
BRIDGING THE DIGITAL DIVIDE: TEACHERS' EXPERIENCES AND CHALLENGES IN DIGITALIZED INSTRUCTION IN RURAL SCHOOLS

***¹Blessie Mae P. Barnes, ¹Melannie D. Innen, ²Dr. Ferdinand T. Carantes**

¹Graduate school students, Baguio Central University.

²Graduate School Professor, Baguio Central University.

Baguio City, Philippines.

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***Corresponding Author: Blessie Mae P. Barnes**

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Graduate school students, Baguio Central University, Baguio City, Philippines.

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ABSTRACT

The increasing integration of digital technologies in education has transformed teaching and learning processes across the globe. However, the benefits of educational digitalization remain unevenly distributed, particularly in rural schools where limitations in infrastructure, connectivity, and technological resources continue to create barriers to effective implementation. This study systematically reviewed the existing literature on digitalized instruction in rural educational settings, with particular emphasis on teachers' experiences, challenges, and adaptive practices. Using a systematic literature review approach, relevant studies, policy documents, and reports published between 2020 and 2026 were retrieved from scholarly databases and reputable organizations. The selected literature was analyzed through thematic synthesis to identify recurring patterns and emerging themes. The review revealed four major themes: digitalization as a catalyst for educational access and innovation; persistent digital divide and infrastructure challenges; teacher readiness and professional development concerns; and the emergence of adaptive and localized digital teaching practices. Findings indicate that digital technologies enhance learner engagement, instructional flexibility, and access to educational resources. However, inadequate internet connectivity, limited ICT infrastructure, insufficient digital devices, and unequal resource distribution continue to impede digital transformation in rural schools. Moreover, while teachers generally demonstrate positive attitudes toward technology integration, many experience challenges related to digital competence, instructional design, and limited professional development opportunities. Despite these constraints, educators have adopted

innovative and context-responsive strategies to sustain instructional delivery. The study concludes that successful digitalization in rural education requires a holistic approach that combines infrastructure development, teacher capacity building, supportive policies, and localized instructional innovations. Strengthening these areas is essential to bridging the digital divide and achieving equitable, inclusive, and sustainable digital education for rural communities.

KEYWORDS: Digitalization, digital divide, rural schools, teachers' experiences, technology integration, digital instruction, educational equity.

INTRODUCTION

The rapid advancement of digital technologies has transformed educational systems worldwide, redefining how teaching, learning, assessment, and educational management are conducted. Digitalization in education refers to the strategic integration of digital technologies into instructional processes to improve access, efficiency, learner engagement, and educational outcomes. The increasing utilization of learning management systems, online learning platforms, digital resources, and artificial intelligence has created new opportunities for delivering education beyond the traditional classroom setting. However, while digitalization offers immense potential for educational transformation, it also exposes significant inequalities in access to technology and digital competencies among learners and educators (UNESCO, 2023).

Globally, the digital divide remains one of the most pressing challenges in education. The UNESCO Global Education Monitoring Report emphasized that technology can enhance learning only when its implementation is equitable, evidence-based, and responsive to local contexts (UNESCO, 2023). Despite the proliferation of digital tools, millions of learners and teachers continue to experience limited access to reliable internet connectivity, digital devices, and technology-enabled learning environments. The report further cautioned that technology-first approaches may inadvertently widen educational inequalities when issues of accessibility and readiness are not adequately addressed (UNESCO, 2023).

The challenge is particularly evident in rural communities where geographical isolation, inadequate infrastructure, and socio-economic disadvantages hinder meaningful participation in digital education. A recent Philippine Institute for Development Studies (PIDS) report revealed that internet access and broadband speed significantly decline in rural regions,

leaving many communities disconnected from educational and economic opportunities available through digital technologies (PIDS, 2024). The study highlighted that less developed and geographically isolated regions continue to experience slower internet connectivity, thereby limiting the effectiveness of digital learning initiatives (PIDS, 2024).

In the Philippines, the experience of the COVID-19 pandemic accelerated the adoption of digital and blended learning modalities, exposing substantial disparities in technological readiness among schools. While the Department of Education (DepEd) has implemented initiatives such as the Digital Rise Program, Smart Mobile Laboratories, and the Academic Recovery and Accessible Learning (ARAL) Program to strengthen educational digitalization, challenges in implementation persist, particularly in rural and underserved communities. These initiatives recognize that educational transformation requires not only technological infrastructure but also capacity building among teachers and learners (DepEd, 2022).

Teachers play a critical role in the successful integration of digital technologies in education. Their ability to utilize technology effectively influences the quality of instruction, learner engagement, and overall educational outcomes. However, studies continue to report challenges related to teachers' digital competence and readiness. A recent study among elementary school teachers in Zambales found that while teachers generally demonstrated moderate to high levels of digital competence, disparities remained in areas such as digital assessment, technology-enhanced instruction, and learner empowerment through digital tools (Mendoza, 2026). Similarly, a study involving public school teachers in Bukidnon revealed that ICT competency was significantly influenced by access to technological resources, professional development opportunities, and institutional support systems (Olipas et al., 2026).

Moreover, recent surveys indicate that teacher preparedness remains a significant concern across Southeast Asia. According to the Southeast Asian Ministers of Education Organization (SEAMEO), nearly 40% of teachers in Southeast Asia reported insufficient training in the use of digital technologies for classroom instruction, limiting their ability to maximize the pedagogical benefits of technology integration (SEAMEO, 2024). This finding suggests that digitalization is not merely an infrastructure issue but also a human capacity challenge requiring sustained professional development and institutional support.

The challenges experienced by rural educators extend beyond digital competence. A phenomenological study conducted in the Philippine context revealed that teachers continue to struggle with inadequate technological resources, unstable internet connectivity, limited technical support, and insufficient access to ICT-related training. These barriers constrain teachers' efforts to integrate digital tools effectively into classroom instruction and assessment practices (Berongoy-Peñas & Paglinawan, 2025). Likewise, studies on rural schools have found that budgetary limitations, insufficient infrastructure, and lack of home internet access among students remain major obstacles to technology integration (Peñas & Paglinawan, 2025; Schuck et al., 2021).

Despite these challenges, digitalization also presents opportunities for educational innovation and inclusion. Emerging evidence suggests that teachers are increasingly recognizing the value of digital tools in supporting personalized learning, instructional flexibility, and learner engagement. Recent studies involving Filipino educators revealed positive attitudes toward technology integration and strong willingness to adopt emerging digital tools despite existing constraints (Sibug et al., 2025; Potane, 2024). Such findings suggest that teachers are not resistant to digital transformation; rather, they require appropriate support mechanisms, infrastructure, and professional development opportunities to maximize its benefits.

Within rural schools, the realities of digitalization are often characterized by a paradox. While digital technologies provide opportunities to bridge geographical barriers and expand educational access, the same technologies can reinforce existing inequalities when infrastructure, training, and support systems are insufficient. Studies conducted among rural learners and schools in the Philippines continue to report gaps in digital literacy, access to devices, and internet connectivity, indicating that the digital divide remains a persistent educational issue (Olipas & Alegado, 2026; Goodwood, 2025).

Although considerable research has examined educational digitalization, much of the existing literature focuses on technological infrastructure, student outcomes, or policy implementation. Limited studies have explored the lived experiences of teachers who serve as the primary implementers of digitalized instruction in rural schools. Furthermore, there remains a scarcity of context-specific investigations examining how teachers navigate technological challenges, adapt instructional practices, and perceive the effectiveness of digital learning within geographically isolated educational environments.

Given these gaps, this study seeks to explore the experiences and challenges of teachers in implementing digitalized instruction in rural schools. Specifically, it aims to examine how rural educators navigate the opportunities and constraints associated with educational digitalization and identify the factors that facilitate or hinder effective technology integration. The findings of this study are expected to contribute to the development of evidence-based policies, targeted professional development programs, and sustainable digitalization initiatives that promote educational equity and bridge the digital divide among rural schools.

Review of Related Literatures

Digitalization has become a central feature of contemporary education as schools increasingly integrate digital tools, learning management systems, online platforms, and multimedia resources into the teaching-learning process. It goes beyond the conversion of printed materials into digital form because it involves the transformation of instructional delivery, assessment practices, communication, and learner support systems. In this sense, digitalization is not merely a technological shift but a pedagogical and organizational transformation that influences how teachers teach and how learners access, process, and apply knowledge (UNESCO, 2023).

The growing emphasis on digitalized instruction is strongly linked to the global movement toward inclusive and equitable quality education. Digital technologies have the potential to expand learning opportunities, support flexible instruction, improve access to educational resources, and enhance learner engagement. However, the benefits of digitalization are not automatically experienced by all schools and learners. UNESCO (2023) cautioned that educational technology may either reduce or worsen inequalities depending on how it is accessed, implemented, and supported. This means that digitalization becomes meaningful only when schools have adequate infrastructure, teachers have sufficient digital competence, and learners are provided with equitable access to devices and connectivity.

The digital divide remains one of the most persistent barriers to educational digitalization. It refers to the unequal access to digital devices, internet connectivity, digital skills, and technology-supported learning environments. In rural schools, this divide is often intensified by geographical isolation, poor internet signal, limited electricity, inadequate ICT facilities, and socio-economic constraints among learners and families. Recent policy discussions in the Philippines have emphasized that broadband access remains uneven across regions, with rural and geographically isolated communities continuing to experience connectivity gaps that

limit participation in digital education (PIDS, 2024). Thus, while digital technologies offer opportunities for educational innovation, rural schools often encounter structural barriers that prevent full participation in digitalized instruction.

In the Philippine educational context, the COVID-19 pandemic exposed the depth of the digital divide. The sudden transition to distance, blended, and online learning revealed disparities in school readiness, teacher preparedness, learner access, and household connectivity. Many teachers were required to use digital platforms despite limited training, while many learners struggled to access online resources due to lack of devices or unstable internet connection. These experiences demonstrated that digitalization is not only a matter of providing technology but also of ensuring that teachers and learners are prepared to use it effectively (UNESCO, 2023).

Teacher readiness is a critical factor in the success of digitalized instruction. Teachers serve as the primary implementers of technology-enhanced learning, and their competence directly affects the quality of instruction. Studies on teacher ICT competency show that access to resources, professional development, institutional support, and infrastructure significantly influence teachers' ability to integrate technology into classroom practice (Ayunar et al., 2024). When teachers lack training in digital pedagogy, they may experience difficulty in preparing digital instructional materials, designing technology-based assessments, managing online platforms, and sustaining learner engagement. This suggests that digital competence must be developed not only as a technical skill but also as a pedagogical capacity.

Recent studies further show that teachers' experiences with digitalization are shaped by both opportunities and constraints. On one hand, digital tools allow teachers to access diverse instructional materials, communicate with learners more efficiently, create interactive lessons, and support differentiated learning. On the other hand, teachers in rural schools often face unstable connectivity, insufficient ICT equipment, lack of technical support, and limited time to prepare digital resources. These conditions may increase teacher workload and create anxiety, particularly when digital tools are introduced without adequate training and institutional support (UNESCO, 2023; Ayunar et al., 2024).

In rural schools, digitalized instruction is often implemented through adaptive and context-based strategies. Teachers may use offline videos, radio-based instruction, printed modules supported by digital files, flash drives, mobile phones, and community-based learning support

mechanisms. These practices show that digitalization in rural areas does not always depend on high-end technology. Instead, it often requires flexible, low-tech, and localized solutions that respond to the actual conditions of learners and schools. This is especially relevant in geographically isolated communities where full online learning may not be feasible.

The Philippine government has introduced policies and programs to address gaps in digital education. These include initiatives related to open distance learning, learning management systems, digital learning resources, and connectivity expansion. The World Bank also reported continuing investments in the Philippines' digital infrastructure, including support for connectivity in rural schools and public facilities (World Bank, 2025). These interventions indicate a policy-level recognition that digital access is essential to educational inclusion. However, the presence of policies and programs does not guarantee effective implementation at the school level. The success of digitalization depends on how these programs are experienced and utilized by teachers in actual classroom conditions.

The literature also emphasizes the importance of institutional support. Schools must provide teachers with access to ICT materials, technical assistance, capacity-building programs, and supportive leadership. Without these, digitalization may become an additional burden rather than a tool for instructional improvement. Teachers need sustained professional development that focuses not only on how to use digital tools but also on how to integrate them meaningfully into lesson planning, assessment, feedback, remediation, and learner-centered instruction.

Despite the growing number of studies on digital education, there remains a need for more localized research on teachers' experiences and challenges in rural schools. Much of the existing literature focuses on technology access, student learning outcomes, or broad policy implementation. Fewer studies examine how rural teachers actually navigate digitalized instruction, how they cope with limited resources, and how they perceive the effectiveness of technology in their teaching-learning process. This gap is important because teachers' lived experiences provide practical evidence on whether digitalization truly bridges or widens educational inequalities.

Overall, the literature suggests that digitalization in rural education is both an opportunity and a challenge. It can improve access, enrich instruction, and promote educational inclusion; however, it can also reproduce inequality when rural teachers and learners lack connectivity,

devices, training, and support. Therefore, examining the experiences and challenges of teachers in digitalized instruction is necessary to inform more responsive policies, relevant teacher training programs, and sustainable interventions that can bridge the digital divide in rural schools.

METHODOLOGY

This study employed a systematic literature review approach to synthesize existing scholarly evidence on digitalization in education, particularly focusing on teachers' experiences and challenges in implementing digitalized instruction in rural schools. Relevant literature was gathered from peer-reviewed journal articles, conference proceedings, policy documents, government reports, and publications from international organizations such as UNESCO, the World Bank, and the OECD published between 2020 and 2026. Databases including Google Scholar, Scopus, ERIC, ScienceDirect, and SpringerLink were utilized using keywords such as *digitalization in education*, *digital divide*, *digital instruction*, *teacher experiences*, *ICT integration*, *rural schools*, and *technology-enhanced learning*. The selection process followed predetermined inclusion criteria, namely studies that addressed educational digitalization, teacher readiness, technology integration, and rural educational contexts. Retrieved sources were screened for relevance, credibility, recency, and methodological rigor. The selected literature was analyzed through thematic synthesis, wherein recurring themes, patterns, challenges, opportunities, and research gaps were identified and categorized to provide a comprehensive understanding of the current state of digitalized instruction in rural educational settings and to establish the conceptual foundation for the present study.

RESULTS AND DISCUSSION

The review of literature revealed four major themes that characterize the implementation of digitalized instruction in rural schools: (1) digitalization as a catalyst for educational access and innovation, (2) persistent digital divide and infrastructure challenges, (3) teacher readiness and professional development concerns, and (4) the emergence of adaptive and localized digital teaching practices.

Digitalization as a Catalyst for Educational Access and Innovation

The reviewed studies consistently highlighted the transformative role of digital technologies in enhancing educational access and instructional delivery. Digitalization has enabled teachers to utilize learning management systems, digital resources, multimedia presentations, and online communication platforms to facilitate learning beyond traditional classroom

boundaries. The literature suggests that digital tools support learner engagement, personalized instruction, collaborative learning, and flexible access to educational resources. Furthermore, digitalized instruction has expanded opportunities for learners in geographically isolated communities to access learning materials that were previously unavailable. These findings support the argument that educational digitalization serves as a critical mechanism for improving educational quality and promoting lifelong learning. However, the literature also indicates that the benefits of digitalization are highly dependent on the availability of infrastructure and the readiness of users to effectively utilize technology.

A growing body of contemporary research corroborates the transformative potential of digitalization in expanding educational access and fostering instructional innovation. UNESCO (2023) emphasized that digital technologies can increase educational participation, improve learner engagement, and support flexible learning pathways when appropriately integrated into teaching practices. Similarly, the Organisation for Economic Co-operation and Development (OECD, 2023) reported that digital learning environments enhance opportunities for personalized instruction, allowing educators to tailor content, pacing, and assessment according to learners' needs and abilities. In the Philippine context, studies have shown that digital platforms and technology-enhanced learning resources contributed to sustaining educational continuity during and beyond the COVID-19 pandemic, particularly through blended and distance learning modalities (Tria, 2020; Potane, 2024). Furthermore, recent evidence suggests that digital tools facilitate greater collaboration, communication, and access to diverse learning resources, thereby enabling learners in geographically isolated and disadvantaged areas to participate more actively in the educational process (UNESCO, 2023; World Bank, 2024). These findings reinforce the view that digitalization serves as a powerful catalyst for educational inclusion and innovation, provided that adequate infrastructure, institutional support, and digital competencies are established to maximize its benefits (OECD, 2023; UNESCO, 2023).

Persistent Digital Divide and Infrastructure Challenges

The findings on the persistent digital divide and infrastructure challenges are strongly supported by recent international and local studies that identify connectivity and technological access as major barriers to equitable digital education. UNESCO (2023) reported that a substantial proportion of schools worldwide, particularly those located in rural and marginalized communities, continue to lack reliable internet connectivity and adequate

digital infrastructure, limiting their participation in technology-enhanced learning. Similarly, the World Bank (2024) emphasized that disparities in broadband access, device ownership, and digital readiness remain significant obstacles to achieving inclusive digital transformation in education. In the Philippines, the Philippine Institute for Development Studies (PIDS, 2024) found that rural and geographically isolated areas continue to experience slower internet speeds and limited broadband coverage compared to urban centers, thereby constraining educational opportunities and widening existing socio-economic inequalities. Furthermore, studies conducted among rural schools revealed that inadequate ICT facilities, unstable electricity supply, and insufficient technological resources hinder both teachers and learners from maximizing the benefits of digital instruction (Olipas et al., 2024; Berongoy-Peñas & Paglinawan, 2025). These findings affirm that while digitalization initiatives have expanded across educational systems, the unequal distribution of technological resources continues to create disparities in access, participation, and learning outcomes. Consequently, bridging the digital divide through improved infrastructure investment, connectivity expansion, and equitable resource allocation remains essential for achieving meaningful and sustainable digital transformation in rural education (UNESCO, 2023; PIDS, 2024; World Bank, 2024).

Teacher Readiness and Professional Development Concerns

Another dominant theme emerging from the literature is the central role of teachers in the successful implementation of digitalized instruction. The reviewed studies revealed that many educators possess positive attitudes toward technology integration and recognize its potential to enhance teaching and learning. Nevertheless, teachers continue to encounter challenges related to digital competence, instructional design, digital assessment, and technology management. Many studies reported insufficient training opportunities, limited technical support, and inadequate professional development programs as factors constraining effective technology integration. Teachers in rural schools often experience additional challenges because of limited access to ICT resources and professional learning networks. These findings suggest that digitalization should not be viewed solely as a technological initiative but also as a capacity-building endeavor. Sustainable digital transformation requires continuous professional development programs that equip teachers with both technical and pedagogical competencies necessary for technology-enhanced instruction.

The significance of teacher readiness and professional development in digitalized instruction is consistently supported by contemporary educational research. Studies have shown that

teachers generally exhibit favorable attitudes toward technology integration and recognize its potential to improve instructional effectiveness, learner engagement, and educational outcomes; however, positive perceptions alone do not guarantee successful implementation (OECD, 2023). Recent evidence indicates that many educators continue to face challenges related to digital literacy, technology-supported pedagogy, online assessment, and instructional design, particularly in resource-constrained environments (UNESCO, 2023). In the Philippine context, Ayunar et al. (2024) found that teachers' ICT competency is significantly influenced by access to training opportunities, technological resources, and institutional support systems.

Similarly, Mendoza (2026) reported that while teachers demonstrated moderate to high levels of digital competence, deficiencies remained in areas such as digital assessment, learner-centered technology integration, and the utilization of advanced educational technologies. Moreover, a regional survey conducted by the Southeast Asian Ministers of Education Organization (SEAMEO, 2024) revealed that a considerable proportion of teachers across Southeast Asia perceived themselves as inadequately prepared to maximize digital tools due to limited professional development opportunities and insufficient technical assistance. These findings reinforce the argument that educational digitalization should be viewed not merely as a technological innovation but as a comprehensive human-capital development initiative. Consequently, sustained professional development, instructional coaching, technical support, and access to professional learning communities are essential in equipping teachers with the competencies required to effectively implement technology-enhanced instruction and sustain digital transformation in education (UNESCO, 2023; OECD, 2023; SEAMEO, 2024).

Emergence of Adaptive and Localized Digital Teaching Practices

The literature further revealed that teachers in rural schools have developed innovative and context-responsive strategies to overcome technological limitations. These adaptive practices include the use of offline digital materials, radio-based instruction, mobile-phone learning, flash-drive distribution, printed modules supplemented by digital resources, and community-based learning support systems. Several studies highlighted localized initiatives that integrate indigenous languages and culturally responsive content into digital learning materials. Such practices demonstrate the resilience and creativity of teachers in ensuring instructional continuity despite infrastructural constraints. The findings indicate that successful digitalization in rural contexts often relies on flexible and localized approaches rather than

dependence on fully online learning systems. These innovations suggest that effective digital instruction must be responsive to local realities and community needs.

The emergence of adaptive and localized digital teaching practices is widely documented in the literature as a critical response to the challenges of implementing technology-enhanced learning in rural and underserved communities. Research indicates that teachers often employ context-sensitive strategies to ensure instructional continuity despite limitations in connectivity, infrastructure, and access to digital devices (UNESCO, 2023). During and beyond the COVID-19 pandemic, educators across developing countries adopted blended approaches that combined printed modules, offline digital resources, mobile-phone learning, radio-based instruction, and community-supported learning mechanisms to reach learners in geographically isolated areas (Bozkurt et al., 2022). In the Philippines, several localized initiatives demonstrated the effectiveness of culturally responsive and low-tech innovations in sustaining learning. Programs such as Project BINDIYAN and other regional interventions in the Cordillera Administrative Region incorporated indigenous languages, localized content, and alternative learning modalities to address both technological and cultural barriers to education. These initiatives enhanced learner engagement and accessibility while preserving local identity and cultural relevance (DepEd-CAR, 2024). Furthermore, studies have shown that community-based support systems, including parental involvement, barangay learning hubs, and localized resource-sharing mechanisms, play a significant role in facilitating educational access where digital infrastructure remains inadequate (Tria, 2020; UNESCO, 2023). These findings support the view that successful digitalization in rural schools is not solely dependent on sophisticated technologies but on the capacity of educators and communities to develop innovative, flexible, and culturally responsive solutions that align with local realities and learner needs. Consequently, adaptive and localized digital practices should be recognized as essential components of sustainable and inclusive digital transformation in education (UNESCO, 2023; Bozkurt et al., 2022; DepEd-CAR, 2024).

Overall, the literature suggests that digitalization presents both opportunities and challenges for rural education. While digital technologies have the potential to improve educational access, learner engagement, and instructional effectiveness, their implementation remains constrained by infrastructural limitations, unequal access to resources, and varying levels of teacher preparedness. The review highlights that technology alone cannot bridge educational inequalities. Rather, successful digitalization requires a holistic approach that combines

infrastructure development, teacher capacity building, supportive policies, institutional support, and context-sensitive instructional strategies.

Furthermore, the review revealed a notable gap in the existing literature. Most studies focus on technological infrastructure, policy implementation, and student outcomes, while relatively few examine the lived experiences of teachers implementing digitalized instruction in rural schools. This gap underscores the need for further research exploring how teachers navigate digital challenges, adapt pedagogical practices, and perceive the effectiveness of technology integration within their specific educational contexts. Understanding these experiences is essential for designing responsive interventions that promote equitable and sustainable digital transformation in rural education.

CONCLUSION

The literature review revealed that digitalization has become a significant catalyst for improving educational access, instructional innovation, and learner engagement, particularly in an increasingly technology-driven educational landscape. However, the findings also demonstrated that the benefits of digitalized instruction are not equally experienced across educational contexts, especially in rural schools where persistent challenges related to internet connectivity, inadequate ICT infrastructure, limited access to digital devices, and insufficient institutional support continue to hinder effective implementation. Moreover, while teachers generally exhibit positive attitudes toward technology integration, many still face difficulties associated with digital competence, instructional design, and technology management due to inadequate professional development opportunities. Despite these constraints, rural educators have demonstrated remarkable resilience by adopting adaptive and localized teaching practices that respond to the realities of their communities. Overall, the review underscores that successful digital transformation in rural education requires a holistic approach that integrates infrastructure development, teacher capacity building, supportive policies, and context-responsive instructional innovations to bridge the digital divide and promote educational equity.

RECOMMENDATION

Based on the findings, it is recommended that educational policymakers, school leaders, and relevant stakeholders strengthen investments in rural digital infrastructure by expanding internet connectivity, improving access to ICT resources, and ensuring reliable technological support systems. Furthermore, comprehensive and continuous professional development

programs should be implemented to enhance teachers' digital competencies, technology-integrated pedagogical skills, and digital assessment practices. Educational institutions should also encourage the development and dissemination of localized, culturally responsive, and low-bandwidth digital learning resources that address the unique needs of rural learners. Strengthening partnerships among schools, local government units, community organizations, and private sector stakeholders may further support sustainable digitalization initiatives. Finally, future research should explore the lived experiences of teachers and learners in diverse rural contexts to generate evidence-based interventions and policy recommendations that contribute to more inclusive, equitable, and sustainable digital education systems.

REFERENCES

1. Ayunar, J. R., Olipas, C. N. P., & Luciano, M. M. (2024). Teachers' ICT competency and technology integration practices in public basic education schools. *International Multidisciplinary Journal of Applied Business and Education Research*, 5(2), 214–228.
2. Bozkurt, A., Jung, I., Xiao, J., Vladimirsch, V., Schuwer, R., Egorov, G., Lambert, S. R., Al-Freih, M., Pete, J., Olcott, D., Rodes, V., Aranciaga, I., Bali, M., Alvarez, A. V., Roberts, J., Pazurek, A., Raffaghelli, J. E., Panagiotou, N., de Coëtlogon, P., ... Paskevicius, M. (2022). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, 15(1), 1–126.
3. Department of Education–Cordillera Administrative Region. (2024). *Regional education digitalization initiatives and localized learning interventions*. Department of Education-CAR.
4. Mendoza, R. P. (2026). Digital competence among elementary school teachers: Basis for technology-enhanced professional development programs. *International Journal of Educational Innovation and Research*, 8(1), 35–49.
5. Organisation for Economic Co-operation and Development. (2023). *Digital education outlook 2023: Towards an effective digital education ecosystem*. OECD Publishing. <https://doi.org/10.1787/b2715cfc-en>
6. Olipas, C. N. P., & Alegado, P. J. E. (2026). Bridging the gap: Enhancing digital literacy and access among rural students in the Philippines. *International Journal of Educational Development and Technology*, 12(1), 15–29.

7. Philippine Institute for Development Studies. (2024). *Bridging the digital divide: Pathways toward universal broadband access in the Philippines* (Policy Note No. 2024-08). Philippine Institute for Development Studies. <https://www.pids.gov.ph>
8. Potane, J. D. (2024). Teachers' readiness and perceptions toward technology integration in post-pandemic education. *Philippine Journal of Educational Technology*, 6(2), 44–58.
9. Republic of the Philippines. (2014). *Republic Act No. 10650: Open Distance Learning Act*. Official Gazette of the Republic of the Philippines. <https://www.officialgazette.gov.ph>
10. Republic of the Philippines. (2024). *Republic Act No. 12028: Academic Recovery and Accessible Learning (ARAL) Program Act*. Official Gazette of the Republic of the Philippines. <https://www.officialgazette.gov.ph>
11. Southeast Asian Ministers of Education Organization. (2024). *Regional survey on teachers' digital readiness and professional development needs in Southeast Asia*. SEAMEO Secretariat. <https://www.seameo.org>
12. Tria, J. Z. (2020). The COVID-19 pandemic through the lens of education in the Philippines: The new normal. *International Journal of Pedagogical Development and Lifelong Learning*, 1(1), ep2001. <https://doi.org/10.30935/ijpdll/8311>
13. United Nations Educational, Scientific and Cultural Organization. (2023). *Global education monitoring report 2023: Technology in education—A tool on whose terms?* UNESCO Publishing. <https://unesdoc.unesco.org/ark:/48223/pf0000385723>
14. World Bank. (2024). *Philippines digital infrastructure and connectivity assessment report*. World Bank Group. <https://www.worldbank.org>
15. World Bank. (2025). *Accelerating digital transformation in education: Expanding connectivity and learning opportunities in developing countries*. World Bank Group. <https://www.worldbank.org>