

Integration of Technology in Teaching and Learning in Island Communities

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ABSTRACT

This study examined the level of technology integration in teaching and learning among teachers and students in island communities in the District of Catbalogan X, Schools Division of Catbalogan City during the School Year 2025–2026. Using a quantitative-descriptive research design with correlational and comparative analyses, data were gathered from elementary teachers and Grade 6 students through validated survey instruments. Findings revealed significant differences between teachers' and students' assessments across all dimensions of technology integration in teaching and learning. No significant relationship was found between teachers' self-assessment and students' assessment of technology integration in teaching, indicating perceptual gaps between the two groups. However, significant relationships were identified between teachers' technology integration practices and student engagement, use of technology in learning activities, and support for personalized and self-directed learning. Teachers' attitude toward technology, years of teaching experience, and participation in ICT-related training significantly influenced their level of technology integration. Teachers reported high levels of challenges, particularly limited access to technological equipment, while students identified unstable internet connectivity as their primary concern. The findings underscore the need to strengthen digital infrastructure, enhance professional development opportunities, and establish mechanisms that align teacher practices with student learning experiences to improve technology integration in island schools.

Keywords: Technology Integration, Digital Learning, Island Communities, Educational Technology, Teacher Perceptions, Student Engagement

INTRODUCTION

The rapid advancement of digital technologies has transformed educational systems worldwide, making technology integration an essential component of effective teaching and learning. In contemporary educational environments, technology is no longer viewed merely as a supplementary instructional tool but as a critical mechanism for enhancing learner engagement, facilitating collaboration, promoting personalized learning, and developing twenty-first-century skills. Educational institutions increasingly utilize digital platforms, multimedia resources, and interactive technologies to create more flexible, accessible, and learner-centered learning environments. Research has consistently demonstrated that meaningful technology integration can improve instructional effectiveness and student learning outcomes when aligned with sound pedagogical practices (Czerkowski & Bicen, 2021; Koehler et al., 2020).

Despite these advances, the benefits of educational technology remain unevenly distributed. Significant disparities continue to exist in terms of access to digital resources, internet connectivity, technological infrastructure, and teacher preparedness, particularly in geographically isolated and disadvantaged communities. According to van Dijk's (2020) Digital Divide Theory, inequalities in technology use extend beyond physical access to include differences in digital competencies, utilization patterns, and institutional support systems. Consequently, learners and teachers in remote educational settings often face greater barriers to effective technology integration than their counterparts in urban and well-resourced schools.

In the Philippines, technology integration has become a strategic priority in educational reform initiatives. The Department of Education (DepEd) has implemented various programs and policies aimed at strengthening digital

learning, recognizing technology as a key factor in improving educational quality and learner outcomes. Technology integration is conceptualized as the purposeful alignment of technological tools, pedagogical approaches, and curriculum content to enhance teaching effectiveness and student learning (Koehler et al., 2020). Empirical evidence suggests that effective technology integration promotes student engagement, collaboration, critical thinking, and academic achievement when accompanied by adequate teacher training and institutional support (Lyu & Liu, 2022). However, national trends often conceal substantial disparities among regions and school contexts, particularly in geographically isolated island communities where technological resources remain limited.

These disparities are particularly evident in Region VIII, where many island schools continue to experience persistent challenges related to internet connectivity, access to digital devices, and opportunities for professional development. Previous studies have shown that schools located in geographically isolated and disadvantaged areas encounter greater obstacles in implementing technology-enhanced instruction due to infrastructural limitations and resource constraints (UNESCO, 2021; DepEd Region VIII, 2023). Consequently, teachers often rely on traditional instructional approaches despite increasing policy emphasis on digital learning. Such conditions highlight the need to examine technology integration within specific local contexts to better understand how contextual realities shape instructional practices and learner experiences.

Within District X of the Schools Division of Catbalogan City, existing educational records indicate gradual progress in technology-related initiatives; however, significant challenges remain. District training records show increasing participation in Information and Communication Technology (ICT) professional development programs over the past three school years. Nevertheless, participation rates remain insufficient relative to the total teaching population, suggesting that many teachers continue to have limited exposure to technology-enhanced pedagogical practices. Since teacher competence and continuous professional development are widely recognized as critical determinants of successful technology integration, these findings raise concerns regarding teachers' readiness to implement technology effectively in classroom instruction (Trust & Whalen, 2021; Koehler et al., 2020).

Further evidence from Classroom Observation Tool (COT) reports reveals that technology use among teachers remains predominantly at the basic level. Most teachers utilize digital technologies primarily for content presentation and information delivery rather than for facilitating collaborative learning, inquiry-based activities, and higher-order thinking processes. Similarly, results of the GIYA assessment indicate that a considerable proportion of teachers continue to experience difficulties in selecting appropriate digital platforms, designing technology-enhanced learning activities, and utilizing digital assessment tools effectively. These findings suggest that although awareness and utilization of technology are gradually increasing, meaningful pedagogical integration remains a challenge. This observation is consistent with the findings of Ertmer et al. (2022) and Tondeur et al. (2021), who emphasized that effective technology integration requires not only technical proficiency but also pedagogical competence and sustained institutional support.

Infrastructural limitations further complicate technology integration efforts in island schools. Although access to digital resources has improved in recent years, many schools continue to experience shortages of technological equipment and unstable internet connectivity. Research has consistently shown that technology integration is most effective when teacher competence is complemented by adequate infrastructure and equitable access to digital resources (van Dijk, 2020; Koehler et al., 2020). In geographically isolated communities, limited technological infrastructure often restricts both instructional innovation and learners' opportunities to develop essential digital competencies.

These challenges may have broader implications for learner achievement. National Achievement Test (NAT) results and division achievement data reveal persistent performance gaps between island schools and division-wide averages, particularly in English and Mathematics. The consistently lower performance of island schools suggests that learners continue to experience educational disadvantages associated with limited instructional resources, technological constraints, and restricted access to learning opportunities. Existing literature indicates that effective technology integration can contribute to improved learner engagement, differentiated instruction, and academic achievement when appropriately implemented (OECD, 2021; Lyu & Liu, 2022). Thus,

understanding how technology is integrated within island school contexts may provide valuable insights into addressing persistent learning gaps.

The importance of technology integration is further reinforced by policy frameworks such as the Philippine Professional Standards for Teachers (PPST), institutionalized through DepEd Order No. 42, s. 2017, which identifies the effective use of Information and Communication Technology (ICT) as a core teacher competency. Likewise, Republic Act No. 10929, or the Free Internet Access in Public Places Act, underscores the government's commitment to ensuring equitable access to digital resources in public educational institutions, including geographically isolated schools. However, persistent disparities between policy aspirations and actual implementation remain evident in many island communities, highlighting the need for context-specific investigations into technology integration practices.

Recent international scholarship has increasingly examined technology integration in remote, rural, coastal, and island communities where geographic isolation creates unique educational challenges. Unlike urban schools, educational institutions located in geographically isolated settings often experience difficulties related to infrastructure development, internet connectivity, equipment maintenance, and access to professional development opportunities (UNESCO, 2021; OECD, 2021). Research conducted in remote communities across Australia, New Zealand, the Pacific Islands, and Southeast Asia demonstrates that geographic isolation significantly influences the effectiveness of technology integration because schools frequently operate with limited technological resources, insufficient digital infrastructure, and reduced access to technical support services (Trinidad et al., 2021; Barbour, LaBonte, Kelly, Hodges, Moore, Lockee, Trust, & Bond, 2020).

Furthermore, educational technology researchers have emphasized that digital inequality in remote communities extends beyond device availability. According to van Dijk (2020), digital divides are manifested not only through access disparities but also through differences in digital skills, quality of connectivity, patterns of technology use, and institutional support. Recent studies indicate that learners and teachers in geographically isolated communities often experience slower internet speeds, higher connectivity costs, limited access to digital learning platforms, and fewer opportunities for technology-related training (OECD, 2021; UNICEF, 2023). These constraints affect not only technology utilization but also the quality and effectiveness of digital learning experiences.

Similarly, studies conducted in island educational settings indicate that environmental and logistical conditions significantly influence technology implementation. Transportation constraints frequently delay the delivery of technological equipment, replacement parts, and maintenance services, while adverse weather conditions may disrupt internet connectivity, telecommunications infrastructure, and power supply (UNESCO, 2021; UNICEF, 2023). Consequently, schools in island communities often adopt adaptive strategies such as mobile learning, offline digital resources, community-based learning hubs, and blended learning approaches to sustain instructional delivery despite infrastructural limitations (Barbour et al., 2020; Trust & Whalen, 2021). These findings suggest that technology integration in island schools should be understood within the broader context of geographic isolation, infrastructure challenges, environmental vulnerabilities, and community-specific realities.

Despite growing research on educational technology, much of the existing literature has focused on urban and mainland educational settings. Comparatively little attention has been devoted to understanding technology integration within geographically isolated island communities where contextual challenges differ substantially. More importantly, previous studies have often examined teacher competence, infrastructure, or technology access independently, with limited investigation of how these factors collectively influence teaching and learning processes within island schools. This represents a significant empirical gap in the literature.

Therefore, this study examined the level of technology integration in teaching and learning among teachers and students in island communities in District X, Schools Division of Catbalogan City. Specifically, it investigated technology integration across dimensions of teacher practices, learner engagement, digital resources, and instructional outcomes. By generating context-specific evidence from geographically isolated schools, the study contributes to the growing body of knowledge on educational technology and provides a basis for designing

responsive interventions, strengthening policy implementation, and promoting equitable access to quality digital education in island communities.

LITERATURE REVIEW

Technology integration has become a fundamental component of contemporary education, transforming how teachers deliver instruction and how students engage in the learning process. The increasing availability of digital tools, online resources, and interactive learning platforms has expanded opportunities for enhancing instructional effectiveness and promoting meaningful learning experiences. Technology integration refers to the purposeful use of technological resources to support curriculum objectives, improve instructional practices, and facilitate student learning (Koehler et al., 2020). Rather than serving merely as supplementary tools, digital technologies have become essential instruments for fostering collaboration, creativity, critical thinking, and learner engagement in twenty-first-century classrooms.

The successful integration of technology is closely associated with teachers' technological competence, pedagogical knowledge, and instructional readiness. The Technological Pedagogical Content Knowledge (TPACK) Framework emphasizes that effective technology integration occurs when teachers are able to combine content knowledge, pedagogical expertise, and technological skills in designing learning experiences (Mishra & Koehler, 2006). Recent studies have shown that teachers who possess higher levels of technological competence and confidence are more likely to implement innovative instructional practices and utilize digital tools effectively in classroom instruction (Ertmer et al., 2021). Furthermore, continuous professional development and training opportunities have been identified as critical factors influencing teachers' ability to integrate technology meaningfully into teaching and learning processes.

Technology integration also plays a significant role in promoting student engagement and improving learning outcomes. Constructivist Learning Theory suggests that learners actively construct knowledge through interaction, collaboration, and authentic learning experiences. Digital technologies provide opportunities for learners to access information, participate in interactive activities, collaborate with peers, and engage in self-directed learning. Studies have reported that students who are exposed to technology-enhanced learning environments demonstrate higher levels of motivation, participation, and academic engagement compared to those in traditional learning settings (Lanuza, 2023). Similarly, Rodriguez and Santos (2021) found that technology integration contributes positively to learner achievement when supported by effective instructional strategies and adequate technological resources.

Despite the recognized benefits of educational technology, numerous challenges continue to hinder its effective implementation. One of the most commonly reported barriers is inadequate access to technological infrastructure, including computers, tablets, digital learning resources, and reliable internet connectivity. According to van Dijk's (2020) Digital Divide Theory, disparities in technology access and utilization create inequalities in educational opportunities and learning outcomes. These challenges are particularly evident in geographically isolated and disadvantaged communities where infrastructural limitations restrict both teachers' and students' ability to fully participate in technology-enhanced learning.

Several studies have documented the unique challenges experienced by schools in island and remote communities. Navarro (2021) reported that weak internet connectivity, inadequate technical support, and limited access to digital equipment significantly constrain technology integration efforts in island schools. Similarly, Villanueva (2023) found that educators in geographically isolated communities often rely on offline instructional materials because of limited digital infrastructure and insufficient ICT training opportunities. These findings suggest that while teachers recognize the value of educational technology, contextual constraints frequently prevent its effective implementation.

Research has likewise highlighted the importance of institutional support in promoting successful technology integration. School leadership, policy implementation, access to professional development, and availability of technological resources have been identified as essential factors influencing the adoption of digital teaching practices (Trust & Whalen, 2021). Educational institutions that provide sustained technical assistance, mentoring

programs, and capacity-building initiatives are more likely to develop a culture of effective technology use among teachers and learners. Conversely, inadequate support systems often result in limited technology utilization and reduced instructional innovation.

Although a growing body of literature has examined technology integration in educational settings, much of the existing research has focused on urban and mainland schools where technological resources are relatively accessible. Comparatively few studies have investigated technology integration within geographically isolated island communities, where challenges related to infrastructure, connectivity, and access to professional development are more pronounced. Furthermore, previous studies have often examined teacher competence, technological resources, or learner outcomes independently, with limited attention given to the interaction between teaching and learning dimensions of technology integration.

In summary, the literature suggests that technology integration has the potential to enhance instructional effectiveness, learner engagement, and educational outcomes when supported by adequate teacher competence, technological infrastructure, and institutional support. However, significant challenges remain, particularly in geographically isolated communities where access to digital resources is limited. The existing gap in research concerning the integration of technology in both teaching and learning within island school contexts underscores the need for further investigation. Thus, this study seeks to examine the level of technology integration in teaching and learning among teachers and students in island communities to provide empirical evidence that may guide educational planning, policy development, and intervention programs aimed at strengthening digital education in geographically isolated schools.

Research Questions

This study assessed the integration of technology in teaching and learning among students and teachers in island communities in the District of Catbalogan X, Schools Division of Catbalogan City, during the School Year 2025-2026 with the end view of crafting an intervention program.

Specifically, the study sought answers to the following questions:

1. What is the profile of the teacher-respondents in terms of the following variates:

- 1.1 age and sex;
- 1.2 civil status;
- 1.3 highest educational attainment;
- 1.4 gross monthly family income;
- 1.5 number of years as teacher;
- 1.6 relevant in-service trainings;
- 1.7 gadgets utilized in teaching;
- 1.8 number of time gadget is being utilized;
- 1.9 performance rating based on the latest IPCRF; and
- 1.10 attitude toward technology integration in teaching?

2. What is the profile of the student-respondents in terms of the following variates:

- 2.1 age and sex;

2.2 parent's highest educational attainment;

2.3 gross monthly family income;

2.4 parents' occupation;

2.5 technology utilized at home;

2.6 number of times that technology is used; and

2.7 attitude toward classroom technology integration?

3. What is the level of technology integration in teaching as assessed by the teacher- and student- respondents in terms of:

3.1 access to digital tools and infrastructure;

3.2 teacher technological competence;

3.3 instructional planning and design with technology;

3.4 pedagogical use of technology; and

3.5 student engagement through technology?

4. What is the level of technology integration in learning as assessed by the teacher- and student- respondents in terms of:

4.1 access to learning technologies;

4.2 digital literacy and skills;

4.3 student engagement and motivation;

4.4 use of technology in learning activities; and

4.5 support for personalized and self-directed learning?

5. Is there a significant difference in the level of assessment of teacher- and student-respondents regarding the following:

5.1 technology integration in teaching; and

5.2 technology integration in learning?

6. Is there a significant relationship between the teacher-respondents' assessed level of technology integration in teaching and the following:

6.1 profile variates of the teacher-respondents;

6.2 profile variates of the student-respondents;

6.3 students assessed level of technology integration in teaching; and

6.4 assessed level of technology integration in learning?

7. What are the challenges encountered by the teacher-and student- respondents in integrating technology in teaching and learning in island communities

Scope And Limitation

This study focused on examining the level of technology integration in teaching and learning among teachers and students in island communities within District X, Schools Division of Catbalogan City, during the School Year 2025–2026. Specifically, it investigated technology integration in teaching in terms of access to digital tools and infrastructure, teacher technological competence, instructional planning and design with technology, pedagogical use of technology, and student engagement through technology. Likewise, technology integration in learning was examined in terms of access to learning technologies, digital literacy and skills, student engagement and motivation, use of technology in learning activities, and support for personalized and self-directed learning.

The study also described the profile characteristics of the teacher-respondents and student-respondents and determined whether significant differences and relationships existed among the variables investigated. Furthermore, it explored the challenges encountered by teachers and students in integrating technology into teaching and learning and utilized the findings as a basis for the development of an intervention program.

The study employed a quantitative-descriptive research design utilizing comparative and correlational approaches. Data were gathered through validated survey questionnaires administered to selected teacher-respondents and student-respondents from identified island schools. Statistical tools such as frequency counts, percentages, weighted means, tests of difference, and correlation analyses were used to analyze the data and answer the research questions.

Despite its contributions, the study has several limitations. First, the respondents were limited to selected teachers and students from island schools within District X, which may limit the generalizability of the findings to other districts, divisions, or educational contexts. Second, the study relied primarily on self-reported data, which may be subject to response bias, social desirability bias, and individual perceptions. Third, the study assessed the level of technology integration as perceived by the respondents and did not directly measure actual classroom practices through observation or experimental methods. Finally, external factors such as school funding, community support, socioeconomic conditions, availability of technological infrastructure, and policy implementation were not extensively examined, although these factors may influence the effectiveness of technology integration in teaching and learning.

Another limitation of the study is its reliance on self-reported perceptions from teachers and students. Although survey responses provided valuable insights regarding technology integration, the findings may be influenced by response bias and subjective interpretation. Future studies should incorporate methodological triangulation through classroom observations, interviews, focus group discussions, document analysis, learning analytics, or instructional artifact reviews. Such approaches would provide richer evidence regarding actual technology integration practices and strengthen the validity of the findings..

RESEARCH METHODOLOGY

This study employed a quantitative-descriptive research design utilizing comparative and correlational approaches to examine the level of technology integration in teaching and learning among teachers and students in island communities within District X, Schools Division of Catbalogan City. The design was deemed appropriate as it enabled the researcher to describe existing conditions, determine relationships among variables, and identify significant differences in respondents' assessments of technology integration.

Sampling

The study employed purposive sampling in the selection of respondents. Teachers were selected based on the following criteria: (1) currently assigned in identified island schools within District X during School Year 2025–2026 and (2) actively involved in technology-supported instructional activities. Grade 6 students were selected

from classes where technology integration formed part of regular instructional delivery. Purposive sampling was considered appropriate because the study sought information from respondents who possessed direct experience with technology integration in geographically isolated educational settings. This approach ensured that participants could provide relevant and informed assessments regarding technology integration practices, learning experiences, and contextual challenges encountered in island communities.

a. Data Collection

Data were gathered through structured survey questionnaires developed and adapted from relevant literature and previous studies on technology integration in education. The instrument consisted of sections that assessed technology integration in teaching, technology integration in learning, respondent profiles, and challenges encountered in the implementation of technology-enhanced instruction.

Prior to data collection, the research instrument underwent content validation by experts in educational technology and research methodology to ensure its relevance, clarity, and appropriateness. Necessary revisions were incorporated based on the validators' recommendations. Reliability testing was likewise conducted to establish the internal consistency of the instrument.

Upon securing the necessary approvals from school authorities, the questionnaires were administered to the selected teacher-respondents and student-respondents. Participants were informed of the purpose of the study and assured that their responses would be treated with strict confidentiality. Participation was voluntary, and ethical considerations were observed throughout the data-gathering process.

Completed questionnaires were retrieved, checked for completeness, coded, and organized for statistical analysis.

b. Data Analysis

The collected data were analyzed using appropriate descriptive and inferential statistical techniques. Frequency counts and percentages were utilized to describe the profile characteristics of the respondents. Weighted means were computed to determine the level of technology integration in teaching and learning, as well as the extent of challenges encountered by teachers and students.

To determine significant differences between the assessments of teacher-respondents and student-respondents, appropriate tests of difference were employed. Correlation analyses were likewise conducted to determine the relationships among selected variables, including technology integration practices, respondent profiles, and learning-related outcomes. All statistical analyses were interpreted using the established level of significance of 0.05.

DISCUSSION OF RESULTS AND RECOMMENDATIONS

Table 1. Profile of Teacher Respondents (N=46)

Variable	Dominant Category	f	%
Age	27–31 years old	23	50.00
Sex	Female	36	78.26
Civil Status	Single	27	58.70
Educational Attainment	With Graduate Units	19	41.30
Family Income	₱30,000–₱34,999	27	58.70
Teaching Experience	Less than 1–3 years	28	60.87
Performance Rating	Outstanding (4.50–5.00)	44	95.65

The findings revealed that the teacher-respondents were generally young, predominantly female, academically prepared, and professionally competent. Most were between 27 and 31 years old, possessed graduate-level academic preparation, had relatively limited teaching experience, and obtained outstanding performance ratings

in their latest IPCRF evaluation. These characteristics suggest that the teaching workforce in the island communities possesses favorable qualifications for adopting and implementing technology-enhanced instructional practices.

The relatively young age profile of the respondents may be advantageous for technology integration, as younger teachers are often more familiar with digital technologies and more receptive to innovative instructional approaches (Ertmer et al., 2021; Tondeur et al., 2021). Likewise, the high proportion of teachers pursuing graduate studies reflects a commitment to professional growth and continuous learning, which may further enhance their capacity to integrate technology effectively into classroom instruction. Their outstanding performance ratings also indicate strong instructional competence and professional commitment.

However, favorable teacher characteristics alone do not guarantee successful technology integration. Research suggests that the effective use of educational technology is influenced not only by teacher competence but also by access to technological resources, reliable infrastructure, professional development opportunities, and institutional support (Trust & Whalen, 2021). This consideration is particularly relevant in island communities, where geographic isolation and resource limitations may constrain technology implementation despite teachers' readiness and capability.

Table 2. Technology Utilization and Attitude Toward Technology Integration Among Teachers

Indicator	Result
Most Utilized Gadget	Smartphone (100%)
Second Most Utilized Gadget	Laptop/Netbook (95.65%)
Grand Mean on Attitude Toward Technology Integration	4.71
Interpretation	Strongly Agree

Table 2 presents the technological devices utilized by the teacher-respondents and their attitude toward technology integration in teaching. The findings revealed that smartphones were universally utilized by all teacher-respondents, while laptops and netbooks were used by nearly all respondents. Other technologies such as projectors, tablets, desktop computers, document cameras, speakers, and interactive whiteboards were utilized less frequently. In addition, the respondents demonstrated a highly positive attitude toward technology integration, as reflected by a grand weighted mean of 4.71, interpreted as "Strongly Agree." The highest-rated indicators reflected teachers' willingness to attend ICT-related training and continuously improve their technology skills. These findings suggest that teachers in island communities recognize the value of technology and are highly motivated to strengthen their technological competencies despite existing challenges.

The universal use of smartphones and the high utilization of laptops indicate that teachers rely primarily on accessible and practical technologies to support instruction. In geographically isolated communities, these devices provide flexible means for communication, lesson preparation, content delivery, and access to educational resources. However, the lower utilization of devices such as interactive whiteboards, projectors, and document cameras suggests that access to more advanced instructional technologies remains limited. This pattern reflects the realities of many island schools where resource constraints, logistical difficulties, and infrastructure limitations influence the availability of educational technologies.

One of the most significant findings of the study is the teachers' highly positive attitude toward technology integration. Their strong willingness to participate in ICT-related training and improve their technology skills indicates a readiness to embrace innovation and adapt to the evolving demands of digital education. This finding is particularly important because teacher attitudes have consistently been identified as a key factor influencing the successful adoption of educational technologies (Ertmer et al., 2021; Trust & Whalen, 2021). The results suggest that the primary challenge in island schools may not be teacher resistance to technology but rather the availability of resources and support needed to facilitate effective implementation.

At the same time, the relatively lower rating for the statement that technology makes teaching more efficient and effective suggests that teachers may still encounter difficulties translating positive attitudes into optimal classroom practice. Factors such as limited equipment, unreliable internet connectivity, and inadequate technical

support may reduce the perceived effectiveness of technology use despite strong motivation among teachers. This finding highlights the gap between technology readiness and technology implementation, particularly in geographically isolated schools.

Table 3. Profile of the Student-Respondents (n = 100)

Variable	Dominant Category	f	%
Age	11 years old	47	47.00
Sex	Female	53	53.00
Father's Education	College Graduate	27	27.00
Mother's Education	High School Graduate	24	24.00
Family Income	₱40,000 and above	26	26.00
Father's Occupation	Farmer	29	29.00
Mother's Occupation	Farmer	34	34.00

Table 3 presents the profile characteristics of the student-respondents in terms of age, sex, parents' educational attainment, family income, and parents' occupation. The findings revealed that most respondents were 11 years old, with a mean age of 11.42 years, indicating that the learners were generally in the early adolescent stage of development. Female students slightly outnumbered male students, while parental educational attainment and family income varied across the sample. Farming emerged as the dominant occupation among both fathers and mothers, reflecting the predominantly rural and island-based nature of the study locale.

The age profile of the respondents suggests that they are at a developmental stage characterized by increasing independence, curiosity, and readiness to engage with technology-assisted learning activities. As learners in the upper elementary level, they are increasingly capable of utilizing digital tools to support learning, communication, and information access. The relatively balanced distribution of male and female respondents further suggests that the findings reflect the experiences of both sexes, providing a broader perspective on students' perceptions of technology integration.

The findings also highlight the influence of family and community contexts on students' educational experiences. Variations in parental educational attainment and family income suggest differences in the level of educational support, access to learning resources, and exposure to technology available at home. Previous studies have shown that socioeconomic conditions and parental educational backgrounds can influence students' opportunities to access digital technologies and participate in technology-supported learning activities (OECD, 2021; van Dijk, 2020). Consequently, learners may experience differing levels of readiness and support for technology-enhanced education outside the school environment.

Moreover, the predominance of farming as the primary parental occupation reflects the realities of many island and rural communities, where livelihoods are closely linked to agriculture and local economic conditions. Such contexts may affect access to digital infrastructure, internet connectivity, and technological resources, which in turn influence students' learning experiences. These findings underscore the importance of considering community-specific conditions when implementing technology integration initiatives in geographically isolated schools.

Table 4. Technology Available at Home and Student Attitude Toward Technology Integration

Technology	Frequency	Percentage
Smartphone	88	88.00
Internet Connectivity	83	83.00
Smart TV	44	44.00
Tablet	43	43.00
Computer	41	41.00

Table 4 presents the technologies utilized by the student-respondents at home and their attitude toward classroom technology integration. The findings revealed that smartphones were the most commonly utilized technology, followed by internet connectivity. Other technologies such as Smart/LED televisions, tablets, computers or laptops, printers, and digital cameras were utilized less frequently. Furthermore, the respondents demonstrated a positive attitude toward classroom technology integration, as reflected by a grand weighted mean of 3.77, interpreted as “Agree.” These findings suggest that smartphones and internet access serve as the primary technological resources available to students and that learners generally recognize the value of technology in supporting their educational experiences.

The widespread use of smartphones highlights their importance as students’ primary gateway to digital learning. In island communities, smartphones often provide the most accessible means of accessing educational resources, communicating with teachers and classmates, and participating in technology-supported learning activities. Their portability and affordability make them particularly valuable in geographically isolated areas where access to other digital devices may be limited. However, the lower utilization of computers, tablets, and other educational technologies suggests that many learners continue to experience unequal access to more comprehensive digital learning resources.

The findings also reveal that access to technology does not necessarily equate to equal learning opportunities. Although a large proportion of students reported internet access, disparities remain in the availability of devices that support more advanced academic tasks. This observation reflects broader concerns regarding digital inequality, particularly in rural and island communities where economic and infrastructural conditions influence access to educational technologies (van Dijk, 2020). Consequently, students may differ in their ability to participate fully in technology-enhanced learning experiences depending on the resources available in their homes.

One of the most encouraging findings is the generally positive attitude of students toward classroom technology integration. Learners appear receptive to the use of technology and view digital tools as beneficial to their learning experiences. This positive disposition provides a favorable foundation for technology integration initiatives because students are likely to engage with technology-supported instructional activities. However, the slightly lower ratings regarding technology’s contribution to learning effectiveness suggest that students may not always perceive a direct connection between technology use and improved academic outcomes. This highlights the importance of ensuring that digital tools are not only engaging but are also meaningfully integrated into instruction to support learning objectives and academic achievement.

Table 5. Level of Technology Integration in Teaching as Assessed by Teachers and Students

Dimension	Teachers Mean	Interpretation	Students Mean	Interpretation
Access to Digital Tools and Infrastructure	3.93	Often	3.63	Often
Teacher Technological Competence	4.47	Often	3.68	Often
Instructional Planning and Design	4.54	Always	4.08	Often
Pedagogical Use of Technology	4.40	Often	3.69	Often
Student Engagement Through Technology	4.47	Often	3.36	Sometimes

Table 5 presents the level of technology integration in teaching as assessed by both teacher-respondents and student-respondents in terms of access to digital tools and infrastructure, teacher technological competence, instructional planning and design with technology, pedagogical use of technology, and student engagement through technology. The findings revealed that both teachers and students perceived technology integration positively across all dimensions. Teachers consistently provided higher ratings, with instructional planning and design with technology receiving the highest assessment ($M = 4.54$), while students likewise rated this dimension highest ($M = 4.08$). However, student engagement through technology received the lowest rating among students ($M = 3.36$), indicating that learners perceived technology integration less favorably than teachers.

The high ratings for instructional planning and design suggest that teachers are making deliberate efforts to incorporate technology into lesson preparation and classroom instruction. Both groups recognized that digital resources and technology-supported activities are regularly integrated into teaching and learning processes. This

finding indicates that technology integration in the participating schools has moved beyond simple access to technology and has become part of instructional practice.

Teachers also rated their technological competence highly, suggesting confidence in their ability to utilize digital tools for instructional purposes. Students generally affirmed these perceptions, although their ratings were consistently lower. This pattern may reflect differences in perspective: teachers often evaluate technology integration based on planning, preparation, and instructional intentions, whereas students assess technology based on their actual classroom experiences and perceived learning benefits. Similar perceptual differences have been reported in previous studies, where teachers tend to view technology implementation more positively than learners (Scherer et al., 2021).

One of the most important findings is the disparity between teacher and student perceptions of student engagement through technology. While teachers believed that technology effectively promoted participation and interaction, students reported more moderate levels of engagement. This suggests that although technology is regularly used in instruction, its presence does not automatically translate into meaningful learner engagement. Students appear to distinguish between the use of technology and the quality of the learning experience it provides. Consequently, technology integration efforts should focus not only on increasing the use of digital tools but also on designing interactive, collaborative, and learner-centered activities that sustain student interest and participation.

The findings further highlight the unique realities of island schools. Despite geographic isolation and potential limitations in infrastructure, both teachers and students reported generally positive levels of technology integration. This suggests that schools have made significant progress in utilizing available resources to support teaching and learning. However, the lower student ratings indicate that challenges remain in ensuring that technology integration consistently enhances learning experiences. Therefore, professional development programs should place greater emphasis on learner-centered digital pedagogies, differentiated instruction, and strategies that maximize student engagement while taking into account the contextual challenges of island communities.

Table 6. Level of Technology Integration in Learning

Dimension	Teachers Mean	Students Mean
Access to Learning Technologies	4.51	4.10
Digital Literacy and Skills	4.58	4.19
Student Engagement and Motivation	4.36	3.93
Use of Technology in Learning Activities	4.37	3.96
Support for Personalized Learning	4.24	3.80

Table 6 presents the level of technology integration in learning as assessed by teacher-respondents and student-respondents in terms of access to learning technologies, digital literacy and skills, student engagement and motivation, use of technology in learning activities, and support for personalized and self-directed learning. The findings revealed that both groups perceived technology integration in learning positively, although teachers consistently provided higher ratings than students across all dimensions. Teachers rated digital literacy and skills and access to learning technologies highest, while students likewise viewed these dimensions favorably. However, support for personalized and self-directed learning received the lowest ratings from both groups, indicating that technology is not yet being fully utilized to promote learner autonomy.

The positive ratings for access to learning technologies and digital literacy suggest that students generally possess the foundational resources and skills necessary to participate in technology-supported learning. Both teachers and students recognized that digital tools and educational applications are regularly utilized as part of the learning process. This finding is consistent with the work of Ng (2021), who emphasized that digital literacy is a critical competency that enables learners to effectively access, evaluate, and utilize information through digital technologies. Likewise, OECD (2021) reported that digital literacy skills are increasingly associated with successful participation in technology-enhanced learning environments.

However, the lower ratings provided by students across all dimensions suggest that learners may experience technology integration differently from their teachers. While teachers often evaluate technology integration based on instructional planning and implementation, students tend to assess it according to their actual learning experiences and perceived benefits. Similar perceptual differences were reported by Scherer et al. (2021), who found that teachers generally view technology integration more positively than students because they focus on implementation efforts, whereas students evaluate technology based on its impact on learning and engagement.

A particularly important finding is the relatively low rating for personalized and self-directed learning. Although technology provides opportunities for independent learning and flexible access to educational resources, the results suggest that students continue to rely heavily on teacher guidance and structured learning activities. This finding indicates that technology is being used primarily to support instruction rather than to promote learner autonomy and self-regulated learning. Broadbent and Poon (2020) noted that learners often require explicit guidance and support to develop effective self-regulation skills in technology-supported environments. Thus, schools should strengthen instructional approaches that encourage students to take greater responsibility for their own learning through technology.

The findings also reflect the realities of island schools, where access to technology may be constrained by infrastructure limitations, connectivity issues, and resource availability. While schools have made significant progress in integrating technology into learning, further efforts are needed to ensure that technology use moves beyond access and basic utilization toward deeper engagement, personalized learning, and meaningful educational outcomes. Consistent with UNESCO (2021), equitable access to technology must be accompanied by effective instructional practices and supportive learning environments if digital technologies are to contribute meaningfully to educational improvement. Consequently, professional development initiatives should support teachers in designing technology-enhanced learning experiences that encourage critical thinking, collaboration, learner autonomy, and sustained engagement.

Table 7. Difference Between Teacher and Student Assessments

Variable	p-value	Interpretation
Access to Digital Tools	0.013016	Significant
Teacher Competence	0.000000	Significant
Instructional Planning	0.000010	Significant
Pedagogical Use	0.000000	Significant
Student Engagement	0.000000	Significant

Table 7 presents the results of the test of difference between the assessments of teacher-respondents and student-respondents regarding technology integration in teaching. The findings revealed that all computed p-values were lower than the 0.05 level of significance, indicating significant differences between the assessments of teachers and students across all dimensions of technology integration in teaching. Consequently, the null hypothesis was rejected. Significant differences were observed in access to digital tools and infrastructure, teacher technological competence, instructional planning and design with technology, pedagogical use of technology, and student engagement through technology.

The results indicate that teachers consistently perceived technology integration more positively than students. This finding suggests that teachers and students evaluate technology integration from different perspectives. Teachers are likely to base their assessments on instructional planning, preparation, and implementation efforts, whereas students evaluate technology according to their actual classroom experiences and the extent to which technology enhances their engagement and learning. Similar perceptual differences were reported by Scherer et al. (2021), who found that teachers often provide more favorable assessments of technology integration because they focus on instructional intentions, while students assess its practical impact on learning.

The significant differences across all dimensions further suggest that the presence of technology does not necessarily guarantee that learners experience its intended benefits. While teachers reported high levels of access, competence, and technology use, students expressed more moderate perceptions, particularly in relation to engagement. This finding indicates a possible gap between technology implementation and learner experience.

In island schools, such differences may be influenced by contextual factors including limited access to devices, connectivity challenges, and varying opportunities for students to interact with digital tools both inside and outside the classroom.

One of the most important findings is the significant difference in perceptions of student engagement through technology. Although teachers believed that technology effectively increased participation and interaction, students reported lower levels of engagement. This suggests that technology use alone may not be sufficient to sustain meaningful learning experiences. As noted by Tondeur et al. (2021), the educational value of technology depends not only on its availability but also on how effectively it is integrated into learner-centered instructional practices. Consequently, schools should focus on ensuring that technology is used to promote active participation, collaboration, and deeper learning rather than simply supporting content delivery.

The findings highlight the importance of incorporating student perspectives when evaluating technology integration initiatives. Regular feedback from learners can help schools identify gaps between instructional intentions and actual learning experiences. Furthermore, professional development programs should emphasize not only technological competence but also pedagogical approaches that maximize student engagement and learning outcomes. By addressing these areas, schools can strengthen the effectiveness of technology integration and ensure that digital tools contribute meaningfully to teaching and learning in island communities.

Table 8. Significant Correlates of Technology Integration in Teaching

Variable	Correlation	p-value	Interpretation
Attitude Toward Technology	0.611	0.000	Strong Positive
Years of Teaching Experience	0.362	0.014	Weak Positive
Relevant ICT Training	0.334	0.023	Weak Positive

Table 8 presents the significant relationships between selected teacher profile variables and their assessed level of technology integration in teaching. The findings revealed that only three variables demonstrated statistically significant relationships with technology integration in teaching: attitude toward technology integration ($\rho = 0.611$, $p = 0.000$), years of teaching experience ($\rho = 0.362$, $p = 0.014$), and relevant ICT training ($\rho = 0.334$, $p = 0.023$). Among these variables, attitude toward technology integration exhibited the strongest relationship, indicating that teachers with more favorable perceptions of technology tend to demonstrate higher levels of technology integration in their instructional practices.

The strong relationship between attitude toward technology integration and technology use highlights the importance of teacher beliefs in shaping instructional practices. Teachers who perceive technology as useful, beneficial, and relevant to teaching are more likely to adopt and integrate digital tools into classroom activities. This finding is consistent with the Technology Acceptance Model, which emphasizes that positive perceptions of technology influence an individual's willingness to use and adopt technological innovations (Davis, 1989). Similarly, Ertmer et al. (2021) and Scherer et al. (2021) identified teacher attitudes as among the strongest predictors of successful technology integration.

The significant relationships involving teaching experience and ICT training further suggest that professional growth contributes to effective technology integration. Teachers with greater experience and participation in ICT-related professional development may have more opportunities to refine instructional practices, develop confidence in using digital tools, and explore innovative teaching strategies. Although the correlations were relatively weak, the findings support previous studies emphasizing the value of continuous professional development in strengthening teachers' technology integration competencies (Trust & Whalen, 2021; Tondeur et al., 2021).

Equally important is the finding that demographic variables such as age, sex, civil status, educational attainment, family income, gadget ownership, frequency of gadget use, and performance ratings were not significantly related to technology integration. This suggests that technology integration is influenced more by professional and attitudinal factors than by personal characteristics. The results challenge common assumptions that younger teachers or those with higher academic qualifications are necessarily more effective users of educational

technology. Instead, willingness to embrace technology, accumulated professional experience, and access to relevant training opportunities appear to be more influential determinants of technology integration.

For island schools, the findings underscore the importance of investing not only in technological infrastructure but also in teacher development. While access to devices and connectivity remains essential, technology integration ultimately depends on teachers' readiness, confidence, and commitment to utilizing digital tools effectively. Therefore, educational leaders should prioritize initiatives that cultivate positive attitudes toward technology and provide sustained ICT-related professional development opportunities to strengthen technology integration practices and improve learning outcomes.

Table 9. Challenges Encountered in Technology Integration

Challenge	Teachers Mean	Students Mean
Limited Access to Equipment	4.20	—
Poor/Unstable Internet Connectivity	—	3.65
Grand Mean	3.58	3.36
Interpretation	Highly a Challenge	A Challenge

Table 9 presents the challenges encountered by teacher-respondents and student-respondents in integrating technology in teaching and learning within island communities. The findings revealed that teachers generally perceived technology integration challenges as highly evident ($M = 3.58$), while students assessed these challenges as evident ($M = 3.36$). Among teachers, limited access to technological equipment emerged as the most significant challenge ($M = 4.20$), whereas students identified poor or unstable internet connectivity as their primary concern ($M = 3.65$). These findings indicate that although both groups recognize substantial barriers to technology integration, their concerns reflect their distinct roles and experiences within the educational process.

The results should be understood within the context of island schools, where geographic isolation often affects access to educational resources and technological infrastructure. Transportation difficulties, limited technical support, weather-related disruptions, and unstable internet and power services can hinder the effective implementation of technology-enhanced learning. These conditions suggest that technology integration challenges in island communities are influenced not only by individual capabilities but also by broader infrastructural and environmental factors.

The finding that limited access to technological equipment is the greatest challenge among teachers highlights the continuing resource constraints experienced in geographically isolated schools. Even when teachers possess positive attitudes toward technology and adequate technological skills, insufficient access to devices and instructional technologies may restrict their ability to implement technology-enhanced learning activities effectively. This finding supports previous studies identifying inadequate technological resources as a major barrier to technology integration in remote and underserved schools (Navarro, 2021; Villanueva, 2023). It also reflects the Digital Divide Theory of van Dijk (2020), which emphasizes that disparities in access to technology contribute to unequal educational opportunities.

For students, poor or unstable internet connectivity emerged as the most pressing concern. While many learners may have access to smartphones and other digital devices, unreliable internet service limits their ability to access learning materials, participate in online activities, and complete technology-supported tasks. Consistent with UNESCO (2021) and OECD (2021), reliable connectivity remains a fundamental requirement for effective digital learning and equitable educational participation. This finding suggests that expanding device ownership alone is insufficient unless accompanied by improvements in internet infrastructure and service reliability.

An important observation is that both teachers and students reported significant challenges despite generally positive attitudes toward technology integration. This suggests that successful technology integration depends not only on user readiness and acceptance but also on the availability of enabling conditions such as adequate infrastructure, technological resources, technical support, and institutional investment. The differing concerns expressed by teachers and students further indicate that interventions should address both instructional and learner needs. Consequently, school administrators and policymakers should prioritize investments in

technological infrastructure, equipment acquisition, connectivity enhancement, and sustainable support systems. Addressing these barriers will help create more equitable opportunities for technology-enhanced learning and strengthen the effectiveness of technology integration initiatives in island schools.

SUMMARY OF FINDINGS

This study assessed the level of technology integration in teaching and learning among teachers and students in island communities in District X, Schools Division of Catbalogan City, during the School Year 2025–2026, with the end view of crafting an intervention program.

Based on the analysis and interpretation of the data, the following findings were obtained:

1. The teacher-respondents were predominantly female, single, and relatively young, with most belonging to the 27–31 age bracket. A substantial proportion had graduate units, earned monthly family incomes ranging from ₱30,000 to ₱34,999, and had less than three years of teaching experience. Most respondents obtained an Outstanding performance rating in their latest IPCRF evaluation. Smartphones and laptops emerged as the most commonly utilized technological devices, while teachers demonstrated a highly favorable attitude toward technology integration in teaching.
2. The student-respondents were predominantly 11 years old and female. Most came from households engaged in farming, with varying levels of parental educational attainment and family income. Smartphones and internet connectivity were the most commonly available technologies at home. Students likewise exhibited positive attitudes toward classroom technology integration.
3. The level of technology integration in teaching, as assessed by both teacher-respondents and student-respondents, was generally high. Teachers rated instructional planning and design with technology as the most evident dimension, while students likewise rated this dimension highest among the indicators assessed. Teachers consistently provided higher ratings than students across all dimensions of technology integration in teaching.
4. The level of technology integration in learning was likewise assessed positively by both groups of respondents. Teachers reported high levels of access to learning technologies and digital literacy and skills, while students reported moderate to high levels across all dimensions. Digital literacy and access to learning technologies emerged as the strongest dimensions of technology integration in learning.
5. Significant differences existed between the assessments of teacher-respondents and student-respondents regarding technology integration in teaching. Significant differences were observed in access to digital tools and infrastructure, teacher technological competence, instructional planning and design with technology, pedagogical use of technology, and student engagement through technology. These findings indicate that teachers and students perceived technology integration differently.
6. Significant positive relationships were identified between technology integration in teaching and selected teacher-related variables. Specifically, attitude toward technology integration exhibited a strong positive relationship with technology integration in teaching, while years of teaching experience and participation in relevant ICT-related training demonstrated weak but significant positive relationships.
7. Teachers and students encountered several challenges in technology integration. Teachers identified limited access to technological equipment as the most significant challenge, while students reported poor and unstable internet connectivity as their primary concern. Overall, teachers assessed technology-related challenges as highly evident, whereas students assessed them as evident challenges affecting their learning experiences.

CONCLUSION

Based on the findings of the study, it is concluded that technology integration has become an important component of teaching and learning in island communities. Teachers demonstrated strong technological competence, positive attitudes toward educational technology, and a willingness to incorporate digital tools into instructional planning and classroom practices. Likewise, students generally perceived technology as a valuable support for learning and demonstrated positive attitudes toward classroom technology integration.

Despite these favorable conditions, significant differences between teacher and student assessments suggest that technology integration is experienced differently by the two groups. While teachers viewed technology integration as highly evident and effective, students reported comparatively lower levels of experience across several dimensions. This finding indicates that instructional efforts involving technology do not always translate into equivalent learner experiences and outcomes.

The study further established that teachers' attitudes toward technology, teaching experience, and participation in ICT-related professional development significantly influence technology integration practices. These findings highlight the critical role of teacher readiness, motivation, and continuous professional learning in promoting effective technology-enhanced instruction.

However, persistent challenges related to limited technological equipment and unstable internet connectivity continue to hinder the full realization of technology integration initiatives in island communities. These barriers reflect the continuing influence of infrastructural and contextual constraints associated with geographically isolated educational settings.

Therefore, successful technology integration in island schools requires not only technologically competent and motivated teachers but also sustained institutional support, adequate infrastructure, reliable connectivity, and learner-centered instructional approaches. Addressing these factors can contribute to more effective, equitable, and sustainable technology-enhanced learning environments for both teachers and students.

RECOMMENDATIONS

In light of the findings and conclusions of the study, the following recommendations are proposed:

1. School administrators should strengthen technology integration initiatives by providing adequate technological resources, improving ICT infrastructure, and ensuring the availability of instructional technologies necessary for effective classroom implementation.
2. Teachers should continue enhancing their technological, pedagogical, and content knowledge through active participation in ICT-related seminars, workshops, training programs, and professional learning communities to further strengthen technology-enhanced instructional practices.
3. Teachers are encouraged to adopt more learner-centered and interactive technology integration strategies that promote collaboration, critical thinking, creativity, and active student engagement rather than relying primarily on technology for content presentation.
4. Students should be provided with greater opportunities to develop digital literacy, self-directed learning skills, and responsible technology use through structured technology-enhanced learning activities both inside and outside the classroom.
5. School leaders and policymakers should collaborate with local government units, telecommunications providers, and other stakeholders to improve internet connectivity and expand access to technological resources in geographically isolated schools.

6. The Schools Division Office may develop and implement a comprehensive Technology Integration Enhancement Program that focuses on infrastructure development, teacher capacity-building, student digital literacy, and technical support services for island schools.
7. Schools should establish regular monitoring and feedback mechanisms that include both teacher and student perspectives to ensure that technology integration initiatives effectively address learners' needs and experiences.
8. Future researchers may examine the effectiveness of specific technology integration interventions and determine their impact on student achievement, engagement, digital literacy, and other educational outcomes.
9. Future studies may employ mixed-methods or qualitative approaches to gain deeper insights into the experiences, perceptions, and challenges of teachers and students regarding technology integration in geographically isolated communities.
10. Researchers are encouraged to expand the scope of future investigations by including respondents from other districts, divisions, or regions to strengthen the generalizability of findings and provide a broader understanding of technology integration practices in diverse educational contexts.
11. Future studies should incorporate classroom observations to verify whether reported technology integration practices are consistently implemented during actual instructional activities.
12. Researchers may utilize qualitative methods such as interviews and focus group discussions to gain deeper insights into the experiences, perceptions, and contextual challenges encountered by teachers and students in island communities.
13. Future investigations should employ mixed-methods approaches that combine survey data with observational and documentary evidence to enhance the validity and comprehensiveness of findings.
14. Comparative studies involving island schools and mainland schools may be conducted to determine how geographic isolation influences technology integration practices and educational outcomes.

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