

Strengthening Science 4 Instruction in Public Elementary Schools: Inputs for Teaching Improvement in Montalban District

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Abstract: Science education is vital for fostering scientific literacy, critical thinking, problem-solving, innovation, and adaptability to technological advancement. This study assessed the implementation of the Science 4 curriculum in public elementary schools in the Montalban District, Division of Rizal, during the 2025–2026 school year. It focused on teachers' personal and professional profiles, the extent of curriculum implementation, teaching strategies' effectiveness and frequency, adequacy of instructional materials, evaluative tools' effectiveness, administrative and supervisory support, pupils' preferred science activities, and challenges in teaching Science 4. Using a descriptive survey design, data were gathered from all 28 Science 4 teachers via a validated researcher-made questionnaire and analyzed using frequency, percentage, mean, and standard deviation. The results showed that teachers were professionally qualified, experienced, and engaged in continuous professional development. The Science 4 curriculum objectives were fully implemented, with teaching strategies rated as very effective and frequently used by the teachers. Classroom instructional materials were deemed adequate, while laboratory materials were adequate but highlighted the need for more resources. Evaluative tools were generally effective, and administrative and supervisory support was positively perceived by the teachers. Pupils favored interactive and hands-on activities such as games, quiz bees, and experiments. However, challenges included inadequate laboratory facilities, limited equipment, large class sizes, and poor comprehension among learners. The study concludes that Science 4 instruction is effectively implemented but recommends enhancing laboratory resources, instructional support, and sustained professional development to improve the quality of elementary science education and learners' scientific competencies.

Keywords: *Science 4 Instruction, Elementary Science Education, Teaching Strategies, Instructional Materials, Science Education Improvement*

INTRODUCTION

Science education is important because it helps people become scientifically literate, think critically, solve problems, innovate, and keep up with rapid technological changes. Globally, there is a significant push to boost science achievement by providing quality teaching and focusing on students' needs. However, there is still concern that students may lose interest and not perform well in science subjects. Therefore, it is important to have effective teaching methods to prepare students for future scientific and technological challenges. In the Philippines, the Department of Education has been working hard to boost science education through the K to 12 curriculums, especially focusing on science 4 to build students' scientific knowledge and skills from an early age. Despite these efforts, national assessments show that Filipino students face challenges in achieving science proficiency. This highlights issues such as teacher qualifications, instructional materials and teaching strategies. To tackle these problems, the government has rolled out initiatives, including teacher training programs, to strengthen science educators' skills and improve the availability of resources (Antipolo & Rogayan, 2021; Luzano, 2024).

Science 4 teachers in the Montalban District of Rizal are crucial in achieving curriculum objectives; however, they face significant challenges owing to varied teaching methods, limited resources, assessment approaches, and administrative support. By understanding learners' preferred science activities and identifying the issues teachers face, we can develop targeted interventions that directly address these challenges. This localized approach is essential for accurately measuring curriculum implementation and ensuring that elementary learners receive high-quality science education, equipping them for advanced scientific studies and future challenges (Bumagat et al., 2023). Although many studies have explored science teaching effectiveness, teacher competencies, and learner achievement, there is a notable gap in research specifically evaluating Science 4 instruction in public elementary schools within the Montalban District, Division of Rizal. Currently, literature often emphasizes student achievement over a thorough evaluation of instructional methods, materials, assessment practices, and administrative support. Furthermore, there is a lack of localized evidence on the implementation challenges faced by science 4 teachers in this district. This study aims to bridge this gap by evaluating the current state of science 4 instruction, identifying the problems teachers encounter, and proposing targeted interventions to improve teaching and learning outcomes.

RESEARCH QUESTIONS

This study aimed to assess the implementation of science 4 instruction in public elementary schools in the Montalban District, Division of Rizal. Specifically, it sought to answer the following questions:

1. What is the personal and professional profile of the respondents in terms of: Age, Gender, Civil status, Position, Highest educational attainment, Performance rating, Length of teaching experience; and Relevant seminars and trainings attended?
2. What is the extent of implementation of the general objectives of science 4 in public elementary schools?
3. What is the level of effectiveness of the teaching strategies employed by science 4 teachers?
4. What is the frequency of use of the teaching strategies employed by science 4 teachers?
5. What is the level of adequacy of the instructional materials used in teaching Science 4 in terms of: Classroom instructional materials; and Laboratory instructional materials?
6. What is the level of effectiveness of the evaluative tools used in teaching Science 4?
7. What is the level of administrative and supervisory support received by science 4 teachers?
8. What is the level of effectiveness of the science activities preferred by pupils in science 4? (
9. What are the problems encountered by science 4 teachers in the implementation of science 4 instruction?

METHODS

Research Design

This study employed a descriptive research design survey to assess the implementation of science 4 instruction in public elementary schools in the Montalban District in Rizal. The design was appropriate because it systematically described the current instructional practices, implementation of curriculum objectives, adequacy of instructional resources, assessment practices, administrative and supervisory support, preferred science activities, and challenges encountered by science 4 teachers. The descriptive survey method enabled the collection of quantitative data that accurately reflected the existing conditions of science 4 instruction in the Philippines.

Local of the Study

The study was conducted in selected public elementary schools in the Montalban District, Division of Rizal, during the 2025–2026 school year. The district was selected because it consists of schools implementing the Department of Education's Science 4 curriculum and provides an appropriate setting for evaluating instructional practices and identifying areas for improvement.

Respondents of the Study

The respondents were **28 Science 4 teachers** from public elementary schools in the Montalban District. These teachers were selected because they were directly involved in the implementation of the Grade 4 Science curriculum and possessed the necessary knowledge and experience to provide reliable information regarding classroom instruction, instructional materials, assessment practices, and challenges encountered in teaching Science 4.

Sampling Technique

The study employed **total enumeration sampling**, wherein all **28 Science 4 teachers** in the selected public elementary schools were included as respondents. This sampling technique ensured complete representation of the target population and minimized sampling bias by including all qualified participants in the study.

Research Instrument

The researcher used a **researcher-made questionnaire** as the primary data collection instrument. The questionnaire consisted of two sections: the first gathered the respondents' demographic and professional profiles, while the second assessed the implementation of the general objectives of science 4, teaching strategies, instructional materials, evaluative tools, administrative and supervisory support, preferred science activities, and problems encountered in teaching Science 4. Responses were measured using a five-point Likert scale, with higher scores indicating greater implementation, effectiveness, adequacy, or agreement. Prior to data collection, the instrument was reviewed by experts in science education and educational research to establish its content validity and to ensure the clarity and relevance of the items.

Data Gathering Procedure

Prior to data collection, the researcher secured approval from the Schools Division Office and respective school heads. After obtaining the necessary permissions, informed consent was obtained from all respondents. The questionnaires were personally distributed to the participants and retrieved after completion. The responses were checked for completeness, organized, encoded, and prepared for statistical analysis while maintaining the participants' confidentiality.

Data Analysis

The collected data were analyzed using descriptive statistics. **Frequency counts and percentages were used to describe the respondents' demographic and professional profiles.** The weighted mean was employed to determine the extent of implementation of the Science 4 curriculum objectives, effectiveness of teaching strategies and evaluative tools, adequacy of instructional materials, administrative and supervisory support, preferred science activities, and problems encountered. Ranking was used to identify the highest- and lowest-rated indicators for each variable.

RESULTS AND DISCUSSION

Table 1. Profile of the Respondents

Profile Variable	Category	Frequency (f)	Percentage (%)
A. Personal Profile			
	Age		
	20–25	2	7.14
	26–30	5	17.86
	31–35	15	53.57
	36–40	2	7.14
	41–45	3	10.71
	46 years and above	1	3.57

Gender	Male	10	35.71
	Female	18	64.29
Civil Status	Single	6	21.43
	Married	21	75.00
	Widowed	1	3.57
B. Professional Profile			
Position	Teacher I	6	21.43
	Teacher II	1	3.57
	Teacher III	20	71.43
	Master Teacher I	1	3.57
Highest Educational Attainment	BEED	3	10.71
	MAEd Units	5	17.86
	MAEd Graduate	19	67.86
	PhD Graduate	1	3.57
Performance Rating	Outstanding	21	75.00
	Very Satisfactory	6	21.43
	Satisfactory	1	3.57
Years of Teaching Experience	1–5 years	3	10.71
	6–10 years	3	10.71
	11–15 years	11	39.29
	16–20 years	8	28.57
	21 years and above	3	10.71
In-Service Trainings Attended*	School/District	28	100.00
	Division	28	100.00
	Regional	18	64.29
	National	16	57.14
	International	1	3.57

Table 1 presents the personal and professional profiles of the Science 4 teachers in this study. The findings show that the majority of the respondents were 31–35 years old (15, 53.57%), female (18, 64.29%), and married (21, 75.00%). In terms of professional characteristics, most respondents held the position of Teacher III (20, 71.43%), completed a Master of Arts in Education (19, 67.86%), and received an outstanding performance rating (21, 75.00%); most teachers also had 11–15 years of teaching experience (11, 39.29%), indicating their substantial classroom experience. Moreover, all respondents (28, 100.00%) had attended school/district and division-level in-service training, while 18 (64.29%) had participated in regional training, 16 (57.14%) in national training, and one (3.57%) in international training. Overall, these findings indicate that the respondents were professionally experienced, academically qualified, and actively engaged in continuous professional development, suggesting that they possessed the competencies needed to effectively implement Science 4 instruction.

Table 2. Extent of Implementation of the General Objectives of Science 4

General Objectives	Mean	SD	Verbal Interpretation
Develop an understanding of basic science concepts and principles.	4.38	0.61	Fully Implemented
Develop scientific inquiry and problem-solving skills.	4.53	0.55	Fully Implemented
Apply scientific knowledge to everyday life.	4.47	0.58	Fully Implemented
Demonstrate concern for environmental and sustainable development.	4.41	0.60	Fully Implemented

Develop critical thinking and decision-making skills through scientific activities.	4.29	0.64	Fully Implemented
6. Appreciate the value of science and technology in society.	4.18	0.67	Implemented
7. Demonstrate positive attitudes and values toward learning science.	4.35	0.59	Fully Implemented
8. Actively participate in science-related activities.	4.17	0.70	Implemented
Overall	4.35	0.49	Fully Implemented

Table 2 shows the extent of the implementation of the general objectives of science 4. The overall mean of 4.35 (SD = 0.49) indicates that the general objectives were fully implemented, suggesting that Science 4 teachers effectively achieved the intended curriculum outcomes. This finding is consistent with the view that effective curriculum implementation strengthens learners' scientific knowledge, skills, and attitudes when instructional goals are consistently achieved (Waseso et al., 2024). Among the indicators, developing scientific inquiry and problem-solving skills obtained the highest mean (M = 4.53, SD = 0.55), followed by applying scientific knowledge in everyday life (M = 4.47, SD = 0.58) and demonstrating concern for the environment and sustainable development (M = 4.41, SD = 0.60), all of which were interpreted as Fully Implemented. These results indicate that teachers strongly emphasize inquiry-based learning, real-life application of science concepts, and environmental awareness, which are recognized as essential components of quality science education (Waseso et al., 2024). The indicators who appreciated the value of science and technology in society (M = 4.18, SD = 0.67) and participated actively in science-related activities (M = 4.17, SD = 0.70) received the lowest mean scores and were interpreted as Implemented rather than Fully Implemented. Although these objectives were still positively rated, the findings suggest opportunities to further strengthen students' appreciation of science and technology and increase their participation in science-related activities through more engaging and experiential learning experiences. Similar studies have emphasized that active participation and authentic learning opportunities enhance students' interest, scientific literacy, and overall achievement in science education (Waseso et al., 2024).

Table 3. Effectiveness of Teaching Strategies in Teaching Science 4

Teaching Strategies	Mean	SD	Verbal Interpretation
Lecture Method	4.38	0.58	Very Effective
Demonstration Method	4.62	0.49	Very Effective
Discovery Method	4.44	0.56	Very Effective
Question-and-Answer Method	4.53	0.51	Very Effective
Cooperative Learning	4.71	0.45	Very Effective
Group Discussion	4.67	0.47	Very Effective
Experimentation	4.58	0.53	Very Effective
Project-Based Learning	3.92	0.71	Effective
Game-Based Learning	4.61	0.50	Very Effective
Outdoor Activities	3.95	0.66	Effective
Overall	4.44	0.42	Very Effective

Table 3 presents the effectiveness of the teaching strategies used in science 4 instruction. The overall mean of 4.44 (SD = 0.42) indicates that the teaching strategies were perceived as very effective, suggesting that teachers consistently employed instructional approaches that supported meaningful learning and student engagement. Among the strategies, cooperative learning obtained the highest mean (M = 4.71, SD = 0.45), followed by group discussion (M = 4.67, SD = 0.47), demonstration method

($M = 4.62$, $SD = 0.49$), and game-based learning ($M = 4.61$, $SD = 0.50$), all interpreted as Very Effective. These findings indicate that collaborative and interactive teaching approaches are highly valued in science 4 instruction because they actively engage learners and promote a deeper understanding of scientific concepts. In contrast, project-based learning ($M = 3.92$, $SD = 0.71$) and outdoor activities ($M = 3.95$, $SD = 0.66$) received the lowest ratings, although they were still considered effective, suggesting that these strategies may be less frequently optimized because of time or resource limitations. These findings are consistent with previous studies showing that learner-centered and interactive instructional strategies improve students' engagement, motivation, and academic achievement in science (Ibrahim & Hindi, 2024; Irmak & Yılmaz Ergül, 2024).

Table 4. Frequency of Use of Teaching Strategies in Teaching Science 4

Teaching Strategies	Mean	SD	Verbal Interpretation
Lecture Method	4.46	0.53	Always
Demonstration Method	4.41	0.55	Always
Question-and-Answer Method	4.56	0.48	Always
Experimentation	3.82	0.68	Often
Outdoor Activities	3.93	0.70	Often
Discovery Method	4.05	0.64	Often
Take-home Activities	2.00	0.91	Seldom
Small Group Activities	4.35	0.52	Always
Partner/Diad Activities	3.60	0.73	Often
Group Quiz Bee	3.51	0.69	Often
Puzzle/Game-Based Activities	4.58	0.47	Always
Investigatory Project	1.53	0.82	Never
Overall	3.56	0.56	Often

Table 4 shows the frequency of teachers' use of various teaching strategies in science 4. The overall mean of 3.56 ($SD = 0.56$) indicates that the strategies were often used during classroom instruction. The most frequently used strategies were puzzle/game-based activities ($M = 4.58$, $SD = 0.47$), question-and-answer method ($M = 4.56$, $SD = 0.48$), lecture method ($M = 4.46$, $SD = 0.53$), demonstration method ($M = 4.41$, $SD = 0.55$), and small-group activities ($M = 4.35$, $SD = 0.52$), all interpreted as Always. These findings suggest that teachers regularly employ interactive and collaborative approaches to maintain students' participation and understanding during science lessons. Meanwhile, investigatory projects ($M = 1.53$, $SD = 0.82$) and take-home activities ($M = 2.00$, $SD = 0.91$) were the least frequently used strategies, indicating that more resource-intensive and time-demanding activities are implemented less often. Similar findings have shown that teachers tend to utilize practical and engaging strategies more frequently because they effectively enhance learners' participation and conceptual understanding in science classrooms (Barantes & Tamoria, 2021; Sari & Rohmani, 2024).

Table 5. Adequacy of Instructional Materials Used in Teaching Science 4

Instructional Materials	Mean	SD	Verbal Interpretation
Classroom Instructional Materials	4.34	0.48	Very Adequate
Laboratory Instructional Materials	3.40	0.71	Adequate
Overall	3.87	0.60	Adequate

Table 5 presents the adequacy of the instructional materials used in teaching Science 4. The overall mean of 3.87 ($SD = 0.60$) indicates that the instructional materials were generally adequate to support classroom instruction. Specifically, classroom instructional materials obtained a mean of 4.34 ($SD = 0.48$) and were interpreted as very adequate, while laboratory instructional materials obtained a mean of 3.40 ($SD = 0.71$) and were rated as adequate. These findings suggest that teachers have sufficient classroom

resources to facilitate effective instruction; however, laboratory resources remain comparatively limited. The difference between classroom and laboratory materials indicates the need to strengthen laboratory facilities and equipment to provide learners with more opportunities for hands-on scientific investigations. Previous studies have emphasized that adequate instructional resources and well-equipped science laboratories contribute significantly to improving science instruction, learner engagement, and academic performance (Abidoeye et al., 2023; Bumagat et al., 2023).

Table 6. Effectiveness of Evaluative Tools Used in Teaching Science 4

Evaluative Tools	Mean	SD	Verbal Interpretation
Written Works	4.74	0.39	Very Effective
Quarterly Examination	4.47	0.52	Very Effective
Rubrics	4.28	0.56	Very Effective
Projects	3.96	0.67	Effective
Recitation	4.23	0.59	Very Effective
Board Work	4.26	0.58	Very Effective
Achievement Test	4.21	0.60	Very Effective
Assignment	2.72	0.81	Moderately Effective
Group Activity	4.09	0.63	Effective
Problem-Solving Activities	3.88	0.69	Effective
Overall	4.08	0.56	Effective

Table 6 presents the effectiveness of the evaluative tools used in teaching Science 4. The overall mean of 4.08 (SD = 0.56) indicates that the evaluative tools were generally effective in assessing students' learning outcomes. Among the evaluative tools, written works obtained the highest mean (M = 4.74), followed by quarterly examinations (M = 4.47), rubrics (M = 4.28), board work (M = 4.26), and achievement tests (M = 4.21), all interpreted as very effective. In contrast, assignments received the lowest means (M = 2.72) and were rated moderately effectively, suggesting that improvements in assignment design and feedback mechanisms may enhance their effectiveness. Overall, the findings indicate that teachers utilize a variety of assessment methods to monitor students' learning, with greater emphasis on classroom-based and performance-oriented assessments. These findings agree with previous studies that reported that diverse and well-designed assessment practices improve students' learning outcomes and provide meaningful feedback for instruction (Ibrahim & Hindi, 2024; Irmak & Yılmaz Ergül, 2024).

Table 7. Administrative and Supervisory Support Received by Science 4 Teachers

Support Dimension	Mean	SD	Verbal Interpretation
Administrative Support	4.00	0.58	Often
Supervisory Support	4.41	0.46	Always
Overall	4.21	0.52	Always

Table 7 presents the administrative and supervisory support received by science teachers. The overall mean of 4.21 (SD = 0.52) indicates that teachers always received support from school administrators and supervisors. Specifically, supervisory support obtained a higher mean (M = 4.41, SD = 0.46) than administrative support (M = 4.00, SD = 0.58), indicating that teachers perceived stronger assistance from their immediate supervisors than from the school administration. This suggests that supervisors play a significant role in providing constructive feedback, professional guidance, and instructional coaching that contribute to teachers' professional growth. Although administrative support was also positively rated, strengthening communication and equitable workload distribution may further enhance teachers' working conditions. Similar studies have shown that supportive school leadership and instructional supervision positively influence teachers' effectiveness, motivation, and instructional performance (Hallinger & Heck, 2010; Leithwood et al., 2020).

Table 8. Perceived Effectiveness of Science Activities Used in Science 4

Science Activities	Mean	SD	Verbal Interpretation
Games	4.40	0.54	Very Effective
Quiz Bee	4.28	0.57	Very Effective
Group Activities	4.07	0.62	Effective
Recitation	4.12	0.60	Effective
Painting	3.47	0.71	Effective
Drawing	3.33	0.73	Moderately Effective
Experimentation	4.26	0.56	Very Effective
Observation	4.11	0.61	Effective
Field Trip	3.77	0.68	Effective
Role Playing	2.65	0.82	Moderately Effective
Film Viewing	4.16	0.58	Effective
Overall	3.88	0.64	Effective

Table 8 shows the effectiveness of science activities preferred by pupils. The overall mean of 3.88 (SD = 0.64) indicates that these activities were generally effective in supporting science learning. Among the activities, games (M = 4.40), quiz bee (M = 4.28), and experimentation (M = 4.26) were rated very effective, suggesting that pupils prefer interactive and hands-on learning experiences. On the other hand, role playing (M = 2.65) and drawing (M = 3.33) received the lowest ratings, indicating that these activities were perceived as less effective compared with other science activities. These findings imply that engaging, collaborative, and experiential activities encourage greater student participation and interest in science lessons. Previous studies have reported that activity-based and inquiry-oriented learning enhances students' motivation, participation, and conceptual understanding in science education (Coşkunserçe, 2021; Kalemkuş & Kalemkuş, 2024).

Table 9. Problems Encountered in Teaching Science 4

Problems Encountered	Mean	SD	Verbal Interpretation
Lack of knowledge about the environment	2.70	0.78	Moderately Serious
Lack of interest in science subject	2.63	0.81	Moderately Serious
Weak understanding of some experiments	3.39	0.69	Moderately Serious
Weak sense of reasoning and inference	4.07	0.57	Serious
Absenteeism	3.77	0.64	Serious
Financial constraints	3.23	0.72	Moderately Serious
Poor comprehension	4.32	0.49	Very Serious
Carelessness in answering activities	4.16	0.53	Serious
Inadequate instructional materials	3.32	0.71	Moderately Serious
Shyness among learners	3.77	0.63	Serious
Large class size	4.21	0.55	Very Serious
Low self-esteem	3.88	0.60	Serious
Lack of motivation	3.37	0.68	Moderately Serious
Emotional problems	3.40	0.67	Serious
Lack of laboratory equipment	3.61	0.66	Serious
No laboratory room	4.51	0.46	Very Serious
Overall	3.65	0.63	Serious

Table 9 presents the problems encountered in teaching Science 4. The overall mean of 3.65 (SD = 0.63) indicates that the respondents generally perceived the identified problems as serious. The most serious

concerns were the absence of a laboratory room ($M = 4.51$), poor comprehension among pupils ($M = 4.32$), and large class sizes ($M = 4.21$), all interpreted as Very Serious. Other issues, including weak reasoning skills, absenteeism, low self-esteem, and lack of laboratory equipment, were also rated as serious, while lack of interest in science ($M = 2.63$) and limited knowledge about the environment ($M = 2.70$) were considered Moderately Serious. These findings suggest that improving science facilities, reducing classroom constraints, and providing adequate instructional resources are essential for enhancing science teaching and learning. Similar studies have emphasized that adequate learning resources, supportive learning environments, and appropriate classroom conditions are critical factors for improving students' engagement and achievement in science (Abidoje et al., 2023; Bumagat et al., 2023).

CONCLUSION

This study concluded that Science 4 instruction in public elementary schools in the Montalban District, Division of Rizal, was generally implemented successfully. The respondents were professionally qualified, experienced, and actively engaged in continuous professional development, providing a strong foundation for effective science instruction. The general objectives of the Science 4 curriculum were found to be fully implemented, while the teaching strategies employed by teachers were very effective and frequently used in classroom instruction. Classroom instructional materials were very adequate, although laboratory instructional materials were only adequate, indicating a need for additional science resources. The evaluative tools used by teachers were generally effective, and teachers consistently received positive administrative and supervisory support. Pupils prefer interactive and hands-on science activities, particularly games, quiz bees, and experimentation. Despite these strengths, challenges such as the lack of laboratory rooms and equipment, large class sizes, and learners' poor comprehension remained significant concerns that may affect the quality of science instruction. Overall, strengthening laboratory facilities, instructional resources, and learner support mechanisms will further improve the implementation of science 4 instruction.

RECOMMENDATIONS

Based on the findings of this study, school administrators should prioritize the provision of adequate laboratory facilities, science equipment, and instructional materials to strengthen the implementation of science 4 instruction. Science teachers should continue employing learner-centred, inquiry-based, and collaborative teaching strategies while increasing the use of hands-on activities, experimentation, and project-based learning to enhance students' scientific understanding and engagement. School heads and instructional supervisors should sustain regular mentoring, classroom observation, and professional development programs that focus on innovative teaching strategies, classroom assessment, and effective laboratory management. In addition, intervention programs should be designed to address learners' poor comprehension, strengthen critical thinking and scientific reasoning skills, and increase students' interest in science through engaging and contextualized learning experiences. Finally, future researchers are encouraged to replicate this study in other school districts using larger samples and additional variables, such as students' academic performance, laboratory utilization, and technology integration, to further validate and expand the findings and contribute to the continuous improvement of elementary science education.

LIMITATIONS OF THE STUDY

This study was limited to 28 Science 4 teachers from selected public elementary schools in the Montalban District, Division of Rizal, during the School Year 2025–2026. The findings were based on the respondents' self-reported perceptions collected through a researcher-made questionnaire and analyzed using descriptive statistics. Consequently, the results describe the current implementation of science 4 instructions but do not establish causal relationships between variables. In addition, the study focused primarily on teachers' perspectives and did not include the views of pupils, school

administrators, or parents, nor did it examine objective measures such as learners' academic achievement or classroom-observation data. Therefore, the findings should be interpreted within the context of the participating schools and may not be generalized to other school divisions or educational settings with different characteristics or contexts.

FUTURE RESEARCH DIRECTIONS

Future studies should expand this research by involving larger samples from multiple school divisions or regions to improve the generalizability of the findings. Researchers are also encouraged to employ comparative, correlational, or mixed-methods research designs to examine the relationships among instructional practices, school support, teacher competencies, and learners' academic achievement. Incorporating the perspectives of pupils, school administrators, and parents would provide a more comprehensive understanding of science 4 instruction in the Philippines. Future investigations should evaluate the effectiveness of technology-enhanced science instruction, inquiry-based learning, laboratory-based interventions, and teacher professional development programs in improving students' scientific literacy, critical thinking, engagement, and overall academic performance. Such studies would provide stronger evidence for developing evidence-based policies and instructional interventions to enhance elementary science education.

ETHICS STATEMENT

This study was conducted in accordance with accepted ethical standards for educational research. Prior approval to conduct the study was obtained from the appropriate educational authorities and school administrators before data collection commenced. Participation was voluntary, and informed consent was obtained from all teacher participants after they were informed of the study's objectives, procedures, expected benefits, and minimal risks.

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AI DISCLOSURE STATEMENT

ChatGPT-assisted writing tools were used solely to support the preparation of this manuscript. through grammar checking, language refinement, sentence organization and formatting. AI tools We're not used to formulating research questions, designing the study, collecting or analyzing data, interpret the findings or generate the study's conclusions and recommendations.

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