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RESEARCH ARTICLE

CONTEXTUALIZED SCIENCE PEDAGOGY AND ENVIRONMENTAL LEADERSHIP IN ELEMENTARY EDUCATION: A QUALITATIVE CASE STUDY

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Abstract

This qualitative case study explored the contextualized science pedagogical practices and environmental leadership initiatives of a Grade Six Science teacher in Mountain Province, Philippines. Anchored on Constructivist Learning Theory and Environmental Education Theory, the study examined how localized science instruction, community-based environmental activities, and learner-centered pedagogical approaches contribute to meaningful science learning and environmental awareness among elementary learners. Data were gathered through semi-structured interviews, classroom observations, and document analysis involving one purposively selected Grade Six Science teacher recognized for implementing contextualized and environmentally responsive teaching practices. Thematic analysis revealed four major themes: (1) contextualized and experiential science instruction, (2) integration of environmental awareness and stewardship, (3) learner participation and collaborative scientific inquiry, and (4) challenges in contextualized science and environmental education. Findings showed that the teacher utilized localized environmental issues, indigenous knowledge, outdoor learning activities, and community-based examples to make science concepts relevant and meaningful. Environmental leadership was demonstrated through waste management projects, school gardening, tree-planting activities, and advocacy for ecological responsibility. However, limited instructional resources, insufficient laboratory facilities, time constraints, and geographic challenges affected the sustainability of contextualized science instruction. The study highlights the significance of culturally responsive science pedagogy and environmentally grounded leadership in strengthening science learning and environmental consciousness among elementary learners.

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INTRODUCTION

Science education plays a critical role in developing learners' critical thinking, environmental awareness, and problem-solving abilities necessary for addressing contemporary ecological and societal challenges. In elementary education, science instruction becomes more meaningful when learners are provided with contextualized, experiential, and learner-centered opportunities that connect scientific concepts to their daily lives and community realities. In geographically and culturally diverse areas such as Mountain Province, Philippines, contextualized science pedagogy becomes particularly relevant because learners' experiences are deeply influenced by local environmental practices, indigenous knowledge systems, and community-based ecological traditions.

The Department of Education in the Philippines emphasizes contextualization and localization as essential instructional approaches under the K–12 curriculum framework. These approaches encourage teachers to relate lessons to local culture, environmental realities, and learners' lived experiences to strengthen engagement and understanding. In science education, contextualized teaching allows learners to better appreciate scientific concepts by connecting classroom discussions with local ecological issues, agricultural practices, climate conditions, and environmental concerns within their communities.

Environmental leadership in schools has likewise become increasingly important in promoting ecological awareness, sustainability, and environmental responsibility among learners. Elementary teachers serve not only as facilitators of scientific knowledge but also as environmental role models who shape learners' attitudes and behaviors toward nature conservation and ecological stewardship. Through environmental projects, community involvement, and experiential learning activities, teachers can cultivate environmental consciousness and sustainable practices among young learners.

Existing literature highlights the effectiveness of contextualized and culturally responsive pedagogy in enhancing learner engagement, comprehension, and participation in science education (Gay, 2018; Kolb, 1984). Similarly, environmental education studies emphasize that experiential and community-based learning activities foster ecological awareness and environmental responsibility among learners. However, limited qualitative studies have examined how elementary science teachers in rural Philippine contexts integrate contextualized science instruction and environmental leadership practices within their actual classroom settings.

In Mountain Province, where communities maintain close relationships with the natural environment and indigenous ecological knowledge, science teaching presents unique opportunities for integrating environmental education with localized pedagogical practices. Understanding how teachers navigate contextualized science instruction and environmental leadership may provide valuable insights into strengthening culturally responsive and environmentally sustainable science education in elementary schools.

This study explored the contextualized science pedagogical practices and environmental leadership initiatives of a Grade Six Science teacher in Mountain Province, Philippines. Specifically, it examined instructional strategies, environmental integration practices, learner engagement approaches, and implementation challenges encountered in contextualized science teaching.

Theoretical Framework

This study was anchored on Constructivist Learning Theory by Lev Vygotsky and Experiential Learning Theory developed by David Kolb.

Constructivist Theory emphasizes that learners construct knowledge actively through interaction, collaboration, and meaningful experiences. Science learning becomes more effective when learners engage in inquiry-based, contextualized, and socially interactive activities that connect scientific concepts to real-world experiences.

Experiential Learning Theory explains that learning occurs through concrete experiences, reflection, active experimentation, and application. Environmental education activities such as gardening, ecological observation, recycling projects, and outdoor investigations provide learners with opportunities to develop scientific understanding through direct environmental interaction.

The study was likewise guided by principles of Environmental Education, which emphasize ecological awareness, sustainability, environmental stewardship, and responsible action toward nature conservation.

METHODOLOGY

Research Design

The study utilized a qualitative case study design to examine the contextualized science pedagogical practices and environmental leadership experiences of a Grade Six Science teacher in Mountain Province. The

case study approach enabled an in-depth exploration of classroom realities, instructional strategies, and environmental initiatives within a specific educational context.

Research Participant

The participant of the study was one Grade Six Science teacher from a public elementary school in Mountain Province selected through purposive sampling. The participant was chosen based on experience in science teaching and involvement in environmental and contextualized educational activities.

Data Collection Instruments

Data were gathered using:

- Semi-structured interviews
- Classroom observations
- Document analysis of lesson plans, activity sheets, and environmental project materials

Data Collection Procedure

Permission to conduct the study was secured from school administrators. The participant was informed about the objectives of the study, and informed consent was obtained prior to data collection. Interviews were audio-recorded with permission, while observations and document reviews were conducted to triangulate findings.

Data Analysis

Thematic analysis following the framework of Virginia Braun and Victoria Clarke was utilized in analyzing qualitative data. Codes and themes were developed from recurring patterns identified across interviews, observations, and documents.

Trustworthiness of the Study

Credibility was established through triangulation and member checking. Dependability was ensured through systematic documentation of procedures and audit trails. Confirmability was strengthened through reflective analysis and validation of themes, while transferability was supported through rich descriptions of the research context.

RESULTS

Theme 1: Contextualized and Experiential Science Instruction

The participant emphasized the importance of relating science concepts to learners' daily experiences, local culture, and environmental realities.

"Mas naiintindihan ng mga bata ang science kapag nakikita nila ito sa paligid nila."
("Learners understand science better when they see it in their surroundings.")

The teacher utilized local agricultural practices, weather conditions, mountain ecosystems, and community activities to explain scientific concepts. Science lessons were contextualized through examples familiar to learners such as farming, composting, water conservation, and indigenous environmental practices.

Outdoor learning activities, nature observations, and hands-on experiments were frequently incorporated to enhance learner engagement and comprehension. Learners participated actively in environmental exploration activities and practical science applications within the school and community environment.

These findings support the principles of contextualized and experiential learning, which emphasize connecting instruction to learners' lived experiences and environmental contexts.

Theme 2: Integration of Environmental Awareness and Stewardship

Environmental leadership emerged as a central component of the participant's science teaching practices.

"Hindi lang dapat science ang matutunan nila kundi paano alagaan ang kalikasan."
("They should not only learn science but also how to care for the environment.")

The participant emphasized that environmental education should develop responsibility, discipline, and ecological consciousness among learners. Learners were encouraged to practice environmental stewardship both in school and at home.

The findings indicate that integrating environmental leadership within science instruction promotes ecological awareness and practical environmental responsibility among elementary learners.

Theme 3: Learner Participation and Collaborative Scientific Inquiry

The participant highlighted the importance of collaborative learning and inquiry-based activities in science instruction.

“Mas natututo sila kapag sila mismo ang nag-oobserba at nagtatanong.”
 (“They learn more when they personally observe and ask questions.”)

Collaborative activities such as group investigations, science experiments, peer discussions, and environmental projects were commonly implemented. Learners were encouraged to explore, hypothesize, observe, and share scientific ideas with classmates.

Classroom observations revealed that inquiry-based instruction increased learner curiosity, confidence, and participation. Learners demonstrated greater engagement when lessons involved active exploration and cooperative tasks.

This finding aligns with Constructivist Theory, which emphasizes active learner participation and collaborative interaction in knowledge construction.

Theme 4: Challenges in Contextualized Science and Environmental Education

Despite positive instructional practices, several challenges affected the implementation of contextualized science pedagogy and environmental leadership.

“Mahirap minsan dahil kulang ang kagamitan at limitado ang resources.”
 (“It is difficult at times because equipment and resources are limited.”)

The participant explained that limited access to laboratory equipment and science materials constrained the implementation of hands-on experiments and inquiry activities. Geographic challenges and limited funding also affected participation in larger environmental programs.

Despite these challenges, the participant remained committed to contextualized and environmentally responsive teaching by improvising materials and maximizing locally available resources.

The findings support literature emphasizing that structural and resource limitations continue to affect science education implementation in rural educational settings.

CONCLUSION AND RECOMMENDATION

The study revealed that contextualized science pedagogy and environmental leadership significantly contribute to meaningful science learning and ecological awareness among Grade Six learners in Mountain Province. The participant demonstrated learner-centered and environmentally responsive instructional practices through localized teaching, experiential activities, and environmental advocacy initiatives.

Findings further showed that integrating environmental education within science instruction promotes learner engagement, collaboration, environmental responsibility, and practical scientific understanding. Contextualized instruction enabled learners to connect scientific concepts with their community experiences and environmental realities.

However, challenges related to instructional resources, laboratory facilities, time constraints, and geographic limitations continue to affect the sustainability of contextualized science and environmental education. Strengthening institutional support, teacher training, and resource provision is essential in enhancing science pedagogy and environmental leadership in elementary schools.

Here are the recommendations:

1. Schools should strengthen contextualized and environmentally responsive science education programs.
2. Teachers should be provided with professional development opportunities focusing on contextualized science instruction and environmental education.
3. Educational institutions should allocate additional resources for science laboratory materials and environmental projects.
4. Community partnerships should be strengthened to support school-based environmental initiatives.
5. Future studies may involve multiple participants and schools to broaden understanding of contextualized science pedagogy in rural educational contexts.

REFERENCES

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>

Gay, G. (2018). *Culturally responsive teaching: Theory, research, and practice* (3rd ed.). Teachers College Press.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.

OECD. (2019). *Education at a glance 2019: OECD indicators*. OECD Publishing.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.