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RESEARCH ARTICLE

Experiential Science Learning Practices and Learner Engagement in Multigrade Classrooms: Insights from Dibewan Integrated School, Palanan, Isabela

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Abstract

Experiential learning practices play a vital role in strengthening learner engagement and meaningful understanding in science education, particularly within multigrade classroom settings. This study explored experiential science learning practices and learner engagement in multigrade classrooms at Dibewan Integrated School, Palanan, Isabela. Anchored on Experiential Learning Theory and Constructivist Learning Theory, the study employed a descriptive qualitative research design to examine instructional practices, classroom participation, learner experiences, and engagement in science learning activities. Participants included multigrade learners and science teachers of Dibewan Integrated School. Data were gathered through semi-structured interviews, focus group discussions, classroom observations, and document analysis. Braun and Clarke's (2006) thematic analysis approach was utilized in analyzing the gathered data. Findings revealed that hands-on activities, collaborative learning, contextualized science instruction, outdoor exploration, and practical experimentation significantly strengthen learner participation and engagement in multigrade science classrooms. Learners demonstrated greater curiosity, motivation, and conceptual understanding when science lessons were connected to environmental experiences, local resources, and real-life applications. The findings further revealed that supportive teacher facilitation and learner-centered instructional practices contribute significantly to behavioral, emotional, and cognitive engagement in science learning. However, challenges such as limited instructional resources, time management difficulties, varying learner abilities, and classroom management concerns affected instructional implementation and learner participation. The study concludes that experiential and contextualized science learning practices significantly contribute to meaningful engagement and scientific understanding among multigrade learners. Strengthening localized science instruction, collaborative learning strategies, and experiential teaching approaches is recommended to improve learner participation and engagement in multigrade science education.

Keywords: experiential learning, science education, learner engagement, multigrade classrooms, contextualized instruction, qualitative research, science learning practices

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INTRODUCTION

Science education plays a significant role in developing learners' curiosity, critical thinking, problem-solving abilities, environmental awareness, and scientific literacy. Through science instruction, learners develop understanding of natural phenomena, scientific inquiry, experimentation, and the relationship between science and everyday life. In elementary education, meaningful science learning experiences are essential in helping learners develop foundational scientific concepts and positive attitudes toward learning.

In multigrade classroom settings, science instruction becomes more complex because teachers simultaneously manage learners from different grade levels, learning abilities, developmental stages, and curricular competencies within a single classroom environment. Multigrade teachers continuously employ adaptive instructional strategies and flexible classroom practices to address diverse learning needs while maintaining learner participation and engagement in science instruction.

One instructional approach that significantly supports science learning in multigrade classrooms is experiential learning. Experiential learning refers to instructional practices that allow learners to actively participate in hands-on activities, experiments, observations, exploration, and reflective learning experiences. Learners develop scientific understanding more effectively when they interact directly with materials, environments, and practical activities related to scientific concepts.

Learner engagement, on the other hand, refers to learners' behavioral, emotional, and cognitive participation in classroom instruction and learning activities. Engaged learners demonstrate attentiveness, curiosity, motivation, collaboration, and active involvement during classroom tasks and discussions. In science education, learner engagement is strengthened when instructional practices are interactive, contextualized, inquiry-based, and connected to learners' real-life experiences.

Within the Philippine educational context, the Department of Education emphasizes learner-centered and contextualized instruction under the K–12 curriculum to promote meaningful learning and improve classroom participation among learners. Science teachers are encouraged to utilize experiential, inquiry-based, and contextualized teaching approaches to strengthen scientific literacy and learner engagement.

At Dibewan Integrated School in Palanan, Isabela, multigrade science teachers continuously employ experiential learning practices to improve learner engagement and participation in science instruction. Teachers integrate hands-on activities, environmental exploration, contextualized examples, collaborative tasks, and practical experimentation to make science lessons more understandable and meaningful for learners. However, despite these efforts, teachers continue to encounter instructional challenges related to limited resources, multigrade classroom management, and varying learner abilities.

Several studies emphasized that experiential and learner-centered science instruction positively influences learner engagement and conceptual understanding. Kolb (2019) explained that experiential learning promotes deeper understanding through concrete experiences, reflection, experimentation, and active participation. Similarly, Bransford et al. (2020) argued that learners understand scientific concepts more effectively when instruction involves inquiry, collaboration, and practical application.

Although experiential science instruction has been widely discussed in educational literature, there remains limited qualitative research exploring experiential learning practices and learner engagement in multigrade science classrooms within rural Philippine educational settings. Thus, this study aimed to explore experiential science learning practices and learner engagement in

multigrade classrooms at Dibewan Integrated School, Palanan, Isabela.

Theoretical Framework

This study was anchored on Experiential Learning Theory by Kolb (2019) and Constructivist Learning Theory by Vygotsky (1978).

Experiential Learning Theory posits that learning occurs through concrete experiences, reflective observation, active experimentation, and conceptual understanding. Learners develop deeper understanding when they actively participate in hands-on and meaningful learning activities.
Constructivist Learning Theory explains that learners actively construct knowledge through interaction, collaboration, reflection, and meaningful experiences. Learning becomes more effective when instructional practices are participatory, contextualized, and connected to learners' prior knowledge and experiences.

These theories provided the framework for understanding how experiential learning practices influence learner engagement and meaningful participation in multigrade science classrooms.

OBJECTIVES OF THE STUDY

This study aimed to explore experiential science learning practices and learner engagement in multigrade classrooms at Dibewan Integrated School, Palanan, Isabela. Specifically, it sought to examine learners' classroom experiences and participation in science learning activities and identify experiential science learning practices that contribute to learner engagement in multigrade classrooms. The study further aimed to explore how learners demonstrate behavioral, emotional, and cognitive engagement during science instruction. Additionally, it intended to identify the challenges encountered by teachers and learners in implementing experiential science learning activities within multigrade classroom settings. Finally, the study aimed to derive insights from the participants' experiences that may serve as basis for strengthening experiential science instruction and learner engagement in multigrade education.

METHODOLOGY

This study employed a descriptive qualitative research design to explore experiential science learning practices and learner engagement in multigrade classrooms at Dibewan Integrated School, Palanan, Isabela. The qualitative approach enabled the researcher to gather rich and contextualized descriptions regarding instructional interactions, classroom participation, learner engagement, and experiential science learning experiences within multigrade settings. Through qualitative inquiry, the study captured the lived classroom experiences of learners and teachers and examined how experiential instruction influences participation and meaningful learning in science education.

The study was conducted at Dibewan Integrated School located in Palanan, Isabela, Philippines. The school operates under the supervision of the Department of Education and serves learners from geographically isolated and rural communities.
The participants of the study included selected multigrade learners and science teachers. Purposive sampling was utilized to select participants who possessed direct experiences and active involvement in science learning activities and multigrade classroom instruction. The selected learners represented varying participation levels, grade levels, and classroom engagement experiences.

The study utilized semi-structured interview guides, focus group discussion guides, classroom observation notes, and document analysis checklists as qualitative research instruments.

Interview questions focused on science learning experiences, learner participation, instructional practices, experiential learning activities, engagement behaviors, and challenges encountered during science instruction.

Prior to data gathering, permission was secured from school administrators and ethical considerations including informed consent, confidentiality, anonymity, and voluntary participation were strictly observed throughout the study. Data were gathered through interviews, focus group discussions, classroom observations, and document analysis. All interviews and discussions were audio-recorded with participants' consent and transcribed verbatim for analysis.

The gathered data were analyzed using Braun and Clarke's (2006) thematic analysis approach. Significant statements and recurring patterns were identified, coded, categorized, and organized into themes representing experiential science learning practices and learner engagement experiences. Trustworthiness was established through triangulation, member checking, audit trails, and thick description to ensure credibility and dependability of the findings.

RESULTS AND DISCUSSION

Theme 1: Hands-On and Experiential Activities Strengthen Learner Engagement
The findings revealed that learners become more engaged in science instruction when classroom activities are experiential, interactive, and hands-on. Participants consistently emphasized that science lessons become more meaningful and enjoyable when learners actively participate in experiments, environmental observations, outdoor exploration, gardening activities, and practical demonstrations.

One learner participant stated:
"Mas gusto ko ang science kapag may experiments at actual activities kasi mas naiintindihan ko ang lesson."
Another learner shared:
"Kapag kami mismo ang gumagawa, mas natatandaan namin ang tinuturo."
Similarly, another participant explained:
"Mas exciting ang science kapag may outdoor activities at observations."

These responses indicate that experiential science learning positively influences learners' behavioral and cognitive engagement in classroom instruction. Learners become more attentive, participative, and curious when instructional activities involve direct interaction with materials, environmental resources, and practical science experiences.

Teachers also emphasized that experiential activities improve learners' understanding of scientific concepts and processes.

One teacher participant stated:
"Mas madaling maintindihan ng learners ang science concepts kapag actual nilang nakikita at ginagawa."
Another participant explained:
"Kapag experiential ang activities, mas active at interesado ang learners."

The findings suggest that experiential science instruction contributes significantly to meaningful learning experiences and conceptual understanding in multigrade classrooms. Learners become more capable of understanding scientific ideas when they actively explore, observe, and interact with their environment.

The findings support Kolb (2019), who emphasized that experiential learning strengthens conceptual understanding through active participation, reflection, and direct experience. Similarly, Bransford et al. (2020) argued that learners understand scientific concepts more

effectively through inquiry-based and experiential instructional practices.

The findings further align with Vygotsky's (1978) Constructivist Learning Theory, which posits that learners actively construct knowledge through meaningful interaction, participation, and experiential learning opportunities.

Classroom observations further revealed that learners demonstrated higher levels of attentiveness, participation, and enthusiasm during practical science activities and environmental exploration tasks.

One learner participant shared:
"Mas masaya at mas madaling matuto kapag actual naming ginagawa ang activities."
This finding highlights the importance of experiential and hands-on science instruction in strengthening learner engagement and meaningful participation in multigrade classrooms.

Theme 2: Contextualized and Environmental-Based Science Instruction Promotes Meaningful Learning

The study further revealed that contextualized and environmental-based science instruction significantly strengthens learner engagement and comprehension in multigrade science classrooms. Participants explained that science lessons become easier to understand when instructional examples and activities are connected to learners' environment, community experiences, and daily life situations.

One learner participant stated:
"Mas naiintindihan ko ang lesson kapag ginagamit ang mga bagay na nakikita namin sa paligid."
Another learner shared:
"Kapag tungkol sa environment at community namin ang examples, mas relatable ang lesson."
Similarly, another participant explained:
"Mas interesting ang science kapag connected sa totoong buhay."

These responses indicate that contextualized science instruction positively influences learners' cognitive and emotional engagement during science learning activities. Learners become more motivated and curious when science concepts are linked to familiar environmental experiences and practical applications.

Teachers also emphasized the importance of utilizing local materials and environmental examples in science instruction.

One teacher participant stated:
"Malaking tulong ang paggamit ng local examples para mas maintindihan ng learners ang concepts."
Another participant explained:
"Ginagamit namin ang paligid bilang learning resource dahil limitado ang materials."

The findings suggest that contextualized science instruction promotes meaningful learning experiences and strengthens scientific understanding among multigrade learners. Environmental-based learning activities encourage learners to appreciate the relevance of science in everyday life and community experiences.

The findings support Gay (2018), who emphasized that contextualized and culturally responsive instruction strengthens learner engagement and meaningful learning experiences. Similarly, Dewey (2019) argued that education becomes more meaningful when instruction is connected to learners' experiences and environment.

The findings further align with Experiential Learning Theory, which posits that learning occurs more effectively when learners actively engage in meaningful and context-based experiences (Kolb, 2019).

Participants further revealed that environmental exploration activities increase learners' curiosity and scientific awareness.

One learner participant stated:
"Mas natututo kami kapag nag-oobserve kami ng plants, animals, at environment."
This finding highlights the importance of contextualized and environmental-based science instruction in promoting meaningful engagement and scientific understanding in multigrade classrooms.

Theme 3: Collaborative Learning and Peer Interaction Enhance Participation
The findings revealed that collaborative learning activities and peer interaction significantly contribute to learner participation and engagement in science instruction. Participants explained that group activities, peer discussions, collaborative problem-solving, and shared experiments help learners become more confident and active during classroom learning activities.

One learner participant stated:
"Mas natututo ako kapag may group activities kasi nagtutulungan kami."
Another learner explained:
"Kapag collaborative ang activities, mas hindi kami nahihiyang magtanong."
Similarly, another participant shared:
"Mas exciting ang science kapag sabay-sabay naming ginagawa ang experiments."

These responses indicate that collaborative instructional practices positively influence learners' behavioral and emotional engagement in multigrade classrooms. Learners become more comfortable participating in science activities when they work collaboratively with peers and receive support from classmates.

Teachers also emphasized that peer interaction helps improve classroom participation and confidence among learners.

One teacher participant stated:
"Kapag collaborative ang activities, mas nagiging confident ang learners sa participation."
Another participant explained:
"Nagtutulungan ang older at younger learners sa multigrade classroom."

The findings suggest that collaborative learning environments strengthen social interaction, learner confidence, and meaningful participation during science instruction. Peer-assisted learning becomes especially important in multigrade classrooms where learners possess varying grade levels and learning abilities.

The findings support Johnson and Johnson (2020), who emphasized that collaborative learning improves learner participation, communication skills, and academic engagement. Similarly, Vygotsky (1978) argued that learning is strengthened through social interaction, collaboration, and guided participation.

The findings further revealed that collaborative activities help learners develop communication skills and teamwork.

One learner participant shared:
"Mas nagiging cooperative kami kapag group activities ang science."
This finding highlights the importance of collaborative and participatory instructional practices in

strengthening learner engagement and social interaction within multigrade science classrooms.

Theme 4: Multigrade Classroom Challenges Affect Science Instruction and Learner Engagement

Despite positive engagement experiences, the findings revealed that teachers and learners encounter several challenges affecting experiential science instruction and classroom participation in multigrade settings. Participants identified limited instructional materials, time management difficulties, varying learner abilities, classroom management concerns, and insufficient science resources as major barriers to effective science instruction.

One teacher participant stated:
"Challenge talaga ang kakulangan sa science materials at equipment."
Another participant explained:
"Mahirap minsan pagsabayin ang iba't ibang grade levels sa isang classroom."
Similarly, another teacher shared:
"Kulang minsan ang oras para matutukan lahat ng learners."

These responses indicate that multigrade classroom realities significantly influence instructional implementation and learner participation. Teachers experience difficulties balancing instructional responsibilities and addressing diverse learner needs within a single classroom environment.

Learners also emphasized that varying classroom abilities sometimes affect participation and understanding during science activities.

One learner participant stated:
"May activities na nahihirapan akong sundan kapag mabilis ang discussion."
Another learner explained:
"Minsan maingay at magulo kapag sabay-sabay ang activities."

The findings suggest that multigrade instructional settings require strong classroom management, flexible instructional strategies, and adaptive pedagogical practices to sustain learner engagement and effective classroom participation.

The findings support OECD (2019), which highlighted that instructional resource limitations and classroom diversity significantly influence learner engagement and instructional effectiveness. Similarly, Fullan (2020) emphasized that teachers in complex classroom settings require adaptive and flexible instructional approaches to address diverse learner needs.

Participants further revealed that geographical isolation and limited school resources affect science instruction.

One teacher participant stated:
"Dahil malayo ang school, limitado rin minsan ang access sa science materials."

This finding implies the need for stronger institutional support systems and localized instructional resources to strengthen science education in geographically isolated multigrade schools.

Despite these challenges, participants emphasized that experiential and collaborative instructional approaches continue to improve learner engagement and classroom participation.

One learner participant shared:
"Kahit mahirap minsan, mas gusto pa rin namin ang science kapag actual at interactive ang activities."

This finding highlights the resilience of teachers and learners in sustaining meaningful science learning experiences despite multigrade instructional challenges.

CONCLUSION

The study revealed that experiential science learning practices significantly contribute to learner engagement and meaningful learning experiences in multigrade classrooms at Dibewan Integrated School, Palanan, Isabela. Hands-on activities, practical experimentation, environmental exploration, and collaborative science tasks strengthen learners' participation, curiosity, and conceptual understanding in science education. Learners become more motivated and actively engaged when science instruction is experiential, interactive, and connected to real-life situations and environmental experiences.

The findings further revealed that contextualized and environmental-based science instruction promotes meaningful learning and strengthens learners' appreciation of scientific concepts and their practical relevance. Collaborative learning activities and peer interaction also contribute significantly to learners' confidence, participation, communication skills, and classroom engagement within multigrade learning environments.

However, the study found that multigrade science instruction continues to encounter several challenges, including limited instructional resources, time management difficulties, classroom management concerns, varying learner abilities, and geographical limitations. These challenges affect instructional implementation and learner participation in science learning activities.

Overall, the study concludes that experiential and contextualized science learning practices play a significant role in promoting meaningful engagement, scientific understanding, and active participation among multigrade learners. Strengthening experiential instruction, collaborative learning environments, localized science resources, and adaptive pedagogical approaches is essential in improving learner engagement and science education in multigrade classrooms.

CONCLUSION AND RECOMMENDATION

The findings of the study provide important implications for science education, multigrade instruction, learner engagement, educational leadership, curriculum implementation, and future research. The study emphasizes the importance of experiential and learner-centered instructional practices in strengthening science learning and classroom participation among multigrade learners.

Educational Implications

The findings imply that science instruction in multigrade classrooms should become more experiential, contextualized, interactive, and learner-centered to strengthen learner engagement and conceptual understanding. Teachers may integrate practical experiments, environmental exploration, collaborative learning activities, and localized science instruction to make learning experiences more meaningful and participatory.

The study further implies that contextualized science instruction strengthens learners' appreciation of science by connecting lessons to environmental realities, community experiences, and practical life situations. Meaningful science learning occurs when learners recognize the relevance of scientific concepts within their daily experiences.

Additionally, the findings suggest that collaborative learning environments contribute positively to learner participation, communication, teamwork, and confidence in multigrade science

classrooms.

Pedagogical Implications
The findings imply that teachers play an essential role in facilitating meaningful science learning experiences and learner engagement within multigrade instructional settings. Teachers should demonstrate flexibility, creativity, adaptability, and instructional responsiveness in addressing diverse learner needs and classroom realities.

The study also highlights the importance of experiential and inquiry-based pedagogies in science education. Teachers may utilize hands-on activities, peer-assisted learning, collaborative problem-solving, environmental observation, and practical experimentation to strengthen scientific understanding and classroom participation.

Furthermore, the findings imply that multigrade science teachers require strong classroom management skills and differentiated instructional approaches to effectively facilitate diverse learners within a single classroom environment.

Institutional and Policy Implications
The findings provide important implications for educational leaders and policymakers within the Department of Education regarding the strengthening of science education in multigrade and geographically isolated schools. Educational institutions may strengthen science instruction by providing localized instructional materials, laboratory resources, contextualized science modules, and teacher training programs focusing on multigrade pedagogy and experiential learning approaches.

The study further implies the need for stronger institutional support systems that address resource limitations and instructional challenges in rural and multigrade schools.
Moreover, the findings suggest the importance of developing localized and low-cost science learning materials that maximize available community and environmental resources.

Social and Environmental Implications
The findings imply that contextualized and environmental-based science instruction contributes significantly to learners' environmental awareness and appreciation of local ecological resources. Experiential science learning helps learners become more conscious of environmental issues and the importance of science in community life and sustainability.

The study also highlights the importance of collaborative learning environments in promoting cooperation, communication, and social interaction among multigrade learners.

Implications for Future Research
The findings highlight the need for future studies exploring experiential science learning and learner engagement across different multigrade and rural educational settings. Future researchers may conduct comparative studies involving urban and rural multigrade schools to examine differences in instructional practices and learner engagement experiences.

Longitudinal and mixed-methods studies may also be conducted to explore the long-term influence of experiential learning practices on scientific literacy, academic performance, and learner motivation.

Future studies may likewise investigate the role of technology integration, indigenous knowledge systems, and environmental education in strengthening experiential science instruction within multigrade educational contexts.

Overall, the study emphasizes that strengthening science education in multigrade classrooms requires collaborative efforts among teachers, school leaders, educational institutions,

policymakers, communities, and learners. Experiential instruction, contextualized learning, collaborative classroom environments, and adaptive pedagogical practices are essential in promoting meaningful science learning experiences and improving learner engagement in multigrade education.

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