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TEACHERS' EXPERIENCES IN TEACHING PHYSICS IN PUBLIC SCHOOLS: GROUNDWORK FOR IN-SERVICE TRAINING PROGRAM

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ABSTRACT

This qualitative study investigated teachers' experiences teaching physics in public schools, examining preparation, delivery, instructional materials, technology integration, evaluation tools, and performance outputs. Data were collected through interviews with twelve (12) physics teachers, utilizing validated researcher-developed questionnaires, and analyzed using thematic analysis. The findings revealed that teacher preparation emphasized curriculum alignment, foundational knowledge, structured lesson planning, varied instructional resources, student-centered activities, and assessment-focused strategies. Lesson delivery involved blended approaches, technology integration, real-world connections, and active learning through experiments and problem-solving. Teachers employed both digital and printed materials to cater to diverse learner needs, while technology facilitated interactive learning and assessment. Evaluation tools comprised formative and summative assessments, as well as performance tasks that applied learning. This study provides a foundational framework for designing a responsive in-service training program aimed at enhancing physics teaching in public schools.

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INTRODUCTION

Physics is a branch of science that focuses on understanding the natural world and has played a crucial role in human advancement. The principles of Physics are applied in daily life, from household activities to technological innovations, making it essential in the modern world. Having a strong foundation in physics equips us to simplify complex concepts (Fulminar, 2022).

Despite the significant role of physics, Philippines still faced challenges in science education. In the 2019 Trends in International Mathematics and Science Study (TIMSS), the country ranked last among 58 participating nations (Mullis et al., 2019). Similarly, the 2022 Programme for International Student Assessment (PISA) placed the Philippines 77th out of 81 countries (DepEd, 2022). Local studies have also highlighted these concerns. Caballes and Capinig (2020) found that students exhibited a "very low mastery level" in Science Content Knowledge (SCK) across concept and application domains. Likewise, Diate and Mordeno (2021) identified scientific literacy, numeracy, inadequate physical facilities, and challenges in real-life application as major obstacles in physics education. Knowledge is acquired through experience and that truth is determined by its outcomes. It was noted by Caballes (2020) that students struggle with procedural changes and concept application in physics.

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In the 21st century, science teachers show a essential role in guiding learners to explore, understand fundamental concepts, develop problem-solving skills, and gather evidence to support their ideas. Science education not only addresses real-world problems but also enhances knowledge, fosters educational development, and improves quality of life. Building on these insights, this study delved into the teachers' experiences in teaching Physics in public schools, examining six key aspects: teacher preparation, lesson delivery, instructional materials, technology integration, evaluation tools, and performance outputs. The findings provided a foundation for designing a targeted in-service training program for Physics educators.

MATERIALS AND METHODS

This chapter describes the study's research method, research design, participants of the study, sampling design, data-gathering procedure, research instruments, and data analysis used in the study. In order to formulate In-Service training program for the Physics Teacher of secondary schools of San Joaquin, Iloilo for the 2024-2025 school year, the purpose of this study is to ascertain the experiences of teachers teaching Physics.

Research Method

The research method used in the study was a qualitative research method to explore the lived experiences of teachers teaching Physics at Don Felix Serra National High School and Lawigan National High School. According to Creswell and Poth (2023), qualitative research is an approach for exploring and understanding the meaning individuals or groups ascribe to a

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social or human problem. This method is particularly suitable for this study as it allows for an in-depth understanding of how physics is taught in public secondary schools, focusing on aspects such as preparation, delivery, instructional materials, technology integration, evaluation tools, and performance outputs. By adopting this approach, the study aims to generate rich, descriptive data that can inform the development of an in-service training program tailored to the necessity of Physics teachers.

Research Design

The study used a qualitative research design to investigate teachers' experiences in teaching Physics at Don Felix Serra National High School and Lawigan National High School during the school year 2024-2025 to develop a in-service training program.

Qualitative research design sought answers to questions in a form of interview and answers were analyzed and interpreted on how social experiences were created and given meaning.

Quantitative studies focused on measuring and analyzing variables rather than examining processes. Many social and behavioral scientists considered qualitative inquiry not only as a method but also as a perspective for investigating a research problem (Denzin & Lincoln, 2023).

The study utilized a phenomenological approach, a method under qualitative research. According to Creswell and Creswell (2023), phenomenology focuses on the commonality of lived experiences within a particular group, aiming to describe the essence of a specific phenomenon. Qualitative methods were well-established tools for gaining in-depth insights

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into the perceptions of individuals or groups regarding certain phenomena (Creswell & Poth, 2022).

Therefore, this engaged us to understand the meanings and interpretations of the research participants. The use of this approach allowed for the recognition that participants' social reality was dynamic and constantly evolving (Bryman, 2004).

Participants of the Study

The study involved twelve (12) physics teachers, with nine (9) teachers from Don Felix Serra National High School, and three (3) teachers from Lawigan National High School, both located in San Joaquin, Iloilo, during the school year 2024-2025. Selection of the participants were based on the following criteria:

1) Teachers with at least one year of experience in teaching Physics at the secondary level.

2) Teachers who are actively involved in lesson preparation, instructional delivery, use of instructional materials, technology integration, evaluation methods, and performance output assessment.

3) Teachers who are participative and share their experiences through interviews or focus group discussions (FGDs).

When no new themes or insights emerge during data collection, the number of participants was set based on data saturation. This approach ensures that the study captures comprehensive and meaningful perspectives without redundancy (Denzin & Lincoln, 2023).

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Purposive sampling was chosen to ensure alignment between the sample and the study's objectives, thereby enhancing the rigor, trustworthiness, and depth of the data. Additionally, this approach upholds key qualitative research principles, including credibility, transferability, dependability, and confirmability (Campbell et al., 2020).

Sampling Design

Purposive sampling design, a type of non-probability sampling was used by the researcher to select participants that has relevant insights into the experiences of teaching Physics in public secondary schools. Purposive sampling is appropriate for qualitative research, particularly in a phenomenological study, as it allows the researcher to focus on individuals who have firsthand experience with the phenomenon being explored (Creswell & Creswell, 2023).

Through this sampling design, the study aimed to gather in-depth qualitative data that may inform the development of a relevant in-service training program in public secondary schools.

Research Instrument

The primary research instrument was a researcher-made questionnaire, consisting of guide questions related to the teaching experiences of physics teachers. It included areas such as lesson preparation and delivery, instructional materials, technology integration, evaluation tools, and performance outputs.

The questionnaire underwent face and content validation by experts in the field to ensure its reliability and appropriateness for the study.

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Validity of the Research Instrument

To ensure the accuracy and appropriateness of the researcher-made questionnaire, the instrument underwent a validation process. Face and content validation were conducted by experts in the field of education and physics instruction to measure the relevance, and comprehensiveness of the questions.

Revisions or refinements were made based on the experts' recommendations to enhance the quality, coherence, and alignment of the instrument with the objectives. This validation process helped establish the credibility and reliability of the questionnaire, ensuring that it would elicit meaningful and relevant data from the participants.

Data Gathering Procedures

The researcher prepared the questionnaire and was validated by the panelists. The researcher sent letters to the Division of Iloilo, District Supervisors and the School Head requesting permission to conduct the study.

As part of the ethical considerations, a consent letter was prepared for the participants. The interview schedule was determined based on the participants' availability, and upon obtaining their consent, audio and video recordings were used to document their responses while maintaining ethical safeguards.

Confidentiality and anonymity were strictly upheld throughout the study. The researcher took measures to protect participants' identities by ensuring that identifiable information, such as names or personal details, remained confidential and was not disclosed without explicit consent. Data were anonymized during analysis and reporting to prevent the

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identification of individual participants. Additionally, respect for participants' autonomy and dignity was prioritized, fostering a respectful and trusting researcher-participant relationship. The researcher ensured that cultural norms, beliefs, and practices were acknowledged and that participants were not subjected to any harm or discomfort.

Throughout the study, the researcher remained mindful of the power dynamics between the researcher and participants, ensuring that participants felt empowered to express their views freely, without coercion or manipulation. Transparency regarding the researcher's role, motives, and any potential conflicts of interest was maintained to promote open communication and trust.

The study was conducted with integrity and adherence to ethical standards set by relevant institutional review boards and professional organizations. Ethical approval was obtained from the appropriate authorities, research findings were accurately represented, and any limitations or biases in the study were acknowledged.

Data Analysis

The collected data from personal interviews with 12 Physics teachers were interpreted and analyzed using thematic analysis. Given the study's focus on preparation, delivery, instructional materials, technology integration, evaluation tools, and performance outputs, the analysis followed a systematic coding process to extract meaningful insights from participants' responses.

To ensure accuracy and reliability, the original transcripts were carefully examined and segmented into meaning units. According to Saldaña (2021), qualitative coding involves

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breaking down data into analyzable segments while preserving the integrity of participants' responses. The coding process should be iterative and reflective, ensuring that responses are neither fragmented into disconnected units nor merged with unrelated concepts. Statements that conveyed coherent ideas were coded as single meaning units, incorporating direct participant comments while ensuring alignment with the study's objectives.

RESULTS AND DISCUSSIONS

This qualitative research aimed to investigate the experiences of teachers in teaching physics at Don Felix Serra National High School and Lawigan National High School for the school year 2024-2025 as the basis for designing an in-service training program for teachers.

This study involved twelve (12) physics teachers from two prominent schools in the San Joaquin North and South school districts. A semi-structured, researcher-made questionnaire consisting of six open-ended questions was employed to gather data through in-depth interviews. The questionnaire explored teachers' experiences in six key areas: preparation, delivery, instructional materials, technology integration, evaluation tools, and performance outputs. The interviews were audio-recorded and video-recorded, and the responses were transcribed, analyzed, and interpreted using thematic analysis. This qualitative approach enabled a rich and nuanced understanding of the teachers' experiences and perspectives on teaching physics.

The following were the findings of the study:

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In terms of teacher preparation in teaching physics, six themes emerged from the responses of the participants, which include adherence to curriculum and competency standards, development of strong foundational knowledge and skills, structured lesson planning process, use of varied resources and materials, incorporation of student-centered activities, and emphasis on assessment and evaluation. This shows that teachers prioritize aligning their instruction with the mandated curriculum and competency standards to ensure they meet educational requirements. The focus on foundational knowledge and structured lesson planning reflects the need to create a strong base for teachers and students. The use of varied resources and materials, coupled with student-centered activities, suggests that teachers aim to make lessons engaging and inclusive for diverse learners. Finally, the focus on assessment and evaluation highlights the importance of measuring student progress and adjusting teaching strategies accordingly.

Furthermore, five themes emerged from the participants' responses regarding teacher delivery of physics lessons, this includes blended instructional approaches, integration of technology and multimedia resources, real-world connections and relevance, student-centered and differentiated instruction, and a focus on active learning through experiments and problem-solving. These findings indicate that teachers strive to make their lessons engaging and relevant by blending traditional and modern instructional strategies. The integration of technology and multimedia resources demonstrates a commitment to utilizing modern tools to enhance learning. By connecting lessons to real-world applications, teachers help students see the relevance of Physics in their daily lives. Additionally, the emphasis on student-centered

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and differentiated instruction ensures that teaching methods cater to diverse learning styles and needs, while active learning through experiments fosters critical thinking and hands-on understanding of concepts.

On the other hand, in terms of teacher utilization of instructional materials in teaching physics, three themes emerged from the responses of the participants. These include multimedia and digital resources for conceptual engagement, printed and physical resources for practical application, and varied instructional approaches to address diverse learner needs. Hence, these findings highlight that teachers balance modern and traditional resources to cater to different learning preferences. The use of multimedia and digital resources indicates a focus on enhancing conceptual understanding through visual and interactive content, while printed and physical resources are used to deepen practical knowledge. This approach ensures that diverse learners are accommodated, making Physics lessons more accessible and inclusive.

Moreover, in the aspect of integration of technology in teaching Physics, themes also emerged. These are technology for visual and interactive learning, assessment and feedback tools for student engagement, and access to supplementary learning resources. These themes suggest that teachers leverage technology to provide dynamic and interactive lessons that capture students' interest. Tools for assessment and feedback demonstrate the integration of technology in tracking student performance and providing constructive input. Additionally, access to supplementary learning resources ensures that students have opportunities to explore and deepen their understanding of Physics concepts beyond the classroom.

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In terms of utilization of evaluation tools in teaching Physics, the themes that emerged were as follows: use of formative assessments for ongoing learning feedback, implementation of summative assessments to measure mastery of concepts, and performance tasks and practical evaluations to apply learning. These findings indicate that teachers use a combination of assessment strategies to monitor and support student learning. Formative assessments provide continuous feedback, enabling students to identify areas for improvement. Summative assessments measure overall mastery of concepts, ensuring learning objectives are met. Performance tasks and practical evaluations encourage students to apply theoretical knowledge, fostering a deeper understanding of physics.

Finally, in terms of approaches to assessing performance outputs in teaching Physics, three themes emerged: performance tasks with rubric-based assessment, formative and summative assessments to track progress, and the use of feedback and reflective practices for improvement. These themes indicate that teachers emphasize the importance of clear and objective evaluation criteria through rubrics, ensuring transparency and fairness in assessing outputs. The combination of formative and summative assessments allows teachers to track progress effectively, while feedback and reflective practices empower students to take an active role in improving their performance.

In light of the findings and insights of the study, the following recommendations were made to enhance the teaching and learning of physics in public secondary schools.

Learners should actively engage in their Physics lessons by familiarizing themselves with curriculum requirements, utilizing available resources, and participating in class

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discussions, experiments, and problem-solving activities to develop critical thinking and practical skills. They should explore both digital and printed materials, embrace formative assessments for growth, and use summative assessments to track progress while applying theoretical knowledge creatively in performance tasks. Furthermore, learners are empowered to utilize teacher feedback as a catalyst for improvement and engage in reflective practices, such as journaling, peer discussions, or self-assessment, to foster a deeper understanding of the subject matter and enhance their overall learning experience.

Physics teachers should align their instruction with curriculum standards, incorporate blended instructional strategies, maximize instructional materials, integrate technology for enhanced learning, and implement effective assessment methods. They are encouraged to utilize varied resources, design performance-based tasks, and provide constructive feedback to support student progress.

Department heads should strengthen teacher support through training, mentoring, and collaboration while promoting blended learning strategies and ensuring the availability of instructional resources. They should also monitor and evaluate instructional practices to improve teaching effectiveness.

School heads should facilitate teacher development programs, allocate funds for learning materials and technology, upgrade school infrastructure, and implement standardized assessment systems. They should also encourage partnerships with industries and academic institutions to promote real-world applications of Physics concepts.

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DepEd supervisors should regularly monitor physics instruction, provide professional development opportunities, and advocate for standardized assessment guidelines. They should also ensure equitable resource distribution, particularly in underserved areas, to support effective instruction.

DepEd officials should enhance teacher training programs, promote innovative teaching strategies, allocate adequate funding for instructional resources, standardize assessment frameworks, and establish partnerships with industries and academic institutions to integrate practical learning experiences into the Physics curriculum. These recommendations aim to create a more engaging, resource-supported, and competency-driven approach to Physics education in public secondary schools.

Lastly, **policymakers** should enhance teacher preparation programs by supporting continuous professional development, emphasizing curriculum adherence, lesson planning, and active learning strategies while integrating technology and real-world applications into teacher education.

They should allocate resources equitably, ensuring access to both digital and traditional instructional materials, funding technological infrastructure, and promoting blended instructional approaches in Physics education.

Additionally, policymakers should standardize assessment practices, strengthen performance-based evaluations, and foster industry partnerships to provide students with real-world exposure through field trips, workshops, and practical learning experiences.

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Teachers should be innovative and creative in making use of scarce resources and availability of the latter in transferring and sharing the technology and knowledge to the learners.

Home Learning Partners should be capacitated on how to extend support to their children at home and appreciated of the work done to sustain their interest and enthusiasm in supporting the school and their children's education.

A copy of the remediation and enrichment programs should be given to the Schools Division Office, Regional Office, and Central office for them to approve and implement.

If a copy of this recommended remediation and enrichment programs would not be approved, school heads are encouraged to implement these in a local arrangement bases only.

A similar study is also encouraged to be conducted in the future and consider other variables not used nor mentioned in the study.

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