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Article

Exploring Science Teachers' Experiences in Implementing the Science 9 Curriculum under the K to 12 Program in Public Secondary Schools of Dupax del Norte I District, Schools Division of Nueva Vizcaya

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Abstract

The successful implementation of the K to 12 Science Curriculum depends largely on teachers' instructional practices and their ability to translate curriculum standards into meaningful classroom experiences. This study explored the experiences of Science 9 teachers in implementing the K to 12 Science Curriculum in public secondary schools of Dupax del Norte I District, Schools Division of Nueva Vizcaya. Using a qualitative phenomenological research design, the study examined teachers' instructional practices, classroom experiences, challenges encountered, and adaptive strategies. Participants were selected through purposive sampling and data were collected using semi-structured interviews, classroom observations, and document analysis. Braun and Clarke's thematic analysis was employed in analyzing the data. Five major themes emerged: (1) contextualizing Science instruction to learners' experiences; (2) utilizing inquiry-based and learner-centered teaching strategies; (3) addressing instructional challenges through resourcefulness and innovation; (4) strengthening learner engagement through formative assessment; and (5) promoting professional growth through collaboration and continuous learning. The findings revealed that Science teachers consistently adapted their instructional practices despite limited instructional resources, diverse learner needs, and curriculum demands. Their commitment to reflective teaching, collaboration, and continuous professional development enabled them to effectively implement the Science 9 curriculum. The study underscores the importance of sustained professional learning, institutional support, and adequate instructional resources to enhance Science teaching and curriculum implementation.

Keywords: Science education, Science 9, K to 12 Curriculum, instructional practices, teacher experiences, phenomenology, curriculum implementation, inquiry-based learning

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Introduction

Science education plays a crucial role in developing scientifically literate learners who can think critically, solve problems, and make informed decisions about issues affecting society and the environment. Under the Philippine K to 12 Basic Education Program, Science instruction emphasizes inquiry-based learning, scientific investigation, and the development of higher-order thinking skills that prepare learners for lifelong learning and global competitiveness (Department of Education [DepEd], 2016).

The implementation of the Science 9 curriculum requires teachers to facilitate meaningful learning experiences that connect scientific concepts with learners' everyday lives. Teachers are expected to employ learner-centered pedagogies, integrate contextualized learning activities, and utilize appropriate assessment strategies that promote conceptual understanding rather than rote memorization. As curriculum implementers, Science teachers play a vital role in translating curriculum standards into effective classroom instruction.

Despite the curriculum's well-defined objectives, teachers continue to encounter various implementation challenges. These include limited laboratory facilities, insufficient instructional materials, diverse learner abilities, time constraints, and the need to continuously adapt teaching strategies to meet curriculum expectations. Such challenges require teachers to become reflective practitioners who can modify instructional approaches while maintaining the quality of Science education.

Previous studies have emphasized that effective curriculum implementation depends largely on teachers' instructional competence, professional commitment, and continuous learning. Collaborative professional development, contextualized instruction, inquiry-based teaching, and formative assessment have consistently been identified as effective practices that enhance learner engagement and scientific understanding (Darling-Hammond et al., 2020; Fullan, 2020). However, few qualitative studies have examined the lived experiences of Science 9 teachers implementing the K to 12 curriculum within the context of public secondary schools in Nueva Vizcaya.

Understanding teachers' experiences is essential because it provides valuable insights into how curriculum reforms are translated into classroom practice. Examining these experiences enables educational leaders and policymakers to identify effective instructional practices, recognize implementation challenges, and develop responsive interventions that strengthen Science education.

Therefore, this study explored the experiences of Science 9 teachers in implementing the K to 12 Science Curriculum in public secondary schools of Dupax del Norte I District, Schools Division of Nueva Vizcaya. Specifically, it sought to understand their instructional practices, classroom experiences, challenges, adaptive strategies, and insights that may contribute to improving Science curriculum implementation.

Review of Related Literature

Science Curriculum Implementation

The K to 12 Science Curriculum emphasizes scientific inquiry, critical thinking, and contextualized learning to develop scientifically literate learners (DepEd, 2016). Effective implementation requires teachers to facilitate learner-centered instruction, encourage scientific investigation, and connect classroom lessons with authentic experiences.

Research indicates that successful curriculum implementation depends on teachers' understanding of curriculum goals, instructional competence, and access to adequate learning resources (Fullan, 2020).

Professional collaboration and continuous teacher development further strengthen curriculum delivery and improve learner outcomes.

Instructional Practices in Science Education

Effective Science teaching promotes inquiry, experimentation, collaboration, and reflective thinking. Inquiry-based instruction encourages learners to investigate scientific problems, analyze evidence, and construct knowledge through active participation (Bybee, 2013). Contextualized teaching further enhances conceptual understanding by relating scientific concepts to learners' local experiences and community contexts (Gilbert, 2006).

Formative assessment also plays a critical role in Science instruction by providing continuous feedback that guides both teaching and learning. Black and Wiliam (2009) emphasized that assessment for learning improves student achievement by identifying misconceptions and informing instructional decisions.

Theoretical Framework

This study is anchored on Constructivist Learning Theory by Lev Vygotsky (1978) and Jerome Bruner's Discovery Learning Theory (1966).

Vygotsky emphasized that learning occurs through social interaction, collaboration, and guided learning experiences. Bruner likewise argued that learners actively construct knowledge through inquiry, discovery, and exploration. These theories support the learner-centered and inquiry-based instructional approaches promoted in the Science 9 curriculum.

Conceptual Framework

The study assumes that Science teachers' instructional practices influence the effective implementation of the Science 9 K to 12 Curriculum. Teachers' experiences in planning instruction, facilitating inquiry-based learning, contextualizing lessons, assessing learners, and adapting to classroom challenges shape the overall implementation of the curriculum and contribute to meaningful learner outcomes.

Statement of the Problem

This study explored the experiences of Science 9 teachers in implementing the K to 12 Science Curriculum in public secondary schools of Dupax del Norte I District, Schools Division of Nueva Vizcaya.

Specifically, it sought to answer the following questions:

1. How do Science 9 teachers describe their experiences in implementing the K to 12 Science Curriculum?
2. What instructional practices do teachers employ in teaching Science 9?
3. What challenges do teachers encounter during curriculum implementation?
4. How do teachers address the challenges encountered in implementing the Science 9 curriculum?
5. What insights can be drawn to strengthen the implementation of the Science 9 curriculum in
6.
7. public secondary schools?

Methodology

Research Design

This study employed a qualitative phenomenological research design to explore the lived experiences of Science 9 teachers in implementing the K to 12 Science Curriculum in public secondary schools of Dupax del Norte I District, Schools Division of Nueva Vizcaya. Phenomenology was appropriate because it sought to understand teachers' instructional practices, classroom experiences, challenges, and adaptive strategies as they implemented the curriculum (Creswell & Poth, 2018).

Research Locale

The study was conducted in the public secondary schools of Dupax del Norte I District, Schools Division of Nueva Vizcaya. These schools implement the K to 12 Science Curriculum and serve learners from diverse socioeconomic and geographical backgrounds, making them suitable settings for examining Science teachers' curriculum implementation experiences.

Research Participants

The participants were Science 9 teachers currently teaching under the K to 12 Curriculum. Purposive sampling was employed to select teachers with direct experience in implementing the curriculum. Participant selection continued until data saturation was reached, ensuring comprehensive descriptions of the phenomenon.

Research Instrument

The primary research instrument was a researcher-developed semi-structured interview guide validated by experts in Science Education and Qualitative Research. To strengthen the credibility of the findings, classroom observations and document analysis of lesson plans, learning materials, and assessment tools were also conducted.

Data Gathering Procedure

After securing approval from the Schools Division Office and school administrators, informed consent was obtained from the participants. Individual semi-structured interviews lasting approximately 45–60 minutes were conducted and audio-recorded with permission. Classroom observations and document analysis were subsequently carried out to validate the interview data. All interviews were transcribed verbatim and verified through member checking.

Data Analysis

The data were analyzed using Braun and Clarke's (2021) thematic analysis, following the phases of familiarization, coding, theme generation, theme review, theme definition, and report writing. Emergent themes were supported by participants' verbatim responses and interpreted using relevant literature.

Trustworthiness of the Study

The study ensured trustworthiness using Lincoln and Guba's (1985) criteria of credibility, transferability, dependability, and confirmability. Credibility was established through member checking, triangulation of interviews, observations, and document analysis. Thick descriptions, peer debriefing and an audit trail further enhanced the rigor of the study.

Ethical Considerations

Ethical standards were strictly observed throughout the study. Permission was obtained from the appropriate educational authorities prior to data collection. Participation was voluntary, and informed consent was secured from all participants. Confidentiality and anonymity were maintained through the use of pseudonyms, and all information gathered was used solely for research purposes. Participants were informed of their right to withdraw from the study at any stage without penalty.

Results and Findings

Theme 1: Contextualizing Science Concepts through Real-Life Experiences

One of the dominant instructional practices identified was the contextualization of Science concepts using learners' everyday experiences and local community situations. The participants emphasized that learners understand scientific concepts more effectively when lessons are connected to familiar events and situations within their environment.

One participant shared:

"Mas naiintindihan ng mga estudyante ang lesson kapag iniugnay namin ito sa kanilang pang-araw-araw na karanasan. Halimbawa, sa climate at weather, ginagamit namin ang mga nangyayaring pagbabago ng panahon sa aming lugar." (Participant 2)

Another teacher explained:

"Kapag pinag-aaralan namin ang earthquakes at volcanoes, ginagamit ko ang mga balita at lokal na pangyayari para maging mas makahulugan ang talakayan." (Participant 6)

Teachers also reported utilizing locally available materials and community resources during Science activities.

One participant stated:

"Hindi man kumpleto ang laboratory equipment, gumagamit kami ng mga materyales sa paligid para maipakita ang konsepto at mas maintindihan ng mga bata." (Participant 4)

These findings indicate that contextualization enhances learner engagement and conceptual understanding by relating scientific knowledge to authentic experiences. Teachers recognized that meaningful learning occurs when students actively connect classroom lessons with their own environment and lived experiences.

The findings support Vygotsky's Constructivist Theory, which emphasizes that learning develops through meaningful social and environmental interactions (Vygotsky, 1978). Likewise, Gilbert (2006) emphasized that contextualized Science instruction promotes deeper conceptual understanding by relating scientific ideas to real-life situations.

Theme 2: Promoting Inquiry-Based and Learner-Centered Science Instruction

The participants consistently described the use of inquiry-based and learner-centered teaching strategies as central to implementing the Science 9 curriculum. Rather than relying solely on lectures, teachers encouraged learners to ask questions, investigate scientific phenomena, conduct experiments, and develop evidence-based explanations.

One participant remarked:

"Mas aktibo ang mga estudyante kapag sila mismo ang nagdi-discover ng sagot. Hindi ko agad ibinibigay ang explanation; hinahayaan ko muna silang mag-observe at mag-investigate." (Participant 1)

Another participant shared:

"Pinapagawa ko sila ng group investigations at problem-solving activities para sila mismo ang makahanap ng solusyon gamit ang scientific process." (Participant 8)

Teachers likewise highlighted the value of collaborative learning in strengthening scientific reasoning.

As one participant explained:

"Kapag magkakasama silang nag-aanalyze ng experiment, mas lumalalim ang kanilang pag-unawa at natututo silang makinig sa opinyon ng iba." (Participant 5)

Participants observed that inquiry-based learning increased learner participation, confidence, collaboration, and critical thinking. Instead of memorizing scientific facts, learners became active participants in constructing scientific knowledge through investigation and reflection.

These findings are consistent with Bruner's Discovery Learning Theory (1966), which proposes that learners develop deeper understanding through active exploration and discovery. Similarly, Bybee (2013) emphasized that inquiry-based instruction strengthens scientific literacy, analytical thinking, and problem-solving competencies, all of which are central objectives of the K to 12 Science Curriculum.

Discussion

The first two themes demonstrate that Science 9 teachers have adopted instructional practices that are consistent with the learner-centered philosophy of the K to 12 Curriculum. Through contextualized instruction and inquiry-based learning, teachers provide authentic learning experiences that encourage learners to actively construct scientific knowledge rather than passively receive information. Despite differences in classroom contexts and available resources, participants consistently emphasized the importance of connecting Science concepts to learners' experiences and engaging students in scientific inquiry. These practices not only promote conceptual understanding but also develop critical thinking, collaboration, and problem-solving skills that are essential for scientific literacy and lifelong learning.

Theme 3: Adapting Instructional Practices Amid Resource and Classroom Challenges

Participants consistently described their ability to adapt instruction despite limited laboratory facilities, insufficient instructional materials, and varying learner abilities. They emphasized that flexibility and creativity enabled them to deliver meaningful Science lessons even under constrained conditions.

One participant shared:

"Hindi lahat ng laboratory equipment ay available kaya gumagamit kami ng improvised materials at video demonstrations para maipakita pa rin ang eksperimento." (Participant 7)

Another participant explained:

"Nag-aadjust kami ng strategies depende sa kakayahan ng mga estudyante. Kung nahihirapan sila, gumagamit kami ng mas simpleng activities at localized examples." (Participant 3)

Several teachers also utilized digital learning resources to supplement classroom instruction.

As one participant stated:

"Malaking tulong ang educational videos at online simulations para mas maintindihan ng mga estudyante ang abstract concepts sa Science." (Participant 9)

These responses demonstrate that teachers continuously modified instructional approaches to ensure meaningful learning despite resource limitations. Their adaptability reflects professional resilience and commitment to quality Science education.

The findings support **Darling-Hammond et al. (2020)**, who emphasized that effective teachers continuously adapt instructional practices to respond to diverse classroom contexts. Likewise, **Fullan (2020)** argued that successful curriculum implementation requires teachers to remain flexible and responsive to changing educational demands.

Theme 4: Utilizing Formative Assessment to Support Learning

Another important instructional practice that emerged was the consistent use of **formative assessment** to monitor learners' understanding and improve instruction. Teachers emphasized that assessment was not limited to grading but served as a continuous process for identifying learning gaps and providing immediate feedback.

One participant shared:

"Mas mahalaga ang feedback kaysa score. Kapag may hindi naiintindihan ang mga estudyante, inuulit namin ang lesson gamit ang ibang strategy." (Participant 4)

Another teacher remarked:

"Gumagamit ako ng questioning, group presentations, exit slips, at performance tasks para makita kung talagang naunawaan nila ang lesson." (Participant 8)

Teachers explained that formative assessment enabled them to adjust instruction according to learners' progress and individual needs.

One participant stated:

"Sa assessment namin nalalaman kung alin ang dapat pang linawin bago kami lumipat sa susunod na competency." (Participant 1)

These findings indicate that continuous assessment supports learner engagement, strengthens conceptual understanding, and enables teachers to make informed instructional decisions.

The findings agree with Black and Wiliam (2009), who emphasized that formative assessment enhances learning by providing timely feedback that guides both teachers and learners. Similarly, the K to 12 Curriculum promotes assessment as an integral component of teaching and learning rather than merely a measure of academic performance.

Theme 5: Strengthening Professional Growth through Collaboration and Continuous Learning

The final theme highlights teachers' commitment to continuous professional development and collaborative learning. Participants recognized that implementing the Science 9 curriculum required ongoing learning, collaboration, and reflective practice.

One participant explained:

"Malaking tulong ang Learning Action Cell sessions dahil doon kami nagpapalitan ng lesson plans at teaching strategies." (Participant 6)

Another participant stated:

"Patuloy kaming dumadalo sa mga trainings at webinars para mas maintindihan namin ang curriculum at mga bagong teaching approaches." (Participant 10)

Teachers also emphasized peer collaboration as an important source of professional support.

One participant shared:

"Kapag may mahirap na competency, nagtutulungan kami ng kapwa Science teachers kung paano ito mas madaling maituturo." (Participant 5)

The findings suggest that collaborative learning communities strengthen teachers' confidence, instructional competence, and curriculum implementation. Through professional collaboration, teachers continuously improve their pedagogical practices and respond more effectively to learners' needs.

These findings support DuFour and Fullan (2013), who emphasized that professional learning communities promote instructional improvement through shared expertise, reflective practice, and collaborative problem-solving. Likewise, Fullan (2020) highlighted that continuous professional learning is fundamental to sustaining educational reform and improving classroom practice.

Discussion

The findings reveal that Science 9 teachers implement the K to 12 Science Curriculum through instructional practices that emphasize contextualized learning, inquiry-based instruction, instructional adaptability, formative assessment, and collaborative professional learning. These practices reflect teachers' commitment to creating learner-centered classrooms where students actively construct scientific knowledge through meaningful experiences and investigation.

Despite challenges related to limited instructional resources, diverse learner abilities, and curriculum demands, participants demonstrated resilience by modifying teaching strategies, utilizing locally available materials, integrating technology, and continuously assessing learner progress. Their willingness to collaborate with colleagues and participate in professional development further strengthened their capacity to deliver quality Science instruction.

Hence, the study demonstrates that successful implementation of the Science 9 K to 12 Curriculum relies not only on curriculum content but also on teachers' instructional competence, adaptability, reflective practice, and institutional support. These findings provide valuable insights for school leaders, curriculum developers, and policymakers in designing professional development programs and support mechanisms that enhance Science teaching and improve curriculum implementation in public secondary schools.

This study explored the experiences of Science 9 teachers in implementing the K to 12 Science Curriculum in public secondary schools of Dupax del Norte I District, Schools Division of Nueva Vizcaya. The findings revealed that teachers play a pivotal role in translating curriculum standards into meaningful classroom experiences through learner-centered, inquiry-based, and contextualized instructional practices. Despite challenges such as limited instructional resources, inadequate laboratory facilities, time constraints, and diverse learner needs, teachers demonstrated adaptability, creativity, and commitment in delivering quality Science instruction.

Five major themes characterized teachers' implementation of the curriculum: contextualizing Science concepts through real-life experiences, utilizing inquiry-based and learner-centered teaching strategies, adapting instructional practices amid resource limitations, strengthening learning through formative assessment, and fostering professional growth through collaboration and continuous learning. These practices enabled teachers to promote scientific literacy, critical thinking, collaboration, and problem-solving while maintaining alignment with the goals of the K to 12 Science Curriculum.

Overall, the study concludes that effective implementation of the Science 9 curriculum depends not only on teachers' content knowledge but also on their instructional competence, reflective practice, adaptability, and continuous professional development. Sustained institutional support, adequate instructional resources, and collaborative learning opportunities are essential to further strengthen Science teaching and improve learner outcomes.

Implications of the Study

The findings have important implications for Science education, curriculum implementation, and teacher development. First, they highlight the need to strengthen teachers' pedagogical competencies through continuous professional development focusing on inquiry-based instruction, contextualized teaching, classroom assessment, and innovative instructional strategies. Second, schools should provide adequate laboratory facilities, instructional materials, and digital resources to support effective Science instruction. Third, school leaders should strengthen professional learning communities, mentoring programs, and Learning Action Cell (LAC) sessions to encourage collaboration, reflective practice, and the sharing of effective teaching strategies. Finally, the study provides empirical evidence that may assist curriculum developers and policymakers in refining implementation support mechanisms for the K to 12 Science Curriculum.

Recommendations

Based on the findings and conclusions, the following recommendations are offered:

1. **The Department of Education** should provide sustained professional development programs focusing on inquiry-based teaching, contextualized instruction, innovative assessment practices, and effective implementation of the Science curriculum.

2. **School administrators** should strengthen institutional support by providing adequate laboratory equipment, instructional materials, digital learning resources, and financial assistance for the development of localized Science teaching materials.

3. **Science teachers** should continue employing learner-centered and inquiry-based instructional strategies, contextualize lessons using real-life situations, utilize formative assessment, and engage in reflective teaching practices to enhance learner engagement and scientific understanding.

4. **Schools** should strengthen Learning Action Cell (LAC) sessions and professional learning communities to promote collaboration, peer mentoring, and the sharing of best instructional practices among Science teachers.

5. **Curriculum developers** should regularly review and refine the Science curriculum by considering teachers' experiences and classroom realities to ensure that curriculum implementation remains relevant, practical, and responsive to learners' needs.

6. **Future researchers** may conduct similar qualitative or mixed-method studies in other districts or regions to compare teachers' experiences and identify additional factors influencing the implementation of the Science curriculum across diverse educational settings.

The findings affirm that successful implementation of the Science 9 K to 12 Curriculum requires a collaborative effort among teachers, school leaders, curriculum developers, and policymakers. Continuous professional growth, adequate instructional support, and reflective teaching practices remain fundamental in promoting quality Science education and developing scientifically literate learners capable of addressing the challenges of the twenty-first century.

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