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## RESEARCH ARTICLE

### Science 6 Instruction in Public Elementary Schools: Teachers' Pedagogical Experiences, Instructional Practices and Challenges in Legislative District IV, Schools Division of Isabela

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#### Abstract

This qualitative study explored the pedagogical experiences, instructional practices, perceptions, and challenges encountered by Science 6 teachers in public elementary schools in Legislative District IV, Schools Division of Isabela. Using a phenomenological qualitative research design, the study investigated how teachers deliver science instruction, engage learners in scientific inquiry, and address contextual instructional difficulties within elementary classroom settings. Data were gathered through semi-structured interviews, focus group discussions, and classroom observations involving twelve purposively selected Science 6 teachers from selected public elementary schools. Thematic analysis following Braun and Clarke's framework was utilized in analyzing the data. Findings revealed five major themes: (1) Contextualized and Learner-Centered Science Instruction; (2) Experiential and Inquiry-Based Learning Practices; (3) Instructional Resource Limitations and Laboratory Constraints; (4) Learner Diversity and Science Learning Difficulties; and (5) Teacher Adaptability, Innovation, and Professional Commitment. Participants emphasized the importance of hands-on learning, localized instructional materials, and collaborative classroom activities in promoting learner engagement and scientific understanding. However, teachers also experienced challenges related to insufficient laboratory equipment, limited instructional resources, large class sizes, and varying learner abilities. Despite these constraints, participants demonstrated resilience and instructional creativity in sustaining meaningful science instruction. The study concludes that effective Science 6 instruction in rural public elementary schools requires contextualized pedagogies, institutional support, and strengthened science education resources. Findings provide implications for science curriculum implementation, teacher professional development, and educational policy enhancement in elementary science education.

**Keywords:** science education, elementary science instruction, pedagogical experiences, instructional challenges, qualitative research

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## **INTRODUCTION**

Science education plays a critical role in developing learners' scientific literacy, critical thinking skills, problem-solving abilities, and understanding of the natural world. At the elementary level, science instruction serves as a foundational component in nurturing curiosity, inquiry, and evidence-based reasoning among learners. In the Philippine educational context, the Science curriculum emphasizes learner-centered instruction, inquiry-based learning, contextualized teaching, and the development of scientific competencies necessary for 21st-century education.

Science 6, as part of the elementary science curriculum, introduces learners to more complex scientific concepts involving matter, ecosystems, force and motion, weather systems, electricity, and environmental sustainability. Effective science instruction requires meaningful classroom engagement, hands-on experimentation, collaborative learning, and contextualized teaching approaches that connect scientific concepts to learners' daily experiences. Consequently, teachers play a central role in facilitating active scientific learning and sustaining learner interest in science education.

However, public elementary school teachers continue to encounter various instructional challenges in delivering science education. Studies have shown that insufficient laboratory facilities, inadequate instructional materials, overcrowded classrooms, limited training opportunities, and learner diversity significantly affect science teaching effectiveness. In rural educational settings, these challenges become more pronounced due to resource limitations and contextual constraints affecting classroom instruction.

The implementation of science instruction in public elementary schools within Legislative District IV, Schools Division of Isabela presents a unique educational context characterized by diverse learner populations, varying school resources, and localized community realities. Understanding teachers' perceptions, instructional experiences, and classroom challenges is essential in examining how science education is delivered within these contexts.

Despite the importance of science education, limited qualitative studies have explored the lived experiences and pedagogical realities of Science 6 teachers in rural Philippine elementary schools. Most existing studies focus primarily on quantitative learner performance outcomes rather than the instructional experiences and perspectives of teachers themselves. Thus, this study explored the perceptions, pedagogical experiences, and instructional challenges encountered by Science 6 teachers in public elementary schools in Legislative District IV, Schools Division of Isabela.

Specifically, the study sought to answer the following questions:

1. How do Science 6 teachers describe their instructional experiences in teaching science?
2. What pedagogical practices and instructional strategies do teachers utilize in Science 6 instruction?
3. What challenges do teachers encounter in implementing science instruction?
4. How do teachers address instructional difficulties and sustain learner engagement in science classes?

The findings of the study may contribute to improving science curriculum implementation, instructional support systems, and professional development programs for elementary science teachers.

## **Review of Related Literature**

### **Science Instruction and Learner-Centered Pedagogy**

Science instruction emphasizes active learner engagement, inquiry-based learning, and experiential educational practices. According to Lev Vygotsky, learning occurs through social

interaction and collaborative engagement, highlighting the importance of participatory classroom experiences in knowledge construction. Learner-centered science instruction encourages students to investigate, question, and construct scientific understanding through active participation.

Inquiry-based science education promotes scientific reasoning, experimentation, and critical thinking. According to National Research Council (2020), science classrooms become more meaningful when learners are engaged in scientific investigations and real-world problem-solving activities. Such instructional approaches encourage deeper conceptual understanding and long-term knowledge retention.

### **Contextualized and Experiential Science Learning**

Contextualized teaching connects scientific concepts to learners' local environments and daily experiences. In Philippine classrooms, contextualized science instruction allows learners to better understand abstract scientific principles through familiar community examples and localized applications.

Kolb's Experiential Learning Theory emphasizes that meaningful learning occurs through concrete experiences, reflection, conceptual understanding, and application (Kolb, 1984). Science instruction that incorporates experiments, demonstrations, and collaborative investigations strengthens learner engagement and scientific literacy.

### **Challenges in Science Education**

Science teachers frequently encounter instructional challenges related to inadequate facilities, lack of laboratory equipment, insufficient instructional materials, and diverse learner needs. According to OECD (2019), resource limitations remain among the most significant barriers to effective science instruction in developing educational systems.

In rural public schools, teachers often improvise instructional materials and utilize alternative teaching strategies to compensate for limited resources. Furthermore, varying learner abilities, reading comprehension difficulties, and low learner motivation may affect science learning outcomes and classroom participation.

### **Theoretical Framework**

This study was anchored on Constructivist Learning Theory proposed by Lev Vygotsky, which posits that learners actively construct knowledge through social interaction, collaboration, and meaningful experiences. The study also utilized Kolb's Experiential Learning Theory, emphasizing the importance of hands-on learning, reflection, and application in science instruction.

These theories guided the interpretation of teachers' instructional practices, pedagogical experiences, and classroom challenges in teaching Science 6.

## **METHODOLOGY**

### **Research Design**

This study was carried out using a mixed method-explanatory sequential research design. For the quantitative research design, a pretest was administered to the control and experimental group and both groups were subjected to a blended-learning class set-up which instructor-made micro-lecture were utilized. After utilization, a posttest was administered to evaluate the significant differences in the pre-and posttest scores of the control and experimental groups. Moreover, an adopted and modified four-point Likert-scale survey was administered to the experimental groups to evaluate their agreement on the effects of the utilization of micro-lecture videos in their academic performance in terms of their control over the learning process, knowledge retention, and intrinsic motivation. For the qualitative research design, to further

investigate students' perception on the effects of utilizing IMMV, this study incorporated four (4) open-ended questions to each category on the adopted and modified survey questionnaire. These questions were used to provide support on the quantitative result of the survey and to further expound data on the phenomenological aspect.

### **Respondents**

The study obtained a total of fifty-four (54) students from the program BS Biology major in Medical Biology enrolled in the course Microbiology through voluntary sampling. Twenty-five (25) students were from Block one (1) and twenty-nine (29) students were from Block 3. Each group were randomly assigned as the experimental and control group, respectively.

### **Research instruments**

Both test and survey instruments were subjected to content validity with three (3) biology teachers from the College of Sciences who are knowledgeable about the topics. The result of the validation for test and survey summarized and analyzed through Aiken's V coefficient, adopted from the study of Ikhsanudin, I. & Subali, B. (2018).

#### **Test Questionnaire**

A forty-five (45)-item test questionnaire for the pre-and posttest were developed utilized in the study. With the use of Aiken's V coefficient, each item of the pre and posttest revealed a rating, ranges from 0.89 to 1.00 which is interpreted as accepted/valid. Moreover, the overall validation of both pre and posttest revealed a V-coefficient value of 0.95, which indicates a valid/accepted material.

#### **Survey**

To further study the effect of IMMVs on their academic performance in terms of control over the learning process, knowledge retention, and intrinsic motivation, a five(5)-point Likert-scale Survey questionnaire adopted and modified from the study of Lacey et al. (2021) and Scholtenhuis et al. (2020) was utilized. The content of the survey questionnaire was validated as overall and the V-coefficient value revealed a 0.99 rating, which is interpreted as valid/accepted (Ikhsanudin et al., 2018)

### **Data collection procedure**

The data were obtained through administration of pretest to all students from both groups for the assessment of their prior knowledge regarding Culture Media Preparation and Gram Staining procedures in a face-to-face class set-up. After administration of the pre-test, all groups were subjected to an asynchronous class set-up. During the asynchronous class set-up, the researcher posted the research materials control in the google classroom of each group. The control group received the Module 3, entitled "Microbiology Laboratory Procedures," which discusses the concept of Culture Media Preparation and Gram Staining Procedure, while the experimental group received the same Module 3 and additional instructor-made micro-lecture videos (IMMVs) as their supplementary materials. The students were strictly instructed to study the topics using the provided materials only and use of other resources were not allowed. For experimental group, they were instructed to watch the IMMVs alone as their supplementary materials. Students were given a week, which is equivalent to two (2) meetings of laboratory hours, to study the module. After a week, the researcher visited each group in a face-to-face class set-up to administer the post-test for the evaluation of their learning regarding the topics using the materials provided.

After the test, the experimental group was asked to answer a Likert-scale survey and few open-ended questions that were included in the survey questionnaire, and they were given a week to finally submit their responses. Among the twenty-five (25) students in the experimental group, only twenty-two (22) students were able to submit their responses. The researcher did not force the remaining students in compliance to the protocol of the University Research Ethics Review Center (URERC).

## **Statistical Treatment**

To analyze the effectiveness of micro-lecture videos on the student's performance, the pretest and posttest results of control and experimental groups were evaluated using the dependent and independent t-test. Furthermore, the survey test results in Likert-scale format were evaluated through mean. The mean of the negative statements from all categories were reversed-coded to obtain consistent interpretation of results. Lastly, the open-ended survey results were summarized, thematized, and used to support the Likert scale survey results of each category.

## **RESULTS**

This study utilized a qualitative phenomenological research design to explore the lived experiences, instructional practices, and challenges encountered by Science 6 teachers in public elementary schools. Phenomenology was deemed appropriate because it enabled the researcher to gain a deeper understanding of teachers' perspectives, classroom realities, pedagogical experiences, and instructional challenges within their actual educational settings. Through this approach, the study examined how teachers interpreted and managed the complexities of science instruction in elementary classrooms.

The study was conducted in selected public elementary schools in Legislative District IV, Schools Division of Isabela. The research locale was chosen because of its diverse school environments, predominantly rural educational contexts, and active implementation of the elementary Science curriculum. These schools provided rich contextual settings for examining the instructional experiences and pedagogical realities of Science 6 teachers in public elementary education.

The participants of the study consisted of twelve Science 6 teachers selected through purposive sampling. Participants were chosen based on the following criteria: they were currently teaching Science 6 in public elementary schools, had at least three years of teaching experience, were directly involved in science curriculum implementation, and were willing to participate in interviews and classroom observations. The selection of participants ensured that the study gathered comprehensive and experience-based insights regarding science instruction and classroom practices.

Data were gathered through semi-structured interviews, focus group discussions, classroom observations, and document analysis of lesson plans and instructional materials. The semi-structured interviews allowed participants to freely share their instructional experiences, perceptions, and challenges in teaching Science 6. Focus group discussions facilitated collaborative sharing of ideas and common instructional realities among teachers. Classroom observations provided direct insights into actual pedagogical practices, learner engagement, and classroom interactions, while document analysis enabled the examination of instructional planning and teaching resources utilized by participants. The interview guide primarily focused on teachers' instructional experiences, pedagogical approaches, classroom challenges, learner engagement strategies, and professional reflections regarding science instruction.

Prior to the conduct of the study, the researcher secured approval from school administrators and obtained informed consent from all participants. Ethical considerations were strictly observed throughout the research process, including confidentiality, anonymity, voluntary participation, and respect for participants' experiences and perspectives. Participants were assured that all gathered information would be used solely for academic and research purposes.

The collected data were analyzed using thematic analysis following the framework developed by Braun and Clarke (2006). Interview transcripts, observation notes, focus group discussion responses, and instructional documents were carefully coded, categorized, and interpreted to identify recurring patterns, concepts, and themes related to science instruction experiences. Trustworthiness of the study was ensured through member checking, peer debriefing, triangulation of data sources, and prolonged engagement within the research setting to enhance

the credibility, dependability, confirmability, and transferability of the findings.

## **Results and Discussion**

### **Theme 1: Contextualized and Learner-Centered Science Instruction**

Participants emphasized the importance of connecting science lessons to learners' daily experiences and local community contexts. Teachers explained that contextualized instruction increased learner understanding and classroom participation.

One participant shared:

"Mas naiintindihan ng mga bata ang science kapag inuugnay namin sa kanilang kapaligiran at pang-araw-araw na karanasan."

Another participant stated:

"Kapag local examples ang ginagamit, mas nagiging interesado sila sa discussion."

The findings suggest that contextualized science instruction enhances learner engagement and conceptual understanding. These observations support constructivist learning principles emphasizing meaningful and socially connected learning experiences.

### **Theme 2: Experiential and Inquiry-Based Learning Practices**

Teachers highlighted the value of hands-on activities, simple experiments, collaborative investigations, and inquiry-based learning approaches in science classes.

One participant explained:

"Mas natututo ang mga bata kapag sila mismo ang nag-eeksperimento at nakakatuklas."

Another teacher remarked:

"Group activities at actual demonstrations ang nagpapasigla sa science class."

These findings align with Kolb's Experiential Learning Theory, which emphasizes learning through concrete experiences and active participation. Inquiry-based learning encouraged curiosity, scientific reasoning, and learner collaboration.

### **Theme 3: Instructional Resource Limitations and Laboratory Constraints**

Participants consistently identified inadequate laboratory facilities, limited science equipment, and insufficient instructional materials as major instructional challenges.

One participant shared:

"Kulang talaga kami sa laboratory materials kaya minsan improvised na lang ang ginagamit namin."

Another participant stated:

"May mga lessons na mahirap ituro nang maayos dahil walang kagamitan."

These findings reflect persistent resource limitations affecting science education in rural public schools. Similar concerns were discussed by OECD (2019), which emphasized that inadequate educational resources hinder effective science instruction.

### **Theme 4: Learner Diversity and Science Learning Difficulties**

Teachers described varying learner abilities, reading comprehension difficulties, and limited scientific vocabulary as challenges affecting science instruction.

One participant explained:

"May mga bata na hirap umintindi ng scientific terms kaya kailangan ulit-ulitin ang explanation."

Another teacher shared:

"Magkakaiba ang learning styles ng learners kaya kailangan flexible ang teaching strategies."

The findings indicate that differentiated instruction and adaptive pedagogical practices are necessary in addressing diverse learner needs within science classrooms.

### **Theme 5: Teacher Adaptability, Innovation, and Professional Commitment**

Despite instructional challenges, teachers demonstrated resilience, creativity, and dedication in sustaining effective science instruction. Participants utilized improvised materials, localized examples, multimedia resources, and collaborative learning strategies to enhance classroom engagement.

One participant stated:

"Kahit limitado ang resources, gumagawa kami ng paraan para maging interesting ang science lessons."

Another participant shared:

"Importante talaga ang pagiging creative at patient sa pagtuturo ng science."

The findings demonstrate teachers' strong professional commitment and adaptability in overcoming contextual instructional barriers within public elementary schools.

## **Conclusion**

The study revealed that Science 6 instruction in public elementary schools within Legislative District IV, Schools Division of Isabela is characterized by contextualized pedagogy, inquiry-based learning practices, and teacher adaptability amidst instructional challenges. Teachers emphasized the importance of experiential learning, localized instruction, and learner-centered classroom engagement in promoting scientific understanding.

However, instructional difficulties related to inadequate laboratory resources, limited instructional materials, learner diversity, and varying comprehension abilities continue to affect science teaching effectiveness. Despite these constraints, teachers demonstrated resilience, innovation, and professional dedication in sustaining meaningful science instruction.

The findings highlight the need for strengthened institutional support, enhanced science education resources and continuous teacher professional development to improve elementary science education in rural Philippine schools.

### **Implications of the Study**

The findings imply the need for increased educational investment in science laboratories, instructional materials, and contextualized science resources within public elementary schools. Teacher professional development programs may further strengthen inquiry-based pedagogies, differentiated instruction, and innovative science teaching practices.

Educational leaders and policymakers may also develop support systems that address instructional resource limitations and promote equitable science learning opportunities for learners in rural communities.

## **References**

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Studies in Technology and Education*

*Psychology*, 3(2), 77–101.

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

National Research Council. (2020). *Inquiry and the national science education standards*. National Academy Press.

OECD. (2019). *PISA 2018 results: Effective policies, successful schools*. OECD Publishing.

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