



MULTIMEDIA IN SCIENCE INSTRUCTION: TEACHERS' EXPERIENCES IN A MOUNTAIN SCHOOL AS BASES FOR ENHANCEMENT PROGRAM

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ABSTRACT

This study explored the experiences of teachers in using multimedia in science instruction in a mountain school, serving as a basis for enhancement program at Igbita-Tigmalapad Elementary School during the School Year 2025-2026. Findings revealed that multimedia is a catalyst for meaningful science learning, tool for differentiated and inclusive instruction, strategy for enhancing engagement and interaction, and springboard for teachers' professional growth. Challenges included limited internet connectivity, insufficient multimedia equipment, difficulty in selecting appropriate multimedia resources, and professional development gap in multimedia. Teachers coped through alternative and localized instructional materials, preparation of offline multimedia resources, collaboration and peer support among teachers, and instructional flexibility and professional expertise. Based on these results, a Multimedia Integration Enhancement Program (MIEP) was proposed to improve teachers' multimedia competence, provide training in low-cost and offline resources, and support effective science teaching in mountain schools.

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Keywords: *Enhancement, Mountain school, Multimedia, Science Instruction, Teachers Experiences*

INTRODUCTION

Multimedia instructional resources that embed text, audio, video, animation and interactivity are widely used as an instructional tool to help improve student learning outcomes based on evidence from different learning environments (Abdulrahman et al., 2020). Instructional resources are intended to ease engagement and support the learning of complex content and diversity of learning styles. The use of multimedia, when appropriately used and aligned with learning objectives, has been shown to be effective in increasing motivation and the retention of information (Abdulrahman et al., 2020; Staneviciene et al., 2025).

Despite the evident benefits of using multimedia in raising engagement and improving learning outcomes, the integration of such technologies into science instruction remains unequal, particularly in resource-constrained or rural settings. Studies in rural schools have highlighted persistent challenges—limited infrastructure, insufficient training, and lack of digital support—which hinder effective multimedia adoption by teachers (Stanley & Marsden, 2018; Enterieva, 2025). In rural contexts, the absence of robust technological infrastructure often limits teachers’ ability to leverage digital resources, reducing opportunities for students to benefit from diverse learning modalities that multimedia offers (Tyler-Wood et al., 2018; Enterieva, 2025).

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At a national level, research from the Philippines reveals that multimedia technology is increasingly integrated into classroom practice, yet significant obstacles persist. A study on the use of multimedia technology in teaching shows that while teachers often utilize multimedia in instruction, the effectiveness of such use varies with teacher characteristics and professional preparation (Generalao, 2025). Moreover, research on technology utilization in science instruction in select Philippine districts, such as Sarangani in Davao Occidental, indicates that science teachers are only moderately skilled in using multimedia resources, and that training and support for technology integration remain limited (Arellano & Lumogdang, 2025).

Locally, although studies on multimedia integration in rural or mountain schools are sparse, evidence points to broader gaps in teacher preparedness, resource availability, and contextualized strategies for multimedia use in science classrooms. Existing research emphasizes that teachers in rural or underserved schools face distinct challenges—including lack of infrastructure, limited professional development opportunities, and contextual constraints unique to their environment—that can influence their experience and effectiveness in integrating multimedia into instruction (Enterieva, 2025; Tyler-Wood et al., 2018).

Since the success of multimedia in teaching depends heavily on teacher competency and contextual alignment, examining teachers' lived experiences in a mountain school provides valuable insights to inform enhancement strategies tailored to similar environments. These insights may contribute to narrowing the gap between multimedia potential and its

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practical application in science instruction, particularly where technological and geographical barriers exist, enhancing both teaching practice and student learning outcomes.

MATERIALS AND METHODS

Research Methodology

This chapter outlines the research methodology, design, and participants involved in the study, as well as the data collection processes, instruments used, and analytical techniques. The research focuses on identifying the experiences of teachers using multimedia in Science instruction within a mountain school to serve as a foundation for instructional enhancement.

Research Method

The research methodology employed in this study was qualitative, utilizing in-depth interviews. Qualitative descriptive research is intended to systematically and precisely characterize a phenomenon in its natural state, enabling researchers to portray actual practices, perceptions, and experiences within educational environments without the manipulation of variables.

According to Hall and Liebenberg (2024), the descriptive qualitative approach is particularly appropriate for studies aiming to provide a thorough, holistic, and rich summary of participants' lived experiences, ensuring that the findings remain closely aligned with the data and provide an accurate representation of teachers' perspectives and practices. This method allows the researcher to capture detailed insights into how science teachers in a

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mountain school integrate multimedia in instruction, the challenges they face, and the coping strategies they employ, thereby providing a meaningful and contextual understanding of the phenomenon under study (Hall, T., & Liebenberg, L., 2024).

During the data collection phase, the researcher and the participant were positioned at a comfortable distance to encourage focus and a sense of ease. The participant was prompted to reflect on a series of questions concerning specific challenges in science teaching. This interaction was designed to elicit the participants' primary perspectives, experiences, and insights within their professional and social environments, allowing the researcher to gain a deeper understanding of the phenomenon from the teachers' viewpoints.

Research Design

This research employed a phenomenological design, a qualitative method intended to investigate and characterize the lived experiences of individuals regarding a particular phenomenon. Rather than testing hypotheses or forming generalizations, phenomenology focuses on uncovering the meaning and essence of an experience through the participants' perceptions, prioritizing the subjective realities and interpretations of those who have personally encountered the phenomenon (McLeod, 2024; Bantugan, 2025). This approach is particularly suitable for educational research that aims to explore how teachers experience and make sense of using multimedia in science instruction within the unique context of a mountain school. Phenomenological inquiry involves in-depth engagement with participants—often through interviews—to identify common themes, perceptions, and meanings that

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emerge from their experiences, allowing the researcher to gain a rich and holistic understanding of the phenomenon under study (Deakin University Library, 2024).

Participants of the Study

The study's participants comprised seven (7) purposively selected Science teachers from Igbita Tigmalapad Elementary School in the Miagao West District, Municipality of Miagao. These educators were actively teaching Science and possessed direct experience in the subject area. Each individual had a minimum of one year of teaching experience at the institution. Inclusion was limited to those willing to discuss their experiences, difficulties, and adaptation strategies regarding multimedia use in Science instruction. Before their involvement, participants were thoroughly briefed on the study's nature and provided their informed consent.

Sampling Design

Purposive sampling was used in this study to identify participants capable of providing the most pertinent and comprehensive information regarding the phenomenon. As stated by Etikan, Musa, and Alkassim (2020), this non-probability sampling technique involves the deliberate selection of individuals based on specific traits that align with the research goals. Also referred to as judgmental sampling, this method relies on the researcher's professional judgment to select participants who have lived the experience and can provide profound and significant insights. In the context of this study, purposive sampling ensures that the selected science teachers have direct experience with using multimedia in science instruction, enabling a deep exploration of their lived experiences, challenges, and coping strategies.

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Research Instrument

The research tool employed for this study consisted of an interview schedule developed by the researcher.

In qualitative research, an interview schedule serves as a structured or semi-structured guide that includes questions or topics the researcher plans to explore during the interview process. Its purpose is to systematically cover all relevant areas while allowing flexibility for probing and follow-up questions, ensuring rich, detailed, and comparable data across participants (Palinkas et al., 2020).

For this study, the interview schedule contains three main questions designed that address the objectives of the research. Furthermore, with the participants' prior agreement, audio and video recording devices were employed to capture the interviews, ensuring the precision and thoroughness of the gathered data.

Validity of the Research Instrument

Prior to confirming the validity of the researcher-constructed interview schedule, the tool was assessed by the research adviser, the Graduate School Dean, and a panel of specialists with established proficiency in research methodology, assessment, and the English language. This process aimed to ensure that each question was clear, relevant, and aligned with the study's objectives.

Validity refers to the degree to which a research instrument accurately measures the concept it intends to examine, and whether the findings, interpretations, and conclusions drawn from the study are meaningful and credible (Marshall & Rossman, 2021). Establishing

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content validity involves verifying that the questions and format align with the study's framework, variables, and objectives. Expert review is a critical step in this process, providing feedback on the clarity, relevance, and representativeness of each item. Incorporating the comments, suggestions, and corrections from the panel ensures that the instrument is consistent with the study's goals and enhances the trustworthiness and accuracy of the data collected (Polit & Beck, 2021).

The panel's feedback was systematically considered, and modifications were made as necessary, using the appropriate form of Good and Scates (1972) as cited by Soqueña (2021) (Appendix A).

Data Gathering Procedures

Before initiating the study, the researcher secured the necessary permits and approvals from the research adviser, the Dean of the Graduate School, the Office of the Schools Division Superintendent, the Office of the District Supervisor, the school head, and the participants themselves. Interviews were carried out in locations that were convenient and comfortable for the participants, such as their school or community setting.

Before the interview, the researcher asked the participants to sign a waiver or consent form related to the conduct of the study.

The study used in-depth interviews as the primary method of data collection, and voice and video recorders were utilized, with the participants' consent, to accurately capture their responses. After completing all the interviews, the researcher systematically organized and

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consolidated the collected data for analysis to ensure that the participants' experiences, perspectives, and insights were properly represented.

Data Analyses

The information collected through the researcher-constructed interview schedule was evaluated using thematic analysis, which is a structured qualitative technique employed to recognize, explain, and document repeating patterns or themes within narrative information. This specific approach allowed the investigator to gain profound and significant understanding regarding the lived experiences, obstacles, and adaptive behaviors of science educators while incorporating multimedia tools into their teaching practices within a mountain school environment.

Each interview transcript was carefully reviewed and coded to extract emerging themes that reflect teachers' experiences. The thematic analysis enabled the researcher to systematically organize and interpret the qualitative data, ensuring that the participants' perspectives and lived experiences are faithfully represented and serve as a basis for developing enhancement strategies for multimedia-based science instruction.

According to Braun and Clarke (2023), thematic analysis offers a structured yet adaptable framework for investigating qualitative information, enabling investigators to distinguish both the surface-level and underlying meanings within the stories shared by participants. This methodology is especially appropriate for research in education that aims to

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investigate intricate social engagements, teaching methods, and the functional dynamics of organizations.

The transcripts from the interviews were processed using Thematic Analysis (Braun & Clarke, 2023), a strategy that is exceptionally efficient for recognizing, explaining, and displaying recurring patterns or motifs within qualitative datasets.

The analytical procedure adhered to the established six-stage sequence:

1. Familiarization with the Data: The investigator engaged in repeated readings of the transcripts in both the original local dialect and the English version.
2. Generating Initial Codes: Brief labels or phrases, such as "shared phone," "fear of judgment," and "poor signal," were assigned to significant portions of the data.
3. Searching for Themes: Preliminary codes were categorized into more expansive themes and sub-themes representing major patterns (for instance, grouping codes like "no insult" and "private correction" under a single theme).
4. Reviewing Themes: The identified themes were polished and checked against the full dataset to verify that they precisely represented the participants' intentions and stayed consistent with the research objectives.
5. Defining and Naming Themes: Final themes were given precise, brief, and scholarly titles, which are to be detailed in Chapter 4.

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6. Producing the Report: These themes were woven into the descriptive presentation, analysis, and discussion of the data (Chapter 4), corroborated by verbatim quotes and linked to the research's theoretical basis.

RESULTS AND DISCUSSIONS

This research explored the utilization of multimedia within Science pedagogy, centering on the lived experiences of educators in a highland educational setting to provide a foundation for instructional improvement at Igbita-Tigmalapad Elementary School during the 2025–2026 academic year.

In particular, the investigation aimed to analyze the experiences of science faculty in incorporating multimedia tools, the obstacles they faced, the adaptive techniques they utilized, and the suggestions offered to bolster multimedia integration in science education.

The inquiry adopted a qualitative methodology centered on comprehensive interviews. It further utilized a phenomenological research framework to gain a profound understanding of the firsthand experiences of science teachers as they embedded multimedia into their instructional routines.

The study's subjects consisted of seven (7) science educators from Igbita–Tigmalapad Elementary School within the Miagao West District, Municipality of Miagao, selected via purposive sampling. These individuals were chosen based on their direct involvement in Science instruction and their use of multimedia resources.

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The primary data collection tool was an interview guide developed by the investigator. Furthermore, audio and video recording equipment were employed, with the subjects' permission, to guarantee the precision and thoroughness of the gathered information.

The interview guide underwent validation by a committee of specialists, and the investigator meticulously incorporated all evaluations and recommendations provided during the instrument's assessment phase.

Authorizations were obtained from the Office of the Schools Division Superintendent, the District Supervisor, the School Principal, and the participants to facilitate the proper execution of the research. The investigator personally administered the interviews in settings that prioritized the comfort and accessibility of the respondents.

Through extensive interviewing, the participants' feedback was captured using audio and video devices. Following the completion of these sessions, the investigator assembled and structured the entirety of the accumulated data.

The compiled information was processed and interpreted using thematic analysis.

The results of the study are as follows:

Based on the results of the in-depth interview with the participants, it was found out that the experiences of science teachers in using multimedia for science instruction in a mountain school included catalyst for meaningful science learning, tool for differentiated and inclusive instruction, strategy for enhancing engagement and interaction, and springboard for teachers' professional growth.

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It was found out that science teachers encountered challenges in integrating multimedia into science instruction in a mountain school setting including limited internet connectivity, insufficient multimedia equipment, difficulty in selecting appropriate multimedia resources, and professional development gap in multimedia.

It was also found out that the coping strategies of teachers in addressing multimedia integration challenges in science instruction included resourcefulness through alternative and localized instructional materials, preparation of offline multimedia resources, collaboration and peer support among teachers, and instructional flexibility and professional expertise.

Based on the findings, the following insights were drawn:

The experiences of science teachers revealed that multimedia plays a significant role in enhancing science instruction. The use of multimedia resources such as videos, images, presentations, and interactive materials helps teachers explain abstract scientific concepts more clearly and enables learners to better visualize scientific processes. Multimedia also supports different learning styles and promotes deeper understanding among learners.

The findings also revealed that despite recognizing the benefits of multimedia integration, science teachers in mountain schools encounter several limitations such as poor internet connectivity, insufficient technological equipment, and challenges in selecting appropriate multimedia resources for instruction, which can hinder effective teaching and learning process. These challenges indicate that the successful integration of multimedia in teaching is highly dependent on the availability of resources and professional support for teachers.

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The study highlights the resilience and adaptability of teachers in addressing these challenges. Teachers demonstrated creativity and resourcefulness by utilizing offline multimedia materials, contextualized resources from the local environment, collaboration with colleagues, and flexible instructional strategies to ensure that learning continues despite technological limitations. These practices emphasize the importance of teacher competence, preparation, and collaboration in overcoming instructional barriers.

CONCLUSION

In the light of the findings and insights arrived at in this study, the following recommendations are forwarded:

Science teachers should continue utilizing multimedia as a strategy to enhance science instruction and to improve learners' understanding of scientific concepts. Teachers are encouraged to develop creative and contextualized multimedia materials that suit the learning needs of their students.

Schools should provide adequate technological resources such as laptops, projectors, speakers, and printed visual materials to support multimedia-based instruction. Establishing a shared digital resource bank within the school may also help teachers access and share multimedia instructional materials more easily.

School administrators and the Department of Education should provide continuous professional development programs such as seminars, workshops, and training sessions focused on multimedia integration, digital resource management, basic ICT troubleshooting,

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and consider providing offline digital learning packages and allocating funds for ICT infrastructure, particularly in geographically isolated schools where internet connectivity is limited. These programs will help teachers strengthen their competence in utilizing multimedia tools effectively in the classroom.

Schools are encouraged to implement the Multimedia Integration Enhancement Program (MIEP) to strengthen teachers' capacity in using multimedia resources effectively in science instruction. Through training programs, collaborative learning activities, and improved access to multimedia tools, teachers can enhance the quality of science teaching in mountain school settings.

Future researchers are encouraged to conduct similar studies in other schools or districts to further examine the effectiveness of multimedia integration in science instruction and to explore additional variables that may influence its implementation.

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