in Nigeria.

3. To identify the challenges hindering effective management of teacher capacity for technology-enhanced learning and strategies for bridging the digital divide in rural secondary schools in Nigeria.

In line with the specific objectives, the following research questions were formulated to guide this study

1. What is the level of digital literacy and digital pedagogical competence of teachers in rural secondary schools in Nigeria?

2. To what extent are technology-enhanced learning resources available and utilized in rural secondary schools in Nigeria?

3. What are the challenges hindering effective management of teacher capacity and what strategies can bridge the digital divide in rural secondary schools in Nigeria?

Three null hypotheses guided this study, thus;

H01: There is no significant relationship between teachers' digital literacy and their capacity for technology-enhanced learning in rural secondary schools in Nigeria.

H02: The availability of technology-enhanced learning resources does not significantly determine their utilization in rural secondary schools in Nigeria.

H03: There is no significant relationship between the challenges of managing teacher capacity and bridging the digital divide in rural secondary schools in Nigeria.

Literature Review

The literature on technology-enhanced learning and the digital divide has grown substantially in the last decade, reflecting the increasing recognition that technology is not merely an instructional aid but a transformative force in education. Scholars have approached the subject from different perspectives, ranging from infrastructure and access to pedagogy, teacher competence, school management and policy implementation. The relevant literature is

reviewed under conceptual review, theoretical review and empirical review, and it concludes with a summary of literature and identification of the gap that this study seeks to fill.

Concepts

Teacher capacity

The concept of teacher capacity has been conceptualised in the literature as a multidimensional construct that goes beyond the mere ability to operate technological devices. Obizue & Obizue (2025) described teacher capacity as the combination of relevant potentials, knowledge, skills, attitudes, confidence, competencies and support systems that enable a teacher to perform effectively in planning, delivering, assessing and managing learning in a technology-inclined setting. In a similar view, Adu & Olatunde (2023) argued that capacity encompasses digital literacy, pedagogical competence, content knowledge and the ability to adapt technology to diverse learning needs and contexts. This understanding aligns with the position of UNESCO (2023) that a digitally competent teacher is one who can use technology critically, creatively and responsibly to enhance learning outcomes, promote inclusion and foster learner autonomy. The implication is that teacher capacity cannot be developed through one-off training or provision of devices alone, but requires continuous professional development, mentoring, institutional support and a culture of reflective practice.

Technology-Enhanced Learning

Technology-enhanced learning itself has been defined by Eze & colleagues (2021) as the use of digital tools, platforms and resources to support, enrich and transform teaching and learning processes, whether in face-to-face, blended or fully online modes. Such tools include learning management systems, multimedia instructional materials, mobile learning applications, virtual classrooms, open educational resources and artificial intelligence-driven tutoring systems. Adedoyin & Soykan (2020) advocated that technology-enhanced learning has the potential to personalise learning, expand access to quality instructional materials, promote collaborative learning and provide immediate feedback to learners, thereby improving engagement and achievement. However, Ogbonnaya & Awoniyi (2024) cautioned that the transformative potential of technology-enhanced learning is only realised when it is pedagogically grounded, that is, when technology is integrated in ways that align with learning objectives, learner characteristics and assessment strategies, rather than being used as a mere replacement for the chalkboard.

The concept of the digital divide has also evolved in the literature from a narrow focus on access to devices and internet connectivity to a broader understanding that includes divides in skills, usage, quality of access and outcomes. The World Bank (2022) distinguishes between the first-level divide, which concerns physical access to infrastructure, and the second-level divide, which concerns differences in digital skills, competence and effective utilisation. In the Nigerian context, Ibrahim and colleagues (2025) argue that rural secondary schools suffer from both levels of divide simultaneously, as they lack not only computers, electricity and internet, but also teachers who possess the requisite skills to utilise available technologies meaningfully.

Oluwalola & Adebayo (2024) further observe that the digital divide in Nigeria is deeply intertwined with socio-economic inequality, geographical location, gender and institutional capacity, such that learners in rural schools are systematically disadvantaged in comparison with their urban counterparts. This conceptualisation is critical to the present study because it shifts attention from the simplistic solution of distributing devices to the more complex task of managing teacher capacity as a sustainable strategy for bridging the divide.

Theoretical Review

This study is anchored on three complementary theories that together provide a robust framework for understanding how teacher capacity can be managed to bridge the digital divide.

Technological Pedagogical Content Knowledge framework

This is popularly known as TPACK, developed by Mishra and Koehler and revisited in recent literature. The framework posits that effective teaching with technology requires an intersection of technological knowledge, pedagogical knowledge and content knowledge, and that a teacher who possesses only one or two of these domains cannot effectively integrate technology into instruction. Mishra & Koehler (2020) emphasised that TPACK is context-sensitive and that teachers must understand how technology can represent content, how pedagogy can be transformed by technology, and how learners interact with technology in specific classroom contexts. In rural Nigerian schools, where teachers often possess content knowledge but lack technological and pedagogical integration skills, TPACK provides a useful lens for diagnosing capacity gaps and designing targeted professional development.

Technology Acceptance Model

This model explains teachers' willingness to adopt and use technology based on perceived usefulness and perceived ease of use. Recent applications of the model in Nigerian secondary schools have shown that teachers who perceive technology as useful for improving learner performance and as easy to use are more likely to integrate it into their teaching, while those who perceive it as complex, time-consuming or irrelevant are more likely to resist it (Eze et al., 2021; Oluwalola & Adebayo, 2024). This theory is relevant to the present study because managing teacher capacity involves not only building skills but also shaping positive attitudes, reducing anxiety and demonstrating the practical benefits of technology-enhanced learning in rural classrooms.

Diffusion of Innovation Theory

This theory deals with how new ideas, practices and technologies spread within a social system over time. The theory identifies categories of adopters, from innovators and early adopters to late majority and laggards, and highlights the role of communication channels, social networks, leadership and institutional support in facilitating adoption. In the context of rural schools in Nigeria, scholars have found that the diffusion of technology-enhanced learning is often slow because of weak leadership, absence of peer mentoring, limited exposure to successful models and poor infrastructural support. The theory therefore underscores the importance of school

management and leadership in creating an enabling environment for innovation to thrive, through vision, resource mobilisation, recognition of early adopters and sustained encouragement of reluctant teachers.

Empirical Review

Empirical studies conducted in Nigeria and other developing countries in the last decade have consistently documented low levels of teacher capacity for technology-enhanced learning, particularly in rural settings.

Ibrahim & colleagues (2025) examined barriers to technology integration in rural secondary schools and found that infrastructural deficits, including epileptic power supply, absence of computer laboratories and high cost of data, combined with low teacher motivation and weak school leadership to frustrate technology-enhanced learning. The study recommended school-based mentoring, community partnerships and provision of solar-powered devices as strategies for bridging the divide. In a related study,

In a study conducted among secondary school teachers in Ekiti State, Oluwalola & Adebayo (2024) found that a majority of rural teachers had low digital competence, limited exposure to learning management systems and poor confidence in using multimedia tools for instruction, despite expressing positive attitudes towards technology. The study further revealed that lack of continuous training, poor internet connectivity and absence of technical support were major barriers to effective integration.

Similarly, Adu & Olatunde (2023) in a survey of teachers in Oyo State reported that while most teachers owned smartphones and used social media for personal communication, very few could design digital lesson plans, create interactive content or use technology for formative assessment, indicating a gap between personal digital use and professional digital pedagogy.

Beyond Nigeria, Adedoyin & Soykan (2020) in a global review of online learning during the COVID-19 pandemic found that teachers in developing countries faced greater challenges than their counterparts in developed countries due to limited digital skills, poor access to devices and lack of institutional support, a finding that resonates with the Nigerian experience.

In Kenya, a study by Mungai & colleagues (2022) reported that rural teachers who received sustained, school-based professional development and peer coaching demonstrated significant improvement in technology integration compared to those who attended one-off workshops, highlighting the importance of continuous, context-sensitive capacity development.

Similarly, a study in Ghana by Agyei & Voogt (2022) found that school leadership played a decisive role in technology integration, as schools with principals who provided vision, resources and encouragement recorded higher levels of teacher adoption than schools where leadership was passive or indifferent.

Other studies have also examined the relationship between professional development and teacher capacity. Ogbonnaya & Awoniyi (2024) found a significant positive relationship

between continuous professional development, mentoring and teachers' capacity for digital pedagogy in Nigerian secondary schools, and argued that effective professional development must be practical, collaborative and aligned with teachers' classroom realities. Eze & colleagues (2021) similarly reported that teachers who participated in regular training and had access to technical support were more likely to use e-learning facilities during the pandemic than those who did not, reinforcing the argument that capacity development is a continuous process rather than a one-time event.

Summary of Literature and Gap

The reviewed literature collectively establishes that teacher capacity is the most critical determinant of successful technology-enhanced learning and that the digital divide in rural schools is fundamentally a capacity divide as much as an infrastructural divide. The literature also shows that while many studies have examined access to technology, attitudes of teachers and challenges of integration, few have specifically focused on the management dimension, that is, how school leaders, education managers and policymakers can systematically plan, develop, support, monitor and sustain teacher capacity for technology-enhanced learning in rural secondary schools in Nigeria. Most existing studies have either been conducted in urban settings, focused on higher education, or treated teacher capacity as a static variable rather than a dynamic process that requires deliberate management. It is this gap that the present study seeks to fill by examining how teacher capacity can be effectively managed as a strategic approach to bridging the digital divide in rural secondary schools in Nigeria.

Methodology

This study adopted a descriptive survey research design because it allows the researcher to collect data from a large population of rural secondary school teachers and to describe their capacity for technology-enhanced learning as it exists without manipulation. The population of the study comprised all teachers in rural public secondary schools in Nigeria, from which a representative sample was drawn using stratified and simple random sampling techniques to ensure that teachers across different subjects, qualifications, years of experience and geopolitical zones were fairly represented. Data were collected with the aid of a researcher-developed structured questionnaire titled Managing Teacher Capacity for Technology-Enhanced Learning Questionnaire, which was designed to measure teachers' digital literacy, availability and utilisation of technology-enhanced learning resources, influence of professional development and mentoring, role of school management, and challenges of bridging the digital divide. The instrument was validated by respective experts in educational management, measurement and evaluation, and educational technology, who examined the items for content relevance, clarity and coverage, and their suggestions were incorporated before the final administration. The reliability of the instrument was established through a pilot study conducted among teachers in rural secondary schools outside the main study area, and the data obtained were analysed using Cronbach Alpha, which yielded a high reliability coefficient of 0.89 indicating that the instrument was internally consistent and suitable for the study. The questionnaire was administered personally by the researcher with the support of

trained research assistants, and the completed copies were retrieved on the spot to ensure high return rate. The data collected were analysed using descriptive statistics of mean and standard deviation to answer the research questions, while inferential statistics of Pearson Product Moment Correlation and Analysis of Variance were used to test the hypotheses at 0.05 level of significance, thereby providing an objective basis for drawing conclusions and making recommendations on how teacher capacity can be effectively managed to bridge the digital divide in rural secondary schools in Nigeria.

For mean and standard deviation, any item with a mean score of 2.50 and above on the 4-point scale was accepted as agreed while any item below 2.50 was rejected, with a low standard deviation indicating consensus among respondents. For Pearson Product Moment Correlation and ANOVA, the null hypothesis was rejected where the p-value was less than 0.05 level of significance, otherwise it was retained.

Results

Table 1: Demographic Distribution of Respondents

Demographic Variable	Category	Frequency	Percentage
Gender	Male	228	57.0
Gender	Female	172	43.0
Qualification	NCE	96	24.0
Qualification	B.Ed /B.Sc (Ed)	212	53.0
Qualification	M.Ed / Others	92	23.0
Teaching Experience	1-5 Years	118	29.5
Teaching Experience	6-10 Years	142	35.5
Teaching Experience	Above 10 Years	140	35.0
Total		**400**	**100.0**

A total of 400 teachers from rural secondary schools participated. The majority were male and degree holders, with most having above 6 years of teaching experience. This shows the respondents were experienced enough to give reliable information on teacher capacity for technology-enhanced learning.

Research Question 1

Table 2: Level of Digital Literacy and Digital Pedagogical Competence

Items	Mean	SD	Decision
I can operate a computer and smartphone for teaching	2.78	0.81	Agreed
I can prepare lesson notes using MS Word / PowerPoint	2.61	0.79	Agreed
I can use internet to search for instructional materials	2.72	0.84	Agreed
I can design interactive digital lessons	2.12	0.76	Disagreed
I can use Learning Management Systems like Google Classroom	1.94	0.71	Disagreed
I can use technology for students' assessment and feedback	2.08	0.74	Disagreed
I can integrate technology with pedagogy and content	2.15	0.78	Disagreed
Cluster Mean	**2.34**	**0.77**	**Low Level**

Teachers have basic digital literacy but their level of digital pedagogical competence is low.

cluster mean of 2.34 is below the 2.50 benchmark, indicating a low overall level of capacity. While teachers agreed they can operate devices and search the internet, they disagreed on higher-order skills such as designing interactive lessons, using LMS and integrating technology with pedagogy. This confirms that personal digital use has not translated to professional classroom use.

Research Question 2

Table 3: Availability and Utilization of Technology-Enhanced Learning Resources

Items	Mean	SD	Decision
Functional computers are available in my school	2.18	0.82	Disagreed
Projectors / Smart boards are available	1.86	0.69	Disagreed
Internet connectivity is available and reliable	1.92	0.73	Disagreed
Electricity supply is stable for technology use	2.05	0.78	Disagreed
Teachers utilize available devices for teaching	2.41	0.80	Disagreed
Students have access to digital learning resources	2.10	0.75	Disagreed
Cluster Mean	**2.09**	**0.76**	**Low / Not Available**

Technology resources are largely unavailable and poorly utilized in rural schools.

All items in table 2 scored below 2.50 with a cluster mean of 2.09. This shows severe infrastructural deficit in rural schools. Even where few devices exist, utilization is low due to lack of electricity, internet and technical support. The divide is therefore both access and usage divide.

Research Question 3

Table 4: Challenges and Strategies for Bridging the Divide

Challenges / Strategy	Mean	SD	Decision
Poor electricity and internet hinder technology use	3.28	0.71	Agreed
Lack of continuous training is a major challenge	3.15	0.74	Agreed
High cost of data and devices	3.02	0.79	Agreed
Low motivation and fear of technology	2.87	0.81	Agreed
Provision of solar-powered devices will help	3.21	0.73	Agreed
Regular school-based training and mentoring will help	3.30	0.70	Agreed
Partnership with government / NGOs / community	3.18	0.75	Agreed
Cluster Mean	**3.14**	**0.75**	**Agreed**

Infrastructural and capacity challenges are high, but teachers agree on practical strategies.

All items scored well above 2.50 with cluster mean of 3.14. This confirms that electricity, internet, cost and lack of training are the major barriers. Teachers strongly agreed that solar devices, regular training, mentoring and partnerships are viable strategies for bridging the divide.

Table 5: Test of Hypotheses

Hypothesis	Test Used	r / F-Value	P-Value	Decision
H01: Digital literacy and capacity	Pearson r	0.682	0.000	Null Rejected
H02: Availability and utilization	ANOVA	8.412	0.000	Null Rejected
H03: Challenges and bridging divide	Pearson r	0.638	0.000	Null Rejected

Given the summary result of the hypotheses test in table 5, all the three null hypotheses were rejected. All relationships are significant at $p < 0.05$.

There is a significant positive relationship between digital literacy and teacher capacity, and between challenges/strategies and bridging the divide. There is also a significant difference in availability and utilization of resources. This means improving literacy, availability, utilization and strategies will significantly improve capacity and help bridge the digital divide.

Discussion of Findings

The finding that teachers possess basic digital literacy but low digital pedagogical competence is similar to the findings of Adu & Olatunde (2023) and Oluwalola & Adebayo (2024), who reported that rural teachers in Nigeria can operate phones and search the internet but cannot design interactive lessons or use learning management systems. However, it differs slightly from Eze et al. (2021) who found higher competence among urban teachers during COVID-19, a difference that can be explained by location, as urban teachers had greater exposure to online teaching than rural teachers in this study.

On availability and utilization, the finding of low availability of computers, internet and electricity agrees with the World Bank (2022) and Ibrahim et al. (2025) who documented severe infrastructural deficits in rural schools in Nigeria. It differs from Ogbonnaya & Awoniyi (2024) who reported moderate availability in some southern schools, suggesting that the divide is more severe in deeply rural schools covered in this study.

Finally, the finding that poor electricity, high cost of data and lack of training are major challenges is similar to Adedoyin & Soykan (2020). The difference is that this study goes further to show that teachers strongly agree that solar-powered devices, regular mentoring and partnerships are workable strategies, a practical solution not emphasized in earlier studies which focused mainly on identifying problems.

Conclusion

Teacher capacity, not just devices, is the real bridge across the digital divide in rural Nigerian secondary schools. Without continuous training, mentoring and committed school leadership, rural learners will remain digitally excluded despite any investment in technology.

Recommendations

Based on the findings of this study, the following recommendations were proffered;

1. Government and school management should organize continuous, practical ICT training for rural teachers instead of one-off workshops, focusing on digital pedagogy, interactive lesson design, and use of Learning Management Systems.

2. Government, NGOs and community stakeholders should provide solar-powered computers, projectors and affordable internet to rural schools to overcome the problem of poor electricity and connectivity.

3. Principals should establish peer mentoring and ICT champions in each school where digitally skilled teachers guide and support less skilled colleagues to build confidence and sustain technology use.

4. Principals should develop a school technology integration plan with a dedicated budget for maintenance, data and repairs, and also monitor and reward teachers who effectively use technology in teaching.

5. Government should partner with NGOs, private sector, alumni associations and host communities to fund devices, training and maintenance, so that bridging the digital divide becomes a shared responsibility and not left to government alone.

References

Adedoyin, O. B., & Soykan, E. (2020). COVID-19 pandemic and online learning: The challenges and opportunities. *Interactive Learning Environments*, 31(2), 863-875.

Adu, E. O., & Olatunde, O. (2023). Digital literacy and pedagogical competence of secondary school teachers in Nigeria. *Journal of Educational Technology and Innovation*, 12(1), 45-62.

Agyei, D. D., & Voogt, J. (2022). School leadership and technology integration in Ghanaian secondary schools. *Journal of Educational Administration*, 60(4), 412-428.

Eze, S. C., Chinedu-Eze, V. C., & Bello, A. O. (2021). The utilisation of e-learning facilities in the educational delivery system of Nigeria during the COVID-19 pandemic. *Education and Information Technologies*, 26, 3665-3686.

Ibrahim, M. A., Yusuf, A., & Bello, S. (2025). Barriers to technology integration in rural secondary schools in Northern Nigeria. *International Journal of Educational Management and Professional Studies,* 4(1), 112-129.

Mishra, P., & Koehler, M. J. (2020). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054.

Mungai, P., Kamau, J., & Otieno, D. (2022). School-based professional development and technology integration among rural teachers in Kenya. *African Journal of Educational Technology,* 8(2), 67-84.

Obizue, E. C. & Obizue, N. (2025). Educational administration and digital divide: Learning outcomes in public secondary schools in Nigeria. *International Journal of Education, Management Sciences and Professional Studies*, 3(1), 67-80.

Ogbonnaya, U. I., & Awoniyi, F. C. (2024). Managing teacher professional development for digital pedagogy in Nigerian secondary schools. *African Journal of Teacher Education,* 13(2), 78-96.

Ogunode, N. J., & Jegede, D. (2023). Challenges facing technology-enhanced learning in Nigerian public secondary schools. *Journal of Educational Research and Development*, 7(3), 201-215.

Oluwalola, F. K., & Adebayo, A. A. (2024). Digital competence and attitude of rural teachers towards ICT integration in classroom instruction in Nigeria. *Journal of ICT in Education*, 9(1), 33-48.

UNESCO. (2023). Global Education Monitoring Report: Technology in Education. Paris: UNESCO

World Bank. (2022). Nigeria Digital Economy Diagnostic Report. Washington, DC: World Bank.