

Lived Experiences of Elementary Teachers in Contextualizing, Localizing, and Indigenizing Science Lessons in Island Schools

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Abstract: *This phenomenological study explored the lived experiences of elementary teachers in contextualizing, localizing, and indigenizing science lessons in island schools in the districts of Estancia and Carles, Iloilo. Ten purposively selected permanent public elementary science teachers participated in the study. Data were gathered through semi-structured interviews, classroom observations, field notes, and document analysis and were analyzed using thematic analysis. Findings revealed that teachers contextualized and localized science instruction by utilizing learners' immediate environment, including marine resources, fishing activities, weather patterns, coastal ecosystems, and community practices, as foundations for science learning. They also integrated indigenous knowledge, cultural beliefs, traditional ecological practices, and local dialects to make lessons more meaningful and relevant. These approaches enhanced learners' engagement, participation, environmental awareness, and appreciation of their cultural identity. The study further revealed challenges such as limited instructional materials, inadequate training on contextualization and indigenization, insufficient technological resources, transportation difficulties, and challenges in aligning indigenous knowledge with curriculum standards. Despite these constraints, teachers demonstrated resilience, creativity, and adaptability through the use of local resources, collaborative practices, and learner-centered strategies. The study concludes that contextualized, localized, and indigenized science instruction promotes meaningful, culturally responsive, and inclusive learning experiences. It recommends strengthened institutional support, continuous teacher training, and the development of localized instructional resources to enhance science education in island schools.*

Keywords: *Contextualization, Localization, Indigenization, Science Education, Island Schools, Indigenous Knowledge, Culturally Responsive Teaching, Cultural Identity.*

I. INTRODUCTION

Science education plays a vital role in developing learners' scientific literacy, critical thinking skills, and understanding of the natural world. Contemporary educational approaches emphasize contextualized, localized, and indigenized instruction to make science learning more meaningful, relevant, and culturally responsive by connecting scientific concepts to learners' experiences, culture, and community contexts (1).

In the Philippines, the Department of Education promotes contextualization, localization, and indigenization as key strategies for delivering learner-centered and culture-based education. Teachers are encouraged to adapt lessons to local realities and integrate Indigenous Knowledge Systems and Practices to enhance learning outcomes (2,3).

Previous studies have shown that integrating local and Indigenous knowledge into science education improves student engagement, cultural identity, environmental awareness, and conceptual understanding (4,5). Likewise, place-based and culturally responsive teaching approaches enable learners to connect scientific knowledge with their daily experiences and community practices (6,7).

These approaches are particularly significant in island schools, where local ecosystems, marine environments, and traditional ecological knowledge provide valuable contexts for science learning. However, teachers often encounter challenges related to geographical isolation, limited resources, inadequate training, and insufficient institutional support



(8). Despite the growing emphasis on culturally responsive science education, limited research has examined the lived experiences of elementary teachers implementing contextualization, localization, and indigenization in island school settings.

Therefore, this study explored the lived experiences of elementary teachers in contextualizing, localizing, and indigenizing science lessons in island schools. Specifically, it examined their instructional practices, challenges encountered, and coping mechanisms to contribute to the development of more inclusive, culturally grounded, and contextually responsive science education in geographically isolated and disadvantaged communities (2,8).

Theoretical Framework and Conceptual Framework

This study was anchored on three complementary theories: Culturally Responsive Teaching Theory (Ladson-Billings, 1995), Place-Based Education Theory (Sobel, 2004), and Indigenous Knowledge Systems Theory (Cajete, 2000). These theories provided a framework for understanding how elementary teachers contextualize, localize, and indigenize science instruction in island schools.

Culturally Responsive Teaching Theory explains how teachers connect science concepts to learners' cultural backgrounds, lived experiences, and community contexts to make learning meaningful and inclusive (14). Place-Based Education Theory emphasizes the use of local environments, culture, and community experiences as foundations for learning, highlighting the importance of utilizing island contexts and local resources in science instruction (15,16). Indigenous Knowledge Systems Theory recognizes indigenous knowledge as a legitimate source of learning and supports the integration of local ecological knowledge, cultural values, and traditional practices into science education (17,18).

The conceptual framework posits that teachers' lived experiences in contextualizing, localizing, and indigenizing science lessons are shaped by instructional practices, environmental conditions, resource availability, institutional support, and community involvement. These experiences influence the development of coping strategies and pedagogical approaches that contribute to culturally responsive science instruction and provide implications for curriculum development, teacher education, and educational policy in geographically isolated school settings.

Statement of the Problem

This study aimed to explore the lived experiences of elementary teachers in contextualizing, localizing, and indigenizing science lessons in island schools. Specifically, it sought to answer the following questions:

1. How did elementary teachers in island schools describe their lived experiences in contextualizing. Localizing and indigenizing science lessons?
2. How did elementary teachers in island schools experience the process of implementing contextualization, localization, and indigenization in science content and learning activities?
3. What challenges did elementary teachers encounter in contextualizing, localizing, and indigenizing science lessons in island schools?
4. What coping mechanisms and strategies did elementary teachers use to address the challenges encountered in contextualizing, localizing, and indigenizing science lessons?

Significance of the Study

This study provides baseline information on the implementation of contextualization, localization, and indigenization in science instruction within island schools. The findings may assist schools and administrators in identifying strengths, challenges, and areas for improvement in culturally responsive science education while informing targeted support and professional development initiatives. The results may also guide policymakers in refining educational policies and programs for geographically isolated and disadvantaged areas.

For teachers, the study offers insights into effective instructional practices and coping strategies in delivering context-sensitive science lessons. Learners may benefit from more meaningful and culturally relevant learning experiences that integrate local knowledge, resources, and community contexts. Furthermore, the study may strengthen school-



community partnerships by promoting the inclusion of Indigenous knowledge and locally relevant educational practices.

Scope and Limitations

This study utilized a phenomenological qualitative research design to examine the lived experiences of elementary science teachers in contextualizing, localizing, and indigenizing science instruction in island schools. Ten purposively selected elementary science teachers from selected schools in Estancia and Carles, Iloilo, during School Year 2025–2026 participated in the study.

Data were collected through face-to-face semi-structured interviews using a validated interview guide. The data were analyzed using Braun and Clarke's (2021) six-phase thematic analysis framework to identify and interpret significant themes emerging from the participants' experiences.

The study explored how teachers adapted science lessons to local contexts and Indigenous knowledge systems, the challenges they encountered, and the strategies and support systems they employed to address these challenges. While the findings are limited to the specific context of island schools in Estancia and Carles, Iloilo, they provide valuable insights that may contribute to curriculum development, teacher preparation, educational policy, and future research on contextualized, localized, and indigenized science education.

II. REVIEW OF RELATED LITERATURE

Science education at the elementary level is essential in developing scientific literacy, critical thinking, problem-solving skills, and inquiry-based learning that enable learners to make informed decisions about real-world issues (1,2). Effective science instruction emphasizes learner-centered approaches, real-life applications, and meaningful learning experiences.

Contextualization in science teaching enhances learners' understanding by connecting scientific concepts to their experiences, environment, and socio-cultural backgrounds (3). Studies have shown that contextualized instruction increases learner engagement, motivation, and conceptual understanding while encouraging teachers to adopt innovative and relevant pedagogical strategies (4,5,6).

Localization involves adapting curriculum content and instructional materials to reflect learners' local culture, environment, and community contexts. Research indicates that localized science materials improve student performance, engagement, and comprehension by making learning more relevant to everyday experiences (3,7).

Indigenization promotes the integration of Indigenous Knowledge Systems and Practices (IKSP) into science education to make learning culturally responsive and meaningful. Literature highlights that incorporating indigenous perspectives, local ecological knowledge, traditional practices, and community experiences strengthens learner identity, promotes inclusivity, and improves understanding of scientific concepts (8,9,10). Furthermore, culturally responsive and decolonizing educational approaches recognize indigenous voices and support community participation in curriculum development, contributing to more equitable and relevant science education (11,12).

Murphy (2020) examined the factors contributing to successful science education in an isolated rural Australian school despite geographical and resource-related challenges. The study found that high academic achievement and science enrolment were supported by context-responsive teaching practices, the effective use of local resources, strong teacher collaboration, and active community involvement. Place-based learning approaches enhanced students' engagement, motivation, and understanding of scientific concepts by connecting lessons to their local environment. The findings suggest that strengthening teacher capacity and fostering school-community partnerships can improve science education outcomes in geographically isolated and resource-limited settings (13).

III. METHODOLOGY

This study employed a phenomenological qualitative research design to explore the lived experiences of elementary science teachers in contextualizing, localizing, and indigenizing science lessons in island schools. Ten purposively selected science teachers from island schools in Estancia and Carles, Iloilo, participated in the study. The participants



were selected based on their teaching experience and direct involvement in implementing culturally responsive science instruction.

Data were collected through semi-structured interviews, classroom observations, field notes, and document reviews. Research instruments underwent expert validation to ensure clarity, relevance, and alignment with the study objectives. Ethical protocols, including informed consent, confidentiality, voluntary participation, and member checking, were observed throughout the research process.

The collected data were analyzed using Braun and Clarke's thematic analysis framework, which involved data familiarization, coding, theme development, interpretation, and conceptual model development. Through methodological triangulation of interviews, observations, and documentary evidence, the study identified patterns and themes that described teachers' experiences, challenges, strategies, and insights in implementing contextualized, localized, and indigenized science education in geographically isolated island schools.

IV. RESULT

How do elementary teachers in island schools describe their lived experiences in contextualizing, localizing, and indigenizing science lessons?

Teachers described their experiences as a continuous process of adapting science instruction to local realities despite limited resources. They utilized local materials, environmental features, and community knowledge to make lessons meaningful and relevant. Their experiences fostered resilience, creativity, professional growth, and emotional fulfillment as they witnessed increased student engagement and understanding.

How do elementary teachers in island schools experience the process of implementing contextualization, localization, and indigenization in science content and learning activities?

Teachers implemented contextualization, localization, and indigenization by integrating local resources, community experiences, indigenous knowledge, and place-based activities into science lessons. They used materials such as seashells, rainwater, soil samples, and local environmental observations to connect scientific concepts with learners' daily experiences and surroundings.

What challenges do elementary teachers encounter in contextualizing, localizing, and indigenizing science lessons in island schools?

Teachers encountered significant challenges related to geographic isolation, limited instructional resources, inadequate laboratory equipment, unstable electricity and internet connectivity, transportation difficulties, and limited access to professional development opportunities. These constraints affected lesson preparation, instructional delivery, and access to educational support systems.

What coping mechanisms and strategies do elementary teachers use to address the challenges encountered in contextualizing, localizing, and indigenizing science lessons?

Teachers addressed challenges through four major strategies: (1) resourcefulness and creativity by improvising materials and maximizing available resources; (2) collaboration and support systems involving colleagues and community stakeholders; (3) self-directed learning and continuous professional improvement; and (4) learner-centered and inquiry-based teaching approaches that promote active student participation and meaningful learning despite resource limitations.

The study revealed that elementary science teachers in island schools demonstrate resilience, adaptability, and commitment in contextualizing, localizing, and indigenizing science instruction. They make science lessons meaningful by integrating local resources, environmental contexts, and indigenous knowledge into classroom activities. Despite challenges such as geographic isolation, limited resources, inadequate infrastructure, and restricted access to professional development, teachers continue to provide effective instruction through creativity, collaboration, self-directed learning, and learner-centered teaching strategies. These experiences contribute to both improved student engagement and teachers' professional growth.



V. DISCUSSION

The findings revealed that elementary science teachers in island schools actively implement contextualization, localization, and indigenization by integrating local resources, community experiences, and indigenous knowledge into science instruction, making learning more relevant and meaningful for learners (1, 6). Teachers utilized locally available materials and place-based learning strategies to enhance student engagement and understanding of scientific concepts, consistent with previous studies emphasizing the effectiveness of localized and contextualized instruction (7, 13).

Despite these efforts, teachers faced challenges such as limited instructional resources, inadequate facilities, geographic isolation, and restricted access to professional development opportunities. These barriers affected the implementation of culturally responsive science instruction and reflected the realities of teaching in geographically isolated schools (13).

To overcome these challenges, teachers demonstrated resilience through resourcefulness, collaboration with colleagues and community members, and continuous professional learning. These strategies enabled them to sustain meaningful science instruction despite existing constraints (4). Furthermore, the integration of Indigenous Knowledge Systems and Practices promoted cultural relevance, inclusivity, and learner engagement, supporting the importance of culturally responsive and community-based science education (8, 9, 10, 11, 12).

Overall, the study highlights that contextualization, localization, and indigenization are effective approaches in enhancing science education in island schools. However, greater institutional support, resources, and professional development opportunities are needed to strengthen their implementation and improve educational outcomes in geographically isolated settings.

VI. ACKNOWLEDGMENT

The researcher would like to express sincere gratitude to all those who contributed to the completion of this study.

First and foremost, heartfelt thanks are extended to the Almighty God for His guidance, wisdom, strength, and countless blessings throughout the conduct of this research. His grace provided the perseverance and determination needed to overcome challenges encountered during the study.

The researcher expresses profound appreciation to the thesis adviser, panel members, and faculty of the College of Information and Computing Studies for their invaluable guidance, constructive suggestions, expertise, and encouragement that greatly enhanced the quality of this research.

Special thanks are extended to the elementary science teachers from the island schools of Estancia and Carles, Iloilo, who willingly participated in this study. Their time, experiences, insights, and cooperation made this research possible and provided valuable contributions to the understanding of contextualization, localization, and indigenization in science education.

The researcher also acknowledges the support of school administrators and the Department of Education officials who facilitated the conduct of the study and provided the necessary permissions and assistance during data collection.

Sincere appreciation is given to friends, classmates, and colleagues for their encouragement, motivation, and support throughout the research process.

Most importantly, the researcher expresses deepest gratitude to his family for their unwavering love, understanding, patience, moral support, and sacrifices. Their constant encouragement served as a source of inspiration and strength in completing this academic endeavour.

To all who, in one way or another, contributed to the successful completion of this study, the researcher extends heartfelt thanks and appreciation.

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