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Assessing the science proficiency of Grade 4 pupils in Roxas Districts, Isabela

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ABSTRACT

Science education in the elementary level plays a vital role in developing learners' critical thinking, problem-solving skills, and scientific literacy needed for national development. However, despite curriculum reforms and improved teaching approaches, there remains a gap between expected learning outcomes and the actual science proficiency of Filipino learners, particularly in rural public schools. This study assessed the science proficiency of Grade 4 pupils in selected public elementary schools in Roxas Districts, Isabela, using a descriptive-normative design with 31 teacher-respondents. Findings revealed that pupils were very proficient in science process skills (WM = 4.27) and demonstrated outstanding performance across all quarters (WM = 4.48). Teaching strategies were rated very effective (WM = 4.63), yet serious challenges persisted (WM = 3.91), particularly in parental involvement and learning resources. The study highlights the need to strengthen assessment practices, improve resource provision, and enhance stakeholder support to ensure meaningful and sustained science learning.

Keywords: Science proficiency, instructional strategies, elementary science education, learning resources, parental involvement.

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INTRODUCTION

Science education in the elementary grades is essential for both individual development and national progress. Globally, primary school is recognized as the stage where children begin formal science learning. These early experiences shape pupils' understanding of scientific concepts and practices, making the quality of instruction crucial for future learning and for fostering interest in science (Harlen & Qualter, 2018). The United Nations also emphasizes that quality education contributes to achieving multiple Sustainable Development Goals by equipping individuals with the knowledge and skills needed to reduce poverty, minimize inequality, and promote sustainable living.

Effective science teaching in elementary school goes beyond memorization. It develops critical life skills such as problem-solving, creativity, and curiosity (Studies Weekly, 2024). Learning becomes more meaningful when it is active and builds on pupils' prior knowledge and experiences (National University, 2024). Through such engagement, pupils become better

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prepared to function as informed citizens capable of applying scientific knowledge in real-world contexts (National Science Board, 2021).

In response, many education systems have shifted toward learner-centered approaches. One widely recognized method is inquiry-based learning (IBL), which promotes higher-order thinking skills by allowing pupils to explore and investigate concepts independently (Antonio & Prudente, 2021; Samaresh, 2017). This approach enhances relevance by connecting lessons to real-life situations, thereby increasing motivation and engagement (Cairns, 2019). Contemporary research also highlights the importance of integrating science with technology, engineering, and mathematics (STEM), as well as developing pupils' ability to reason and argue using evidence.

Alongside these pedagogical shifts, there has been a growing emphasis on redefining science proficiency. Modern assessments focus not only on content knowledge but also on the ability to apply scientific understanding. The Programme for International Student Assessment (PISA) defines scientific literacy as the capacity to explain phenomena, evaluate investigations, and interpret data for decision-making. This involves content, procedural, and epistemic knowledge (OECD, 2019). These dimensions serve as the foundation of this study in assessing Grade 4 pupils' science proficiency.

Despite global advancements, the Philippines continues to face significant challenges in science education. In its first participation in PISA in 2018, the country ranked second to last in science among 79 countries, with an average score of 357—far below the OECD average of 489 (Galvez & Reyes, 2023). The 2022 results showed minimal improvement, with an average score of 356 (Philippines Basic Education, 2024). Only 23% of Filipino learners reached Level 2 proficiency or higher, compared to the OECD average of 76%. This indicates that many learners struggle to explain basic scientific concepts or interpret data correctly. Similarly, national assessments such as the National Achievement Test (NAT) reveal persistently low performance in Science, Mathematics, and English (Behiga, 2022).

Several factors contribute to this issue. One major concern is insufficient funding, with education expenditure at only 3.6% of the country's Gross Domestic Product—below UNESCO's recommended 4–6% (Sta. Rosa, 2024). Consequently, many public schools lack laboratories and modern equipment necessary for hands-on learning (de Borja & Marasigan, 2020). Additionally, a significant proportion of science teachers are not specialists, which affects instructional quality (Chi, 2025). Socioeconomic factors, including poverty, low motivation, and language barriers, further hinder pupils' performance (Alivernini & Manganelli, 2015).

Although the Philippines reports a high basic literacy rate of 97% (Philippine Statistics Authority, 2021), this does not translate into functional literacy. Many pupils struggle to comprehend, analyze, and apply information effectively. The situation is more pronounced in rural and underserved areas where resources and qualified teachers are limited (Ambag, 2018).

To address these challenges, the Department of Education implemented the K to 12 Basic Education Program, which aims to develop scientifically literate learners who are critical thinkers and responsible decision-makers (DepEd, 2019). The curriculum emphasizes three key domains: understanding scientific concepts, conducting investigations, and developing scientific attitudes.

For Grade 4 pupils, the curriculum outlines competencies such as investigating material changes, describing body systems, classifying living organisms, and understanding forces and motion. It promotes inquiry-based and learner-centered instruction, encouraging pupils to use evidence in explaining scientific ideas.

However, a gap remains between curriculum goals and classroom practice. Many schools lack adequate resources, and teachers often have limited training in inquiry-based instruction. Time constraints also push teachers toward lecture-based approaches rather than experiential learning. Additionally, some instructional materials are outdated or contain inaccuracies, further affecting learning outcomes (De La Cruz, 2022).

This study assessed the science proficiency of Grade 4 pupils in public elementary schools in Roxas Districts, Isabela. It examined pupils' mastery of science process skills and competencies under the MATATAG Curriculum, as well as teaching strategies, instructional materials, and classroom practices influencing proficiency. Furthermore, it identified areas for improvement.

The findings are expected to benefit the Department of Education, school administrators, teachers, and curriculum planners by providing evidence-based insights for improving science instruction. The study also highlights challenges faced by rural schools, offering context-specific recommendations.

The study is grounded in several learning theories, including Constructivism, Social Constructivism, Vygotsky's Zone of Proximal Development (ZPD), Social Cognitive Learning Theory, Brain-Based Learning Theory, and Cognitive Load Theory. These frameworks collectively explain how pupils develop science proficiency.

Constructivism (Piaget, 1972) posits that learners actively construct knowledge by connecting new information with prior experiences. In science education, this is achieved through hands-on activities, problem-solving, and guided discovery.

Social Constructivism (Vygotsky, 1994) emphasizes that learning occurs through social interaction. Knowledge is co-constructed through communication with teachers and peers, making it essential to contextualize lessons within pupils' experiences.

Vygotsky's ZPD (1978) highlights the importance of scaffolding. Pupils can accomplish tasks beyond their independent capability when provided with appropriate support, such as guided questioning and demonstrations.

The Social Cognitive Learning Theory (Bandura, 1977) explains that learning occurs through observation and imitation. Teacher modeling and peer interaction enhance understanding and motivation.

Brain-Based Learning Theory (Caine & Caine, 1994) underscores the importance of aligning instruction with how the brain processes information. Engaging, meaningful, and emotionally relevant activities improve retention.

Cognitive Load Theory (Sweller, 1988) stresses that instructional design should consider the limits of working memory. Simplified and well-structured lessons facilitate better comprehension and long-term retention.

Together, these theories suggest that science proficiency develops through active engagement, social interaction, guided support, effective modeling, and well-designed instruction.

Statement of the problem

This study aimed to assess the science proficiency of Grade 4 pupils in public elementary schools in Roxas Districts, Isabela, for the school year 2025–2026.

Specifically, it sought to answer the following questions:

1. What is the profile of the respondents in terms of age, gender, civil status, highest educational attainment, present position, latest performance rating, number of years in service, and level of in-service training attended?
2. What is the level of proficiency of Grade 4 pupils in science process skills?
3. What is the level of pupils' proficiency in the MATATAG Science 4 competencies?

4. How effective are the different teaching strategies in developing science proficiency in terms of student engagement, classroom instruction, monitoring and evaluation, and learning environment?
5. What challenges do teachers encounter in Science 4 instruction in terms of learner materials, instructional supervision, learner factors, parental factors, and school facilities?

METHODOLOGY

The study employed the descriptive-normative research method, which is appropriate for determining and describing the present conditions of a group or phenomenon. According to Good and Scates, this method is useful in organizing, analyzing, and interpreting current situations, while Van Dalen and Meyer (1999) emphasized its role in identifying relationships among variables. Similarly, Best (1999) and Whitney (1999) noted that descriptive research focuses on describing existing conditions and providing a basis for informed decision-making.

The study was conducted in selected public elementary schools in Roxas Districts, Isabela. The respondents consisted of 31 Grade 4 teachers, selected through purposive sampling, ensuring that participants were directly involved in teaching Science 4.

Data were gathered using multiple instruments. The primary tool was a structured questionnaire developed from a review of related literature and validated through a try-out and expert evaluation. Supporting data were obtained through unstructured interviews and documentary analysis, which helped validate and enrich the survey responses.

The data gathering procedure involved securing approval from education authorities and school heads, followed by the distribution and retrieval of questionnaires. The researcher personally administered the process to ensure completeness and accuracy of responses.

For data analysis, frequency and percentage were used to describe the respondents' profile, while the weighted mean was utilized to determine pupils' science proficiency, the effectiveness of teaching strategies, and the challenges encountered by teachers.

RESULTS AND DISCUSSION

The study involved 31 Grade 4 teachers, most of whom were female (77.42%), married (83.87%), and in their mid-career stage, particularly within the 41–45 age group. A majority held a master's degree (55.56%), occupied the position of Teacher III (77.42%), and all received an outstanding performance rating (100%). Most had 11–15 years of teaching experience (35.48%), indicating that the group was generally experienced and professionally developed.

Despite this strong teacher profile, the findings present an interesting situation. Pupils were rated very proficient in science process skills (WM = 4.27) and showed outstanding performance across all quarters (overall WM = 4.48). On the surface, this suggests that teaching is effective and that pupils are learning well. However, when examined more closely, this raises important questions. If both teachers and pupils are performing at such high levels, it would be expected that learners would also perform well in larger national or international assessments —but this is not always the case.

This gap suggests that the high ratings may reflect how learning is measured inside the classroom rather than the actual depth of understanding. Teachers may be effective in delivering lessons, but assessment practices might not be strict or varied enough to capture real mastery. For example, pupils performed best in simpler skills like observing, while more complex skills like measuring and inferring had slightly lower scores. This pattern shows that while basic understanding is strong, higher-order thinking skills may still need improvement.

The teaching strategies used were rated very effective overall (WM = 4.63), with classroom instruction (WM = 4.71) as the strongest area. This means teachers are confident in how they teach and present lessons. Pupil engagement (WM = 4.65) and learning environment (WM = 4.63) were also high, showing that classrooms are generally interactive and supportive. However, monitoring and evaluation had the lowest rating (WM = 4.55) among the strategy areas. This is important because it suggests that while teaching is strong, checking whether pupils truly understand the lesson may not be as strong.

At the same time, teachers reported facing serious challenges (overall WM = 3.91). The most pressing issues were related to parents (WM = 4.08) and learners (WM = 4.01). Many parents are not actively involved in their children's learning, and learners may show poor behavior, lack of interest, or absenteeism. These factors directly affect how well pupils learn, regardless of how effective the teacher is.

There are also concerns about learning materials (WM = 3.90) and school facilities (WM = 3.86). The lack of resources, especially science-related materials and laboratory spaces, limits hands-on learning. This is critical because science is best learned through actual experience, not just discussion. In addition, instructional supervision (WM = 3.68) was also identified as a challenge, suggesting that teachers may not be receiving enough guidance or support to improve further.

On the whole, the findings show a mixed picture. On one hand, teachers are qualified, experienced, and using effective strategies, and pupils appear to perform well. On the other hand, the consistently high ratings may not fully reflect the real situation. Weaknesses in assessment, combined with challenges from home, learner behavior, and limited resources, suggest that there is still a gap between teaching effectiveness and actual learning outcomes.

This means that improving science education is not only about teaching better lessons. It also requires stronger assessment practices, better support from parents, improved student attitudes, and adequate learning resources to ensure that pupils truly understand and can apply what they learn.

CONCLUSION

Based on the findings of the study, it can be concluded that the group of teachers is generally experienced, qualified, and professionally active. Most are married female teachers within the 41–45 age range, holding MAEd degrees, occupying Teacher III positions, and consistently receiving outstanding performance ratings. Their average teaching experience of 11–15 years, along with active participation in in-service trainings, reflects a strong foundation for effective instruction. To sustain and further enhance this competence, it is important for teachers to continue engaging in professional development programs, particularly those that strengthen instructional practices and integrate technology into science teaching.

The findings also show that Grade 4 pupils demonstrated high levels of proficiency in science, particularly in basic process skills such as observing, classifying, and predicting, and maintained outstanding performance across all quarters of the MATATAG Science 4 curriculum. However, sustaining this level of performance requires continuous use of effective teaching strategies, especially those that promote active learning, such as hands-on activities, group work, and real-life applications. Teachers should therefore be encouraged to consistently apply these strategies to keep learners engaged and deepen their understanding.

The study further revealed that the instructional strategies used by teachers were very effective, particularly in promoting pupil engagement and improving classroom instruction. This indicates that teachers are capable of delivering meaningful and interactive lessons. Nevertheless, to maximize their effectiveness, there is a need for stronger instructional support.

School leaders should provide more consistent supervision, mentoring, and feedback to help teachers refine their practices and ensure that high-quality instruction is sustained.

Despite these strengths, the study identified several serious challenges that affect the quality of Science 4 instruction. These include limited learning materials, inadequate school facilities, insufficient instructional supervision, learner-related issues, and low parental involvement. Among these, parental support emerged as a major concern, highlighting the need for schools to strengthen home–school partnerships. Schools are encouraged to implement programs such as parent orientations, regular communication, and capacity-building activities to help parents support their children's learning at home.

In addition, the lack of modern teaching tools and science facilities, such as laboratory rooms and equipment, limits opportunities for hands-on learning. Addressing this requires investment in instructional materials, digital resources, and improved school infrastructure to create a more conducive learning environment for science education.

Finally, while the study provides valuable insights, it is limited to selected public elementary schools in Roxas Districts, Isabela. Future studies should expand the scope to include more schools and diverse respondents, such as school heads, parents, and learners, to gain a more comprehensive understanding of science education. Further research may also explore the long-term effects of improved resources, supervision, and parental involvement on teaching effectiveness and student learning outcomes.

REFERENCES

Alivernini, F., & Manganelli, S. (2015). Country, school and student factors associated with extreme levels of science literacy across 25 countries. International Journal of Science Education, 37(12), 1992–2012. https://doi.org/10.1080/09500693.2015.1060648

Ambag, R. (2018). The challenges of science education in the Philippines. The Manila Times.

Antonio, R., & Prudente, M. (2021). Effectiveness of metacognitive instruction on students' science learning achievement: A meta-analysis. International Journal on Studies in Education, 4(1), 43–54. https://doi.org/10.46328/ijonse.50

Bandura, A. (1977). Social learning theory. Prentice Hall.

Behiga, R. (2022, June). Issues with National Achievement Test (NAT) in the Philippines. University of Science and Technology of Southern Philippines.

Best, J. W. (1999). Research in education. Prentice Hall.

Caine, R. N., & Caine, G. (1994). Making connections: Teaching and the human brain. Addison-Wesley.

Cairns, D. (2019). Investigating the relationship between instructional practices and science achievement in an inquiry-based learning environment. International Journal of Science Education, 41(15), 2113–2135. https://doi.org/10.1080/09500693.2019.1660927

Chi, C. (2025, January 3). DepEd to study Pisay's best practices in STEM. Philstar.com.

de Borja, J. M. A., & Marasigan, A. C. (2020). Status of science laboratory in a public junior high school. International Journal of Research Publications, 46(1).

De La Cruz, J. (2022, August 29). DepEd admits errors in textbooks. Philippine News Agency.

Department of Education. (2019). Science curriculum guide. DepEd Complex.

Galvez, D. M. P., & Reyes, R. C. (2023). Identifying factors influencing the science proficiency of Filipino students in the PISA 2018 using machine learning. Proceedings of the Samahang Pisika ng Pilipinas, 41, SPP-2023-1H-03.

Harlen, W., & Qualter, A. (2018). The teaching of science in primary schools. Routledge. https://doi.org/10.4324/9781315398907

National Science Board. (2021). Vision 2030: A roadmap for science and engineering.

National University. (2024). What is constructivism in education?

Organisation for Economic Co-operation and Development (OECD). (2019). PISA 2018 results (Volume I): What students know and can do. OECD Publishing. https://doi.org/10.1787/5f07c754-en

Philippine Statistics Authority. (2021). 2020 census of population and housing.

Philippines Basic Education. (2024, April). PISA 2022: No change in dismal performance of the Philippines.

Piaget, J. (1972). The psychology of the child. Basic Books.

Samaresh, A. (2017). Effectiveness of constructivist approach on academic achievement in science at secondary level. Educational Research and Reviews, 12(22), 1074–1079. https://doi.org/10.5897/ERR2017.3298

Sta. Rosa, M. (2024, January 16). Addressing the Philippines' education crisis. Fulcrum.

Studies Weekly. (2024, February 26). Why science education matters in your elementary school classroom.

Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. Cognitive Science, 12(2), 257–285.

Van Dalen, D., & Meyer, W. (1999). Understanding educational research: An introduction. McGraw-Hill.

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

Vygotsky's developmental theory: An introduction. (1994). PsycEXTRA Dataset. https://doi.org/10.1037/e547452004-001

Whitney, F. L. (1999). Elements of research. Prentice Hall.