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Experiences of School Heads and Teachers in Implementing Techno-Based Instructional Strategies in Coastal Areas

Mienrado T. Prado Jr.[1]
1 – Universidad de Sta. Isabel de Naga, Inc.

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Abstract

Technology integration in education has become essential in promoting learner-centered and interactive instruction, however, teachers in coastal schools face persistent challenges due to limited infrastructure, unstable connectivity, and insufficient digital resources. In this regard, the study explored the experiences of school heads and teachers in implementing techno-based instructional strategies in coastal schools.

Specifically, it aimed to examine teachers' experiences, identify the challenges they encounter, describe their coping strategies, determine available support mechanisms, and develop a responsive techno-based enhancement program. A qualitative descriptive phenomenological design was employed. Eleven (11) participants, consisting of eight (8) teachers and three (3) school heads from selected coastal schools in San Fernando, Camarines Sur, were purposively selected. Data were collected through semi-structured interviews, supported by field notes and document analysis, and were analyzed using thematic analysis to identify recurring patterns and themes.

Findings revealed that teachers transform classroom practices by adopting interactive and learner-centered strategies despite constraints. However, major challenges were identified, including infrastructure and connectivity barriers, resource scarcity and maintenance issues, technological competency gaps, and time and workload constraints. To address these, teachers employed coping strategies such as peer collaboration, professional resilience, resourcefulness in low-tech settings, and stakeholder engagement. Support mechanisms, including administrative support, ICT training, mentorship, and community involvement, were found to be critical in sustaining technology integration.

Based on the findings, the Tech-CARE Program was developed to enhance teachers' digital competence, resource access, collaboration, and instructional innovation. The study highlights the need for strengthened institutional support and continuous professional development to ensure sustainable and inclusive technology-integrated instruction in coastal schools.

Keywords: *technology integration, coastal schools, teacher experiences, ICT challenges, professional development, phenomenological study*

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I. INTRODUCTION

Background and Rationale

Technology has transformed education by shifting traditional teaching into more interactive and learner-centered approaches that enhance critical thinking, creativity, and problem-solving skills. In the Philippines, the Department of Education has promoted technology integration through various policies and programs to ensure continuous and inclusive learning.

Contradictory, teachers in coastal schools face significant challenges such as limited access to devices, unstable internet connectivity, and insufficient training in digital pedagogy. These constraints hinder the effective use of technology and affect both teaching quality and student engagement. Despite these difficulties, teachers continue to adapt by utilizing available resources and alternative strategies to sustain instruction.

Given these conditions, it is essential to examine the experiences, challenges, and coping mechanisms of teachers and school heads in implementing techno-based instructional strategies in coastal areas. Understanding these realities provides a basis for developing responsive and sustainable programs, such as the proposed Tech-CARE Program, to support effective and inclusive technology-integrated instruction.

Review of Related Literature

This chapter presents a synthesis of relevant literature and studies that provide the foundation for the present research. It highlights key concepts, recent developments, and empirical findings related to techno-based instruction, including its benefits, challenges, and implementation in diverse educational contexts.

Techno-based instruction enhances learner engagement, collaboration, and critical thinking when aligned with sound pedagogical practices and supported by adequate resources and training (Comninaki, 2024; UNESCO, 2023). Global and local studies emphasize that its success depends on teacher competence, access to ICT infrastructure, and institutional support (U.S. Department of Education, 2023; Cabansag, 2025). In the Philippine context, research shows that while technology integration improves learning outcomes, its implementation is often limited by inadequate resources, unstable connectivity, and varying levels of teacher readiness (Celeste & Nimfa, 2024; Bolante, 2024).

Existing literature also identifies major challenges such as infrastructure limitations, digital divide, lack of training, heavy workload, and contextual mismatch of digital resources (Mustafa et al., 2024; Nguyen, 2023; Espinosa, 2025). These issues are more pronounced in rural and coastal schools, where geographic and socio-economic factors hinder consistent technology use (Abella, 2023; Escala et al., 2024).

Furthermore, studies highlight that effective implementation of techno-based instructional strategies in coastal schools requires strong leadership, continuous professional development, community support, and contextualized teaching approaches (Fullan, 2021; Ogunyemi & Bauters, 2023; Sharma & Gupta, 2022). Overall, the literature underscores that successful technology integration is not solely dependent on access to tools but also on sustained

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support systems, teacher capacity-building, and alignment with local educational needs (Villanueva & Santos, 2025).

Statement of the Problem

This study aimed to explore the experiences of school heads and teachers in implementing techno-based instructional strategies in coastal areas Specifically, this research sought to answer the following questions:

1. How do teachers describe their experiences in implementing techno-based instructional strategies?
2. What challenges do teachers encounter in utilizing techno-based instructional strategies?
3. How do teachers cope with these challenges in utilizing techno-based instructional strategies?
4. What support mechanisms are available to teachers in implementing techno-based instructional strategies?
5. What techno-based enhancement program may be proposed for coastal area schools?

Objectives of the Study

This study targeted to explore and analyze the implementation of techno-based instructional strategies among school heads and teachers in coastal schools.

Specifically, it sought to:

1. Describe the experiences of teachers in implementing techno-based instructional strategies in coastal schools;
2. Identify the challenges encountered by teachers in utilizing techno-based instructional strategies;
3. Determine the coping strategies employed by teachers in addressing these challenges;
4. Examine the support mechanisms available to teachers in implementing techno-based instructional strategies; and
5. Develop a proposed technology-based enhancement program (Tech-CARE) to support effective and sustainable technology integration in coastal schools.

II. MATERIALS and METHODS

Section of this paper focuses on materials and methods including research design, participants, instruments, procedure, and data analysis.

Research Design

This study employed a descriptive phenomenological research design (Creswell & Poth, 2023) to explore and describe the lived experiences of teachers in coastal communities. Data were gathered through in-depth, semi-structured interviews to capture participants' insights on

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their challenges and experiences. Bracketing was applied to minimize researcher bias and ensure that the participants' authentic perspectives were accurately represented.

Participants

The study involved eleven (11) participants from four coastal schools in San Fernando District, Camarines Sur, composed of eight (8) Key Stage II teachers and three (3) school heads. Participants were selected based on their teaching experience in coastal schools and involvement in instruction. Data collection followed the principle of saturation, continuing until no new themes emerged.

Data were gathered through face-to-face, semi-structured interviews, supported by audio recordings, field notes, and document review. Secondary sources such as certificates and photographs were also used for triangulation. Data were analyzed using inductive thematic analysis, where transcripts were coded, categorized, and organized into emerging themes reflecting the participants' experiences, challenges, coping strategies, and support mechanisms in implementing techno-based instructional strategies.

Instruments

This study used a semi-structured interview guide as the main research instrument to gather in-depth information on teachers' and school heads' experiences in implementing techno-based instructional strategies. The guide consisted of open-ended questions that explored participants' experiences, challenges, coping mechanisms, and suggestions for improving technology integration in coastal schools.

The semi-structured format allowed flexibility for follow-up questions and clarification, ensuring rich and detailed responses while maintaining focus on the study objectives. To strengthen data validity, secondary documents such as certificates and other professional records were also reviewed for triangulation. Overall, the instrument provided comprehensive qualitative data for understanding the lived experiences of participants in coastal school settings.

Procedure

This study followed a systematic and ethical data gathering procedure. Approval was first secured from the Dean of the Graduate School and the Schools Division Superintendent (SDS) of Camarines Sur. After approval, participants were selected through purposive sampling based on their experience in coastal schools and willingness to participate.

Informed consent was obtained before data collection. Semi-structured, face-to-face interviews were conducted in private school settings, lasting 45–60 minutes, and guided by open-ended questions. Interviews were audio-recorded with permission and supplemented with field notes. Transcripts were analyzed using thematic analysis following Creswell and Poth's framework, where responses were coded and grouped into emerging themes.

Confidentiality was ensured by assigning fictitious names and securely storing all data. Ethical principles of respect, beneficence, and justice were strictly observed throughout the entire research process.

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Data Analysis

The data gathered from semi-structured interviews were analyzed using thematic analysis. All audio-recorded interviews were transcribed verbatim to ensure accuracy and completeness of participants' responses. The transcripts were carefully reviewed and read multiple times to gain a thorough understanding of the data.

Using an inductive coding approach, significant statements were identified and assigned initial codes based on recurring ideas and patterns. These codes were then grouped into categories and further organized into broader themes that reflected the participants' experiences, challenges, coping strategies, and support mechanisms in implementing techno-based instructional strategies.

IOTo ensure trustworthiness of the findings, triangulation was conducted using field notes and available documents such as certificates and other relevant records. The analysis followed the principles of phenomenological inquiry, focusing on capturing the essence of participants' lived experiences while minimizing researcher bias through bracketing.

III. RESULTS and DISCUSSION

Results

Findings of the study are presented based on the research problems, focusing on teachers' experiences, challenges, coping strategies, and support mechanisms in implementing techno-based instructional strategies in coastal schools. Data were organized into thematic categories and supported by participants' narratives for clarity.

Regarding the first research problem, the study found that teachers in coastal schools have transformed their instructional practices by shifting from traditional lecture-based approaches to more interactive, learner-centered strategies. Teachers commonly utilize PowerPoint presentations, videos, mobile applications, and offline materials to sustain instruction despite limited access to ICT resources. These practices reflect their adaptability and commitment to enhancing student engagement through technology integration.

For the second research problem, the analysis revealed key challenges encountered by teachers, including infrastructure and connectivity barriers, resource scarcity and maintenance issues, technological competency gaps, and time and workload constraints. These challenges hinder the consistent use of techno-based instructional strategies and affect the quality and continuity of instruction in coastal schools.

The third research problem identified coping strategies employed by teachers, such as peer collaboration and knowledge sharing, professional resilience and continuous learning, resourcefulness in using low-tech alternatives, and active collaboration with stakeholders. These strategies enable teachers to sustain instruction despite technological and environmental limitations.

Finally, in response to the fourth research problem, the study identified key support mechanisms that facilitate technology integration, including administrative support, ICT training

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and professional development, mentorship and peer coaching systems, and community and parental involvement. These support systems play a crucial role in strengthening teachers' capacity to implement techno-based instructional strategies effectively in coastal school contexts.

Discussion

The findings of this study show that teachers and school heads in coastal communities implement techno-based instructional strategies through a combination of institutional support, professional development, peer collaboration, and community engagement. These support mechanisms reflect a shared effort to sustain technology integration despite persistent contextual constraints. Teachers' commitment to adapting instruction using available resources highlights their resilience and willingness to innovate in resource-limited environments.

Administrative and institutional support emerged as a key enabler of technology integration. Provision of ICT tools, allocation of MOOE funds, and partnerships with LGUs and stakeholders helped facilitate instructional delivery, although limitations in quantity, maintenance, and sustainability remain. These findings align with studies emphasizing that leadership support and resource availability are critical determinants of effective technology integration, particularly in underserved and geographically isolated schools (UNESCO, 2023; Villanueva & Santos, 2023).

ICT training and professional development were also identified as essential in strengthening teachers' digital competence. Teachers actively participated in webinars, in-service training, and self-directed learning, while school heads promoted peer coaching and external training opportunities. This reflects earlier findings that continuous, pedagogically focused professional development is necessary to sustain meaningful ICT integration in instruction (Huebner & Burstein, 2023; U.S. Department of Education, 2023).

Mentorship and peer coaching systems further supported teachers in overcoming technical and pedagogical challenges. Collaborative practices among teachers, ICT coordinators, and community partners enabled shared learning and improved confidence in using digital tools. This supports research indicating that peer collaboration enhances teacher motivation and improves the quality of technology use in classrooms (Cukurova et al., 2023).

Community and parental involvement also played a significant role in sustaining techno-based instruction. Parents and local stakeholders contributed resources, provided learning spaces, and assisted in equipment maintenance, reinforcing school efforts. This finding is consistent with studies showing that community engagement strengthens educational resilience and improves access to learning resources in low-resource settings (Herwin & Che Dahalan, 2022).

Overall, the findings demonstrate that successful implementation of techno-based instructional strategies in coastal schools depends on the integration of institutional leadership, teacher capacity-building, collaborative networks, and community participation. However, despite these support mechanisms, challenges such as limited infrastructure, unstable connectivity, and resource scarcity continue to hinder full implementation. This highlights the need for a more sustainable and systemic support framework to strengthen technology integration in coastal education settings.

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IV. CONCLUSION

In the end, this study concludes the availability of institutional support, teacher professional development, peer collaboration, and community participation strongly influences the implementation of techno-based instructional strategies in coastal schools. These support mechanisms collectively enable teachers to adapt and sustain technology integration despite persistent limitations in infrastructure, connectivity, and digital resources.

Results reveal school heads and teachers demonstrate a high level of adaptability and commitment in integrating technology into instruction. Administrative support through resource allocation and partnerships, continuous ICT training, mentorship among peers, and active involvement of parents and the community all contribute to improving instructional practices and learner engagement. However, these efforts are often constrained by insufficient equipment, unstable internet access, and environmental challenges common in coastal areas.

The study highlights that while individual and collaborative efforts are essential, they are not sufficient without a structured and sustainable support system. Strengthening policy implementation, expanding ICT infrastructure, and ensuring continuous, context-based professional development are necessary to fully maximize the benefits of techno-based instruction in coastal schools.

Overall, the success of technology integration in coastal education depends on a holistic approach that combines leadership support, teacher capacity-building, and strong stakeholder engagement. The proposed framework offers a basis for improving current practices and enhancing the sustainability of techno-based instructional strategies in geographically isolated and resource-limited school settings.

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