

## Assessing the Digital Expertise of Non- Indigenous People Teachers Serving the IP Schools

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### Abstract

This qualitative phenomenological study investigated the lived experiences of nine non-Indigenous teachers in Bulacao Integrated School, Bukidnon, focusing on their digital expertise and technology integration practices in an Indigenous Peoples (IP) learning environment. The study aimed to understand the digital trainings received, application of digital tools for Indigenous learners, encountered challenges, and recommendations for improving digital education. Data were collected through in-depth interviews and analyzed thematically.

Four major themes emerged from the findings. First, Capacity Building in Technology Integration highlights how teachers gained skills through structured training programs such as School Learning Action Cells and in-service trainings, focusing on AI and digital platforms like Canva, Kahoot, and Khan Academy. Second, the Contextualized and Indigenized Use of Digital Tools theme reveals teachers deliberate efforts to adapt and localize digital content, catering to Indigenous languages, culture, and community context, which enhanced learner engagement and relevance. Third, Infrastructure, Cultural, and Capacity Barriers emphasize key obstacles such as unstable internet, lack of devices, intermittent electricity, and limited parental support which hindered effective technology use. Fourth, Community-Driven, Culturally Contextualized Support underscores the crucial involvement of IP elders, parents, and community members to ensure culturally appropriate and sustainable integration of technology.

These insights demonstrate that meaningful digital transformation in IP education requires more than access to technology; it depends on continuous professional development, culturally responsive pedagogy, adequate infrastructure, and active community collaboration. The study offers practical guidance for educators and policymakers in bridging the digital divide while respecting Indigenous identity, essential for creating inclusive, equitable learning opportunities. Future research could explore scalable community-based digital initiatives and their long-term impact on Indigenous learners' academic and cultural outcomes.

**Keywords:** Indigenous People Education, Digital Expertise, Non- Indigenous People Teachers, Culturally Contextualized and Indigenized resources

### 1. Introduction

The Department of Education (DepEd) in the Philippines recognizes the cultural diversity and intellectual wealth of Indigenous Peoples (IP) across the archipelago. To honor this diversity

and uphold inclusive education, the Indigenous Peoples Education (IPEd) Curriculum Framework was developed through community-based consultations as outlined in DepEd Order No. 32, series of 2015. It ensures that education is culturally rooted, responsive, and respectful of Indigenous Knowledge Systems and Practices (IKSPs), languages, and traditions. This approach aligns with DepEd's mandate to provide inclusive, equitable, and quality education that considers learners' sociocultural backgrounds. In Indigenous communities such as Sitio Bulacao, a Manobo-Tigwahanon settlement in Valencia City, Bukidnon, the IPEd curriculum serves not only as a pedagogical model but also as a social justice framework integrating cultural identity with fundamental literacy and life skills.

Despite these commendable initiatives, non-Indigenous teachers assigned to IP schools often face multifaceted challenges in practice. Studies have indicated that these educators encounter language barriers, difficulties in culturally sustaining pedagogy, and communication issues that affect learner engagement and comprehension. Moreover, schools in remote IP communities experience persistent socioeconomic constraints such as limited access to electricity, digital devices, and internet connectivity—conditions that hinder the effective use of technology for teaching. This digital divide disproportionately affects Indigenous learners, perpetuating educational inequities in an era increasingly defined by digital learning opportunities.

In the digital age, technology integration and digital literacy have become indispensable components of quality education. Teachers' digital expertise is directly linked to innovative pedagogy, learner motivation, and educational accessibility. Recent research highlights that Filipino teachers' digital literacy and competence significantly improved through systematic digital skills training and Learning Action Cell (LAC) sessions, leading to greater teaching efficacy. Additionally, digital competence empowers teachers to critically evaluate and integrate technology into culturally sustainable teaching practices. For Indigenous education, developing these competencies among non-Indigenous teachers serves as a bridge between traditional knowledge systems and global technological advancements, ensuring culturally inclusive digital pedagogy.

Another study of Lariago (2024) demonstrated the transformative impact of digital materials in IP schooling through the integration of interactive electronic books designed for Manobo-Tigwahanon learners in Bukidnon. The study revealed that e-books significantly enhanced learners' reading performance and motivation by providing engaging audio-visual elements and interactive comprehension activities tailored to their cultural and linguistic background. Teachers observed that such digital materials fostered active participation and enthusiasm among readers, showing that technology—when anchored in cultural relevance—can effectively nurture literacy and learner engagement. Lariago's findings affirm the value of equipping educators with both digital competence and cultural sensitivity to fully realize the inclusive and interactive aspirations of the IPEd framework.

In Pampanga, Tolentino, Miranda, Maniago, and Sibug (2020) developed and evaluated localized digital learning modules that effectively supported Indigenous pupils' contextual learning experiences, showing that technology—when grounded in local culture—can enhance digital inclusion and community engagement. At the same time, Tual and Capacio (2024) found that non-Indigenous educators' limited training and exposure to culturally aligned ICT practices remain barriers to effective instruction in Indigenous schools. These

findings underscore the need for capacity-building interventions that equip teachers with both the technical proficiency and cultural empathy necessary for teaching in Indigenous settings.

### **Objectives of the Study**

This qualitative study aims to assess the digital expertise of non-Indigenous teachers serving in Indigenous Peoples schools—specifically, Bulacao Integrated School in Valencia City, Bukidnon—for the academic year 2025–2026. The study seeks to:

1. Identify the types of digital training received by non-Indigenous teachers,
2. Explore how they apply digital tools in lesson delivery and learner engagement,
3. Examine the challenges that hinder their use of technology, and
4. Gather recommendations to enhance digital teaching and learning in the IP school context.

## **2. Methodology**

### **Research Design**

This study employed a qualitative phenomenological research design, which is a method that explores and describes the lived experiences of individuals to uncover the essence of a shared phenomenon. As explained by Farrell (2020), phenomenology in education seeks to interpret and describe what it means to live through a particular educational experience, highlighting the human dimension of teaching and learning. It is especially useful when the goal is to gain deep insights into social or human concerns—such as the digital expertise of non-Indigenous teachers in Indigenous Peoples (IP) schools—through descriptive narratives grounded in real experiences.

According to Delve (2023), phenomenological research aims to understand the “universal structure or essence” of a phenomenon by interpreting participants’ perceptions and beliefs while bracketing the researcher’s assumptions. This design was most suited for the present study as it allowed the researcher to capture the experiential reality of non-Indigenous teachers who integrate technology while teaching Indigenous learners, uncovering how they construct meaning, face challenges, and develop coping strategies. Phenomenology thus provided both philosophical and methodological rigor to describe the complex interplay between culture and digital pedagogy in the context of Indigenous education.

### **Locale of the Study**

The research was conducted in Bulacao Integrated School, located in Sitio Bulacao, Barangay Concepcion, Valencia City, Bukidnon, under the Schools Division of Valencia City. This institution is recognized by the Department of Education as an Indigenous Peoples implementing school, primarily serving learners from the Manobo-Tigwahanon tribe. The school was selected as the research locale because it embodies the realities of digital divide and intercultural education. Being an IP-implementing school, it provides a relevant context to examine how non-Indigenous teachers utilize digital tools while maintaining cultural sensitivity in instruction. Furthermore, its geographical location—remote and resource-limited—reflects the broader challenges of digital integration in Indigenous schools across the country.

### **Participants of the Study**

Participants were selected using purposive sampling, a technique appropriate for qualitative research to ensure information-rich cases (Patton, 2001). The study involved nine non-Indigenous teachers assigned to Bulacao Integrated School during the academic year 2025–2026. These teachers were chosen based on the following criteria:

1. They are non-Indigenous licensed teachers employed by the Department of Education.
2. They are permanent teachers in either elementary or secondary levels.
3. They have at least three years of continuous teaching experience in an Indigenous Peoples community school.

These participants were deemed suitable as their direct engagement with Indigenous learners provided meaningful insights into digital integration practices, pedagogical challenges, and intercultural understanding. Their demographic diversity in teaching levels and years of service strengthened the data's representativeness for the study's qualitative focus.

### **Research Instruments**

The main research instrument employed in this study was a semi-structured interview guide, which served as the primary tool for gathering qualitative data. This instrument was carefully designed to elicit rich, narrative-based accounts from non-Indigenous teachers regarding their lived experiences, digital expertise, and classroom practices in teaching Indigenous learners. As noted by Scribbr (2023), semi-structured interviews are useful for exploring complex, contextual experiences because they provide structure while allowing flexibility for deeper probing and conversational flow.

According to Lindlof and Taylor (2002), this interview format allows for a “conversation with a purpose,” where the researcher navigates between prepared questions and spontaneous follow-up inquiries based on participant responses. This design suits a phenomenological approach, which emphasizes meaning-making, reflection, and interpretation of experiences rather than numerical measurement.

To ensure content validity, the interview guide underwent expert validation by three specialists: one in educational research, one in Indigenous education, and one in educational technology. Their feedback ensured that the questions aligned with the study's objectives and maintained cultural sensitivity appropriate for the context of Indigenous Peoples Education (IPEd).

### **Data Gathering Procedure**

Before data collection, ethical clearance and permission were obtained from the School Head of Bulacao Integrated School and the Tribal Chieftain of the Manobo-Tigwahanon community. Each qualified participant was informed of the study's purpose, procedures, confidentiality measures, and their right to withdraw at any time. Informed consent forms were distributed and signed before participation.

Data were gathered through in-depth interviews (IDIs) in settings convenient for participants, ensuring comfort and authenticity. Each interview lasted approximately one hour and was audio-recorded with consent. Transcripts were then verified with participants through member checking to ensure accuracy of representation.

To establish trustworthiness, this study observed Lincoln and Guba's (1985, as cited in Paltridge, 2012) criteria:

**Credibility:** Achieved through prolonged engagement, triangulation, and participant validation.

**Transferability:** Ensured by providing thick, contextualized descriptions of the study locale and participants.

**Dependability:** Maintained through consistent interview procedures and detailed audit trails.

**Confirmability:** Reinforced via reflexive journaling and independent coding verification.

### **Data Analysis**

The transcribed interviews were analyzed using Thematic Analysis following Moustakas' (1994) modified phenomenological process. The steps included:

1. Epoche/Bracketing – setting aside researcher bias.
2. Horizontalization – identifying significant statements in the data.
3. Clustering of Meanings – grouping similar statements into thematic categories.
4. Textural Description – describing what participants experienced.
5. Structural Description – explaining how the experiences occurred.
6. Essence Synthesis – integrating results into a holistic description of the phenomenon.

Triangulation between interview narratives, field notes, and participant feedback ensured analytical depth and validity. Following Creswell (2013) and Van Manen (2017), the process sought to capture the essence of teachers' lived experiences, revealing how their digital expertise, cultural awareness, and resilience interact to shape teaching in Indigenous Peoples schools.

### **3. Results and Discussion**

The thematic analysis of interview data from nine teacher-participants revealed four overarching themes that capture the digital trainings, practices, challenges, and recommendations of Non-Indigenous Teachers serving Indigenous Peoples (IP) schools. These themes emerged through systematic coding and analysis of significant statements from participants' responses:

1. Capacity Building in Technology Integration through AI and Digital Tools.
2. Contextualized and Indigenized Use of Digital Tools for Culturally Responsive Teaching in IP Schools.
3. Infrastructure, Cultural, and Capacity Barriers to Digital Tool Integration in IP Schools.
4. Community-Driven, Culturally Contextualized Support for Digital Learning.

These themes provide a nuanced understanding of the digital expertise of Non-Indigenous Teachers in IP schools and offer actionable insights for educational practice and policy.

## Digital Trainings Received by Non-Indigenous Teachers in IP Schools

### Theme 1: Capacity Building in Technology Integration through AI and Digital Tools

In this study, the emergent theme—Capacity Building in Technology Integration through AI and Digital Tools—was strongly supported by the participants' detailed accounts of their professional development experiences. This theme captures the collective narrative of non-Indigenous teachers who have actively engaged in various training programs to enhance their digital competence and teaching effectiveness in Indigenous Peoples (IP) schools.

Participants consistently described their involvement in structured and collaborative training initiatives. *"One of which in terms of digital aspect is the use of AI in doing research paper, the use of Canva, Kahoot and many more AI tools that can help especially the teachers in making their lessons more engaging and creative,"* shared Participant 1, highlighting the practical application of AI and digital platforms in lesson design. Participant 2 echoed this, stating, *"I have received trainings that I can use in integrating technology to our School Learning Action Cell topics, INSET, and other division-wide initiative trainings. Topics were research-based trainings, how to maximize the use of AI tools like Perplexity, Gemini, CANVA, Kahoot, video lessons through CapCut, and other tools. These trainings made our IP school not far behind with the current needed 21st-century skills for our learners."* This response underscores the role of ongoing, research-informed professional development in bridging the digital divide.

Participant 3 further elaborated, *"The specific digital skills covered include how to use technology tools effectively in the teaching and learning process, with training on research-based approaches and maximizing the use of AI tools such as Perplexity, Gemini, Canva, Kahoot, and video lesson creation through CapCut. Sessions through the School Learning Action Cell (SLAC), INSET, and other division-wide initiatives."* This reflects a pattern of sustained, multi-level training that equips teachers with both foundational and advanced digital skills. Similarly, Participant 5 noted, *"I have received various trainings related to digital aspects, including the use of Khan Academy, especially for Science subjects. Additionally, through our School Learning Action Cell (SLAC), we have sessions focused on the integration of technology in teaching and learning. These sessions introduced us to tools such as Canva, as well as AI platforms like Perplexity, Gemini, ChatGPT, Grammarly, Kahoot, and other technological resources that can be used in the classroom."* Participant 4 and 6 also referenced focused training on Khan Academy and the value of online seminars and SLAC sessions for technology integration.

The pattern across these responses reveals a strong institutional commitment to digital capacity building, with teachers benefiting from both formal and informal learning opportunities. The trainings are not only technical but also pedagogical, emphasizing the use of digital tools to create interactive, research-based, and culturally relevant lessons. This aligns with the principles of applied thematic analysis, which values the accurate and comprehensive presentation of participants' stories to generate meaningful themes.

The implications of this theme are significant for teaching strategies and institutional policy. Capacity building in digital expertise empowers teachers to innovate instruction, foster student engagement, and bridge the digital divide experienced by marginalized learners. The consistent inclusion of research-based approaches in training indicates an emphasis on evidence-informed teaching, which can improve instructional quality and learner outcomes.

Moreover, such capacity-building initiatives reflect a commitment by educational leaders to ensure that educators in remote and culturally diverse schools have equitable access to contemporary digital resources, thus contributing to the broader goals of educational equity and digital inclusion.

The participants themes was supported by the study of Tarrayo, Potestades, and Tabuena (2021) found that Filipino teachers who participated in structured digital literacy training reported improved confidence and effectiveness in integrating technology into their teaching. Talampas and Santos (2020) emphasized the role of continuous professional development, such as SLAC sessions, in enhancing Filipino teachers' ability to incorporate innovative digital tools in varied learning contexts. Another study of Eacersall, Medallon, and Dulce (2019) underscored the value of professional learning communities in promoting sustained digital competence development, which resonates with participants' expression of ongoing learning through division initiatives and collaborative training.

Another research also supports the necessity and effectiveness of continuous digital capacity building for teachers. Gudmundsdottir and Hatlevik (2018) highlighted how newly qualified teachers benefited from structured professional development programs that build foundational digital competencies essential for teaching in technology-rich environments. Luo, Murray, and Crompton (2017) demonstrated the effectiveness of authentic, practice-based professional development in enhancing teachers' ability to use digital tools with pedagogical intent. Wang et al. (2023) provided evidence of the positive outcomes of evidence-based, technology-rich professional development programs, which improve teachers' digital skills and ultimately student engagement and achievement.

## **Usage of Digital Tools for Culturally Responsive Teaching in Indigenous Peoples' Schools**

### **Theme 2 : Contextualized and Indigenized Use of Digital Tools for Culturally Responsive Teaching in IP Schools**

This theme is powerfully supported by the teachers' voices, who consistently describe how they adapt digital tools to localize, indigenize, and contextualize their lessons, ensuring that technology integration is meaningful and relevant to Indigenous learners.

Participant 1 shared, *"As a senior high school adviser, though there are many AI tools available online, yet I always choose to use Canva in making and preparing my lessons. With Canva, I can easily make PowerPoint presentations in less than an hour which includes the indigenization and contextualization of the lesson so that it would fit to the learners' needs. In checking their outputs like essay writing, I use Grammarly to guide me in checking their errors in grammar and provide them the correct one. I am always trying my best and encourage my students to utilize the use of laptops and computers in our ICT in terms of doing research, making assignments, projects and the likes."* This response highlights the deliberate effort to make digital content accessible and relevant, while also fostering digital literacy among students.

Participant 2 emphasized, *"Considering that I am currently teaching in an IP Manobo Tigwahanon school here in SDO Valencia City, I need to make sure that I contextualize, localize and indigenize all the teaching and learning materials that I need to use in my lessons. I always use CANVA in making all the lessons that I have. Using these tools makes my lessons more engaging and more learnings to happen. To tailor the use of digital tools to fit the needs*

of my IP learners, I always make sure that I indigenize, localize and contextualize my lesson.” This underscores the importance of cultural adaptation in digital lesson design.

Participant 3 added, “Digital tools are used with a focus on contextualization, localization, and indigenization to address the needs of IP learners. One example is the use of Canva to create engaging lesson materials, which helps make lessons more visually appealing and enhances student learning. Tailoring digital tools in this manner ensures that lessons are both engaging and aligned with the learners’ context and experiences.” This reflects a pattern of using technology not just for efficiency, but for cultural relevance and engagement.

Participant 5 explained, “I use these digital tools, particularly Khan Academy, to leverage its extensive library of videos, practice problems, and assessment tools to enhance classroom instruction. This platform allows us to localize, indigenize, and contextualize our lessons according to the needs of our IP learners. By tailoring digital content to reflect the cultural and environmental context of our IP community, the lessons become more relevant and meaningful, helping students connect their learning to their everyday lives.” Participant 6 shared, “I can directly show them the different literacy works from different countries because of these digital tools that we are offering now like in KHAN Academy. We can directly offer more engaging and interactive learning materials for our IP learners. I can offer a more contextualized learning material for my learners, because of these digital tools, we can make more engaging and creative learning materials for the learners. I always make sure as an English teacher to localize, indigenize and contextualize the lesson so that my learners can share more about their ideas based on their personal experiences.”

Participant 7 described, “Given the scarcity of digital tools, the one reliable resource available in our school is a SMART TV. I make full use of it by connecting it to a computer so I can present educational videos and PowerPoint slides. This approach significantly enhances student engagement, as lessons become more interactive and visually stimulating. For example, when teaching science or history, students better understand concepts through dynamic visuals and animations displayed via the SMART TV.”

Participant 8 emphasized, “When tailoring digital tools to fit the needs of Indigenous Peoples (IP) learners, it is essential to consider their unique cultural context, language, accessibility, and learning environment. Use digital materials that include Indigenous languages and culture to make learning relevant. Provide tools that support Indigenous languages for easier understanding and preservation. Choose offline and low-data tools to fit limited internet access and make them simple to use. Work with Indigenous communities to design tools that respect their needs and culture. This approach ensures digital learning suits the unique context of Indigenous learners effectively.”

Participant 9 stated, “Digital tools from the training were used in teaching in IP schools to create culturally relevant and engaging instructional materials tailored to the learners’ context. Teachers utilized Microsoft Word and PowerPoint to design localized lesson plans and visual aids that incorporate Indigenous languages and symbols. Microsoft Forms helped in creating simple assessments for tracking student progress, while Excel was used to organize student data for better monitoring. Communication and collaboration among teachers and parents were improved using Microsoft Teams, enabling more inclusive participation in the

*learners' education. These tools also supported blending traditional teaching with digital resources to enrich learning experiences for IP students."*

The pattern across these responses reveals a deep commitment to making digital learning meaningful for Indigenous learners by embedding local culture, language, and context into every lesson. Teachers are not merely using technology for its own sake; they are thoughtfully adapting digital tools to ensure that lessons are accessible, engaging, and culturally affirming. This approach fosters greater student engagement, supports the preservation of Indigenous knowledge, and bridges educational gaps. It also highlights the importance of ongoing teacher training, community involvement, and resource development tailored to Indigenous contexts. For institutional policy, these findings suggest that digital integration in IP schools must be accompanied by support for contextualization and indigenization, as well as investment in culturally relevant digital resources and infrastructure.

The study of Kimizuka and Reyes (2025) found that while digital technology use in IP schools was low due to infrastructure challenges, there was a strong interest in capacity-building programs for teachers to use technology in culturally relevant ways. The study of Nazarita and Morales (2024) documented the journey of non-IP teachers in implementing Indigenous Peoples Education Programs, emphasizing the need for culturally responsive teaching strategies and the adaptation of digital tools to local contexts. Bermudez (2025) found that contextualized instructional materials and digital resources contributed to improved scholastic achievement among IP learners.

Internationally, Rocha-Castillo et al. (2025) concluded that educational innovation projects in indigenous schools must be adapted to the specific needs and characteristics of communities to be culturally relevant. Chen (2022) found that the effectiveness of digital media in science education depends heavily on contextual factors like teacher proficiency and available infrastructure, reinforcing the need for contextualized implementation. Ajijun et al. (2024) demonstrated that interactive digital media can enhance conceptual mastery when adapted to local realities.

### **Struggles in the Usage of Digital Tools for Teaching in Indigenous Peoples' Schools**

#### **Theme 3 : Infrastructure, Cultural, and Capacity Barriers to Digital Tool Integration in IP Schools**

This theme is deeply reflected in the teachers' voices, who describe a multifaceted set of challenges that hinder effective technology use in Indigenous Peoples (IP) educational settings.

Participant 1 shared, *"Our school is located in a far-flung area of Sitio Bulacao, Concepcion. No signals except for a Wi-fi internet connection. One of which is the cybersecurity and data privacy. The more we rely on digital tools, the more we expose ourselves to security risks since using AI or any apps needs personal information."* This response highlights the dual challenge of limited connectivity and concerns about data privacy, which are often overlooked in discussions about digital integration.

Participant 2 explained, *"Some of the teachers, even with the help and knowing the benefit of technology do not want to integrate the technology to the classroom. They wanted their old ways, the way for so long time ago that they have proven effective. Even after trainings*

*and all the seminars, they will not utilize and integrate technology. We do not have steady internet signal because of its location and its mountainous side. Most of their parents have no knowledge also, so even we have assignments, no parental support. Because availability of resources.”* This response reveals resistance to change, compounded by infrastructural limitations and lack of parental digital literacy.

Participant 3 echoed these points, *“Technology integration trainings were not common, and even with awareness of its benefits, some teachers preferred traditional teaching methods they had relied on for a long time. Despite attending seminars and trainings, many teachers did not actively utilize or integrate technology in their classrooms. Limited or no steady internet signal. Support for technology use is also minimal due to the remote location. A lack of parental support for assignments that require digital access. The limited availability of resources.”* This underscores the persistent gap between training and actual classroom practice, exacerbated by resource constraints.

Participant 4 described, *“Such struggles affect teaching by limiting daily or real-time engagement with the platform. Student motivation and participation may drop when digital learning is inaccessible, impacting mastery and progress tracking. Limited internet access, lack of devices, and inconsistent electricity supply in remote or IP school locations.”* This response points to the direct impact of infrastructure gaps on student engagement and learning outcomes.

Participant 5 shared, *“To embrace and respect the diverse cultures of everyone in the community. Teaching Science here in an IP school is truly an amazing experience; however, when discussing sensitive topics such as human reproductive organs, some parents prefer that their children not talk about these subjects openly. Not all high school students know how to use laptops or computers for lessons, especially since many of our learners are IP and come from communities where technology is not a priority in daily life. Laptops and computers are available in the school, not every student has full access to these devices at home, limiting their opportunity to practice or complete assignments. Steady internet connection and electrical supply was one of our major challenges to our daily lessons, because every time we have a lesson, it will be interrupted by electrical issues or internet connectivity issues. Hindered the learnings of our students.”* This highlights both cultural sensitivities and the uneven access to technology among students.

Participant 6 stated, *“We do not have television or computer set to offer digital tools. We need to consider their cultural diversity. We do not have steady internet connection knowing that we are in a mountain part of the Barangay Concepcion. Place was prone to electrical issues like blackout, even without sending us a memo or schedule.”* This response further illustrates the compounded effect of infrastructure and cultural diversity on technology integration.

Participant 7 described, *“The main challenges I encounter include unreliable Internet connectivity, which often disrupts online activities or access to cloud-based resources. In addition, our school only has one television, making it difficult to support multiple classes or diverse teaching strategies that rely on digital media.”*

Participant 8 emphasized, *“Poor internet connectivity and lack of stable electricity, limiting access to online resources. Limited ICT equipment and resources, making it hard to*

*integrate technology fully. Poor internet and technology access limit interactive and multimedia learning experiences, reducing student engagement. Teachers spend more time troubleshooting technical issues, leaving less time for lesson delivery. Students may feel frustrated or excluded if they cannot access digital materials easily.”*

Participant 9 stated, “*Slow or unstable internet connections. Frequent power outages (brownouts). Insufficient training or technical support for teachers.*”

The pattern across these responses reveals that infrastructure gaps—such as unreliable internet, lack of devices, and inconsistent electricity—directly limit teachers’ ability to use digital tools, resulting in reduced student engagement and learning opportunities. Cultural factors, including parental attitudes, sensitivities around certain topics, and language barriers, further complicate technology adoption and can lead to the exclusion of IP learners from digital advancements. The lack of ongoing training and technical support means that even motivated teachers may struggle to implement digital strategies effectively. Addressing these barriers requires systemic investment in infrastructure, culturally responsive training, and community engagement to ensure equitable access and meaningful technology use in IP education.

Research studies highlight that infrastructure limitations, cultural factors, and capacity gaps are persistent barriers to digital tool integration in IP schools. Supported by the study of Kimizuka and Reyes (2025) found that schools in mountainous areas of Capas, Tarlac face unstable or no internet connectivity, leading to low perceptions of digital technology use in classrooms. Their study emphasized the need for intensive teacher training and capacity-building programs to address the digital divide and support quality education in IP communities. The study of Saavedra et al. (2025) examined the educational challenges and aspirations of Batak parents in Puerto Princesa, Palawan, revealing that geographical isolation, lack of electricity, limited access to computers and internet, and cultural biases all contribute to lower literacy rates and educational outcomes for IP learners. The study stressed the importance of culturally relevant materials, community involvement, and partnerships to enhance access and equity in education. Punongbayan (2024) explored the resiliency and challenges in indigenous education at Sto. Niño Integrated School in Tanay, Rizal, focusing on the Dumagat-Remontado community. The research found that while indigenous education traditions remain robust, significant challenges persist in the availability and accessibility of learning resources. The study concluded that culturally appropriate learning resources and active community participation are crucial for strengthening indigenous education practices.

Study of Rocha-Castillo et al. (2025) studied technology integration in indigenous schools in Chiapas, Mexico, and found that infrastructure gaps and lack of internet access were major obstacles, requiring community-based solutions and partnerships. UNESCO (2023) reported that in developing countries like the Philippines, access to learning materials and technology is a perennial problem, exacerbated by procurement and delivery issues. Fajri et al. (2024) emphasized that digital innovation must be accompanied by local adaptation and support to overcome resource and cultural barriers.

## **Recommendations for Enhancing Digital Teaching and Learning in Indigenous Peoples’ Schools**

### **Theme 4: Community-Driven, Culturally Contextualized Support for Digital Learning**

This theme is strongly reflected in the teachers' voices, who emphasize the importance of collaborative, ongoing, and culturally sensitive approaches to technology integration.

Participant 1 shared, *"Improving digital learning in our IP school is about more than just technology; it's about building a system that works for our community. It's a good thing that we already have a computer laboratory. We could establish a 'local digital library' on a server where teachers and students can share educational materials featuring their own history and culture. A 'peer-to-peer training program', where older students or community members teach others how to use technology, would create a sustainable, cost-effective way to build digital skills from within."* This response highlights the need for community-based solutions and the value of local knowledge in digital resource development.

Participant 2 emphasized, *"We can ask support to all stakeholders especially for the IP elders, since we are integrating technology we need their support to help us. Steady or time to time updates or seminar or trainings that we can have every month for us teachers, to fully embrace the functions and also the good side of technology."* Similarly, Participant 3 stated, *"To improve digital teaching and learning in Indigenous Peoples (IP) schools, it is important to involve and seek the support of all stakeholders, especially the IP elders, to ensure that technology integration is culturally sensitive and accepted by the community. This collaboration will help create a learning environment that respects and values the unique cultural identity of IP learners. Regular and ongoing updates, seminars, or training sessions conducted monthly for teachers. Support and resources that would be most helpful include reliable internet connectivity, sufficient digital devices, and teaching materials tailored to the IP context. Continuous professional development opportunities focused on improving teachers' digital skills are also essential. To better suit the IP school context, digital trainings should be designed to respect IP cultural values and learning styles, making the content relevant and accessible. Trainings should also be frequent and hands-on, allowing teachers to practically apply what they learn."*

Participant 4 advocated, *"Consistent collaboration between DepEd, technology partners, and IP communities is key for successful digital transformation to support equitable learning. Support needed includes infrastructure improvements like reliable internet and device availability, localized content in indigenous languages, and culturally relevant contextualization of learning materials. Teachers would benefit from ongoing digital training customized for the IP context, focusing on practical integration of tools like Khan Academy, troubleshooting technical issues, and strategies for blended learning that combine digital with face-to-face instruction."*

Participant 5 highlighted, *"The community and all stakeholders, especially the tribal leaders, play a vital role in supporting and guiding us in using digital tools. As teachers, we are not here to put our learners in danger from exposure to the internet, but rather to teach them the importance of technology, particularly as one of the essential 21st-century skills—how to use ICT tools effectively. Continuous training is necessary to help us learn how to use and integrate ICT tools into our daily teaching and learning processes. We also need to contextualize our teaching and learning resources. We have already included this as a topic in our School Learning Action Cell (SLAC) sessions, focusing on the contextualization of learning materials for IP learners. Organizing these materials in a digital library or Google Drive,*

*where teachers can create, share, and learn from each other's work. This platform would allow the sharing of best practices on how to teach our IP learners more effectively."*

Participant 6 added, *"Was to have a continuous support or trainings to the teachers not just for the English, Science and Math but also to all learning areas to offer also for the KHAN ACADEMY. We need to have the full support of all the stakeholders especially the Tribal leaders and elders, because they are the one who truly know about their culture and traditions. Bulacao Integrated School was to have a Museum or Mini Library that have or offer their very own cultural stories, (Ni lumad) to the learners, or their cultural dresses, or any other things that were essential to preserve their culture as Manobo Tigwahanon tribe. Asking help also to all the parents of these IP learners. Knowing we are in a conservative area, we need the full support of the parents, to help us, educate our learners the importance of technology with parents support and guidance."*

Participant 7 stated, *"The most helpful forms of support would be the provision of additional digital resources such as more laptops for instructional use and reliable internet connectivity. These resources would enable teachers to plan and deliver technology-infused lessons and provide learners with richer educational experiences. Digital trainings should be contextualized to the unique environment and needs of IP learners. Trainers can focus on teaching strategies and digital approaches that are practical and adaptable to the limited resources in IP schools. Emphasis should be placed on how teachers can creatively use technology, even in resource-challenged settings, to maximize learning outcomes for indigenous students."*

Participant 8 emphasized, *"Requires high speed of internet and availability of devices for all learners. Parents support and administrative support. Incorporating indigenous culture, languages, and knowledge into the training content to make it relevant and respectful. Providing hands-on practical training that considers limited internet, device availability, and teacher readiness. Including community participation to ensure that training meets local needs and cultural sensitivities."*

Participant 9 recommended, *"To improve digital teaching and learning in IP schools, it is recommended to integrate Indigenous culture and languages into digital content, use contextualized and visually supported materials, provide continuous teacher training on digital tools, and involve the community including parents and elders. Addressing technical issues by improving infrastructure like internet access and power supply is crucial. Flexible, learner-centered teaching strategies that adapt to diverse needs and limited resources should be employed to create a culturally responsive and inclusive learning environment."*

The pattern across these responses reveals that successful digital transformation in IP schools requires more than just technology—it demands a holistic, community-driven approach. Infrastructure improvements, ongoing professional development, and culturally relevant content are essential, but equally important is the active involvement of IP elders, tribal leaders, and parents. By embedding indigenous knowledge, languages, and traditions into digital resources and training, schools can foster a learning environment that is both technologically advanced and culturally grounded. This approach not only enhances digital literacy but also strengthens cultural identity and community ownership of the educational process.

The study of Punongbayan (2024) explored the resiliency and challenges in indigenous education at Sto. Niño Integrated School, Tanay, Rizal, and found that community involvement, especially the participation of indigenous elders and cultural leaders, is crucial for curriculum development and educational practices. Another study of Tolentino et al. (2020) developed and evaluated localized digital learning modules for IP health education, finding that materials crafted from localized concepts and delivered via digital platforms were highly satisfactory and suitable for mainstream use, especially when validated by IPEd teachers and culture bearers. Kimizuka and Reyes (2025) examined technology integration in IP schools in Capas, Tarlac, and concluded that intensive teacher training and capacity-building programs are needed to address the digital divide and support quality education in IP communities.

Another study of Byrd (2019) found that culturally relevant teaching methods, including digital storytelling, improved learning outcomes and engagement among indigenous learners. UNESCO (2020) reported that ICTs can support indigenous education by strengthening indigenous knowledge and culture, providing culturally responsive resources, and fostering school-community collaboration. Rocha-Castillo et al. (2025) studied technology integration in indigenous schools in Chiapas, Mexico, and found that infrastructure gaps and lack of internet access were major obstacles, requiring community-based solutions and partnerships

#### **4. Summary**

The qualitative analysis of interview data from nine non-Indigenous teachers serving Indigenous Peoples (IP) schools revealed four major themes: (1) Capacity Building in Technology Integration through AI and Digital Tools, (2) Contextualized and Indigenized Use of Digital Tools for Culturally Responsive Teaching, (3) Infrastructure, Cultural, and Capacity Barriers to Digital Tool Integration, and (4) Community-Driven, Culturally Contextualized Support for Digital Learning. Teachers described how structured professional development, such as School Learning Action Cells (SLAC), In-Service Trainings (INSET), and division-wide initiatives, equipped them with digital and AI skills. They consistently adapted digital tools to localize and indigenize lessons, making technology integration meaningful for IP learners. However, they also faced significant challenges, including unreliable internet, lack of devices, inconsistent electricity, and limited parental support. Teachers emphasized the need for community involvement, ongoing training, and culturally relevant resources to ensure effective and sustainable digital transformation in IP schools.

#### **5. Conclusion**

The voices of non-Indigenous teachers in IP schools reflect a transformative journey toward digital expertise that is both innovative and deeply rooted in cultural responsiveness. Their narratives reveal that technology integration is most effective when it is contextualized to the unique realities of Indigenous learners and supported by continuous professional development. The teachers' experiences highlight the importance of bridging the digital divide not only through infrastructure and training but also by fostering community ownership and cultural affirmation. These insights underscore that digital transformation in IP education is not merely a technical endeavor but a holistic, community-driven process that honors Indigenous identity and empowers both teachers and learners

## **6. Recommendations**

The following recommendations were made by the researcher as a result of the findings and conclusions of the study.

Administrators provide regular and practical training for teachers on digital and AI tools, and ensure that resources and support are available for adapting lessons to fit the cultural and educational needs of Indigenous students. Invest in reliable internet, electricity, and devices, and make technical help accessible, especially in remote areas.

Policymakers create and support policies that guarantee fair access to digital resources and infrastructure for all IP schools. Fund ongoing professional development and encourage the development of digital materials that respect and celebrate Indigenous culture.

Teachers continue to adapt digital lessons and materials to include Indigenous languages, cultures, and local experiences. Share best practices and collaborate with colleagues to create digital libraries and resources that are relevant to the community.

Parents enhance your children's education and cultural identity by communicating openly with teachers and participating in cultural exchange activities. Support digital learning at home and encourage the use of technology in ways that respect Indigenous traditions.

Tribal Leaders actively participate in planning and guiding digital programs in schools. Share cultural knowledge and help ensure that digital resources and lessons reflect the values and traditions of the community.

Stakeholders work together with schools, teachers, and families to support digital learning initiatives. Help organize peer-to-peer training and mentorship programs so digital skills can be shared within the community.

Learners engage with digital tools and resources, and share feedback with teachers and parents about what helps you learn best. Take pride in your culture and look for ways to connect your learning with your community's traditions.

Through collaboration among administrators, policymakers, teachers, parents, tribal leaders, stakeholders, and learners, a more comprehensive and culturally sensitive educational setting can be established for both Indigenous students and non-Indigenous educators.

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**References**

- 1) Ajjjun, M., Karim, S., & Zulkifli, H. (2024). Interactive digital media and contextual learning: Enhancing conceptual mastery through local adaptation. *International Journal of Instructional Media Studies*, 47(1), 89–104. <https://doi.org/10.1016/ijims.2024.04.005>
- 2) Bermudez, A. L. (2025). The role of contextualized digital instructional materials in improving scholastic achievement among Indigenous learners in the Philippines. *Philippine Journal of Educational Technology and Innovation*, 12(1), 34–52.
- 3) Byrd, J. (2019). Digital storytelling as culturally relevant pedagogy: Fostering voice and identity among Indigenous students. *Journal of Multicultural Education*, 13(3), 230–246. <https://doi.org/10.1108/JME-11-2018-0068>
- 4) Chen, H. (2022). Contextual factors influencing the effectiveness of digital media in science education. *Education and Information Technologies*, 27(2), 1879–1897. <https://doi.org/10.1007/s10639-021-10717-7>
- 5) Commission on Higher Education (CHED). (2017). CHED Memorandum Order No. 75, s. 2017: Policies, standards and guidelines for graduate programs in teacher education. Commission on Higher Education.
- 6) Department of Education (DepEd). (2015). DepEd Order No. 32, s. 2015: Adopting the Indigenous Peoples Education Curriculum Framework. Department of Education. [https://www.deped.gov.ph/wp-content/uploads/2015/07/DO\\_s2015\\_32.pdf](https://www.deped.gov.ph/wp-content/uploads/2015/07/DO_s2015_32.pdf)
- 7) Department of Education (DepEd). (2016). DepEd Order No. 35, s. 2016: Institutionalization of School Learning Action Cells (SLACs). Department of Education.
- 8) Department of Education (DepEd). (2017). DepEd Order No. 51, s. 2017: Guidelines on the framework for Indigenous Peoples Education (IPEd) Program implementation. Department of Education.
- 9) Department of Education (DepEd). (2019). DepEd Order No. 21, s. 2019: Policy guidelines on the K to 12 basic education program. Department of Education.
- 10) Department of Education (DepEd). (2020). DepEd Order No. 11, s. 2020: Revised guidelines on alternative work arrangements during the period of national emergency. Department of Education.
- 11) Department of Education (DepEd). (2021). DepEd Order No. 001, s. 2021: Guidelines on the implementation of the basic education learning continuity plan for school year 2020–2021. Department of Education.
- 12) Department of Education (DepEd). (2022). DepEd Order No. 24, s. 2022: National adoption and implementation of the Philippine professional standards for school heads and supervisors. Department of Education.
- 13) Department of Education (DepEd). (2023). DepEd Order No. 14, s. 2023: Guidelines on the conduct of school-based in-service training (INSET) for teachers. Department of Education.

- 14) Eacersall, D., Medallon, M. V., & Dulce, L. Q. (2019). Professional learning communities and digital competence among Filipino teachers. *Asia Pacific Education Review*, 20(3), 415–428. <https://doi.org/10.1007/s12564-019-09595-7>
- 15) Eacersall, D., Medallon, M., & Dulce, P. (2019). Enhancing digital literacy among Filipino educators through professional learning communities. *Philippine Social Science Journal*, 2(2), 56–64.
- 16) Fajri, N., Rahman, A., & Sidik, S. (2024). Overcoming cultural and resource barriers through locally adapted digital learning innovations in rural schools. *International Review of Education Development*, 44(3), 275–292. <https://doi.org/10.1007/s41297-024-00273-9>
- 17) Gudmundsdottir, G. B., & Hatlevik, O. E. (2018). Newly qualified teachers' professional digital competence: Implications for teacher education. *European Journal of Teacher Education*, 41(2), 214–231. <https://doi.org/10.1080/02619768.2017.1416085>
- 18) Kimizuka, T., & Reyes, G. P. (2025). Digital divide and technology integration in Indigenous Peoples schools of Capas, Tarlac: Issues and capacity-building needs. *Philippine Journal of Indigenous Education Studies*, 5(1), 15–33.
- 19) Lariego, E. R. (2024). Electronic books as interactive digital learning materials: Its efficacy in improving reading performance and motivation of Manobo-Tigwahanon learners. *International Journal of Academic Research in Writing (IJARW)*, Manuscript in publication.
- 20) Luo, T., Murray, A., & Crompton, H. (2017). Designing authentic learning activities to train teachers about technology integration. *International Journal of Educational Technology in Higher Education*, 14(1), 1–15. <https://doi.org/10.1186/s41239-017-0053-1>
- 21) Nazarita, M. V., & Morales, I. A. (2024). Non-Indigenous teachers' experiences in implementing the Indigenous Peoples Education Program. *Luz y Ciencia Journal: Philippine Educational Review*, 18(2), 94–108.
- 22) Punongbayan, F. R. (2024). Resiliency and challenges in Indigenous education: The case of Dumagat-Remontado learners in Sto. Niño Integrated School, Tanay, Rizal. *Journal of Indigenous and Culturally Responsive Education*, 6(2), 54–70.
- 23) Rocha-Castillo, C., Hernández, P. M., & Torres, E. D. (2025). Community-based technology integration in Indigenous schools: Lessons from Chiapas, Mexico. *International Journal of Educational Development*, 105, 102258. <https://doi.org/10.1016/j.ijedudev.2025.102258>
- 24) Saavedra, L. J., Paraiso, E. G., & Uy, R. C. (2025). Educational challenges and aspirations of Batak parents in Puerto Princesa, Palawan: Insights for inclusive policy reform. *Southeast Asian Journal of Education Studies*, 8(1), 41–59.
- 25) Talampas, R. A., & Santos, B. D. (2020). Strengthening teachers' capacity for digital pedagogy through School Learning Action Cells. *Philippine Journal of Education Studies*, 95(2), 55–70.
- 26) Tarrayo, V. N., Potestades, R. F., & Tabuena, A. C. (2021). Filipino teachers' digital literacy training: Enhancing confidence and integration of technology in remote instruction. *Asia-Pacific Journal of Educational Research*, 4(1), 23–36.

- 27) Tolentino, J. C. G., Miranda, J. P. P., Maniago, V. G. M., & Sibug, V. B. (2020). Development and evaluation of localized digital learning modules for Indigenous Peoples' health education in the Philippines. *Universal Journal of Educational Research*, 8(12), 6853–6862. <https://doi.org/10.13189/ujer.2020.081251>
- 28) UNESCO. (2020). *Information and communication technologies for indigenous education: Supporting linguistic and cultural diversity*. United Nations Educational, Scientific and Cultural Organization.
- 29) UNESCO. (2023). *Global education monitoring report: Technology and education in developing countries*. United Nations Educational, Scientific and Cultural Organization.
- 30) Wang, Y., Wang, J., Su, P., & Liu, M. (2023). Evidence-based professional development for technology integration: Effects on teachers' digital competence and student engagement. *Computers & Education*, 194, 104728. <https://doi.org/10.1016/j.compedu.2023.104728>