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A MULTIFACTOR ANALYSES ON LEARNERS' PERIODICAL TEST PERFORMANCE IN SCIENCE GRADES 4-6

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ABSTRACT

This study analyzes the extent of factors affecting the performance of grade 4-6 learners in science. Rizal Elementary School, Kananga I District, Leyte Division is the locale of the study. The respondents of this study are eighteen (18) grade 4-6 learners who failed during the periodical test in science and currently enrolled for school year 2025-2026. The researcher utilizes the survey from the study of Mindo & Paglinawan (2025) in their study on "The Relationship Between Classroom Environment and Learners' Motivation in Science" to determine the extent of factors affecting their performance and the test scores of the grade 4-6 learners in science for quarter 4. Based on the findings of the study, it can be concluded that several factors significantly influence the academic performance of Grades 4–6 learners in science, particularly learner factors, teacher-related factors, school or environmental factors, and family factors. The respondents generally agreed that these factors affect learners' performance. Moreover, the significant relationship between the factors affecting learner performance and the learners' Quarter 4 test scores confirms that learner achievement in science is strongly associated with the quality of instruction, learning environment, learner

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motivation, and family support. Hence, improving these factors may contribute to better academic outcomes and higher learner achievement in science.

Keywords: *Multifactor Analyses, Learners' Periodical Test Performance, Science grades 4-6*

INTRODUCTION

Science education plays a vital role in developing learners' critical thinking, problem-solving skills, and scientific literacy, which are essential competencies in the modern world. At the elementary level, science instruction introduces learners to fundamental concepts about the natural world and encourages curiosity, inquiry, and exploration. Early exposure to effective science education helps learners build the foundation needed for higher-level scientific understanding and prepares them for future academic and technological challenges.

However, despite the importance of science education, many elementary learners continue to demonstrate unsatisfactory performance in science subjects. Learners often encounter difficulties in understanding scientific concepts, conducting inquiry-based activities, and applying scientific knowledge to real-life situations. These challenges may result from various internal and external factors that influence learners' academic achievement. Understanding these factors is crucial for educators and school leaders who aim to improve the quality of science instruction and learners' academic outcomes.

Research indicates that learners' academic performance in science is influenced by multiple interacting variables rather than a single factor. These factors may include learners'

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motivation, study habits, interest in science, teacher competence, instructional strategies, classroom environment, parental involvement, and access to learning resources. For instance, a study examining factors related to the science academic performance of elementary pupils found that learners' motivation, teacher teaching strategies, parental support, and availability of learning resources significantly influenced their science achievement (Paano & Apigo, 2025). The study emphasized that improving learners' performance in science requires a comprehensive approach that considers both school-related and home-related factors.

Similarly, research conducted among elementary learners revealed that scientific literacy is strongly influenced by both internal factors, such as students' interest, motivation, and self-efficacy, and external factors, including classroom climate, learning quality, and parental support. These factors were found to have significant effects on learners' science learning outcomes and overall academic performance (Syofyan, Fadli, & Pappachan, 2025). Such findings highlight the complex and multifaceted nature of science learning among elementary pupils.

Furthermore, studies investigating academic performance among elementary learners emphasize that teachers' professional competence and instructional practices also play a crucial role in shaping learners' learning outcomes. Research conducted in elementary schools in the Philippines found that teacher-related factors, including teaching strategies, professional competence, and instructional support, significantly influence learners' performance in science and other subjects (Mempin, 2024). Effective teaching practices, engaging learning activities,

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and contextualized lessons help learners better understand scientific concepts and increase their interest in science learning.

In addition to teacher and learner factors, the learning environment also significantly affects learners' academic achievement. Studies have shown that classroom environment, availability of instructional materials, and supportive learning conditions can greatly enhance learners' engagement and understanding of scientific concepts. On the other hand, inadequate learning resources, limited laboratory equipment, and insufficient instructional support may hinder learners' academic progress in science subjects (Dablo, Osias, & Comon, 2024). These conditions highlight the need to examine the different variables that contribute to learners' performance in science.

Given these considerations, it becomes necessary to conduct a multifactor analysis to identify the key determinants of learners' science performance at the elementary level. Understanding how different factors interact to influence learners' academic achievement can help educators design appropriate interventions that address the specific needs of learners. By identifying the most significant factors affecting science performance, teachers and school administrators can develop targeted strategies to improve instructional practices and learning environments.

Moreover, Grade 4 is considered a critical stage in elementary education where learners begin to encounter more complex scientific concepts and develop deeper understanding of scientific principles. Investigating the various factors that influence learners'

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performance at this stage is therefore essential in ensuring that learners acquire the necessary competencies required for higher grade levels.

Therefore, this study aims to conduct a multifactor analysis of learners' performance in Science among Grade 4 pupils. Specifically, it seeks to determine the different learner-related, teacher-related, and environmental factors that may influence learners' academic performance in science. The findings of this study are expected to provide valuable insights that can guide educators, school administrators, and policymakers in designing effective interventions and strategies to improve science education and learners' academic achievement.

This study analyzes the extent of factors affecting the performance of grade 4-6 learners in Science in Rizal Elementary School, Kananga I District, Leyte Division. The findings of the study were basis for the proposed intervention plan.

Further, it sought to answer the following sub-problems:

1. What is the extent of factors affecting the performance of grade 4-6 learners in science in terms of:
    - 1.1 learner-factors,
    - 1.2 teacher-factors,
    - 1.3 environmental or school support factors; and
    - 1.4 family factor?
2. What is the periodical test performance of grade 4-6 learners in science in quarter 4?

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3. Is there a significant relationship between the extent of factors affecting the performance of grade 4-6 learners in science and their academic performance in quarter 4?

4. What improvement plan can be proposed based on the findings of this study?

METHODOLOGY

Design. This study employs employed descriptive-correlational research design to analyze the extent of factors affecting the performance of grade 4-6 learners in science. This study is descriptive because it describes the variables- extent of factors affecting the performance of grade 4 learners in science in terms of learner, teacher and environment or school support factors and academic performance of grade 4-6 learners in science. Further, this is also correlational because it finds the relationship between the dependent (academic performance of grade 4-6 learners in science) and independent variables (multi-factors affecting the performance of grade 4-6 learners). The locale of this study is Rizal Elementary School, one of the schools of Kananga I District, Schools Division of Leyte. The respondents of this study are eighteen (18) grade 4-6 learners who failed during the periodical test in science and currently enrolled for school year 2025-2026. The researcher utilizes the survey from the study of Mindo & Paglinawan (2025) in their study on "The Relationship Between Classroom Environment and Learners' Motivation in Science" to determine the extent of factors affecting their performance and the test scores of the grade 4-6 learners in science for quarter 4.

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Sampling. The twenty (20) grade 4-6 learners who failed during the periodical test in science and currently enrolled for school year 2025-2026 were involved in the study. Complete enumeration was employed in choosing the respondents of the study.

Research Procedure. Upon securing a research permit, data gathering was initiated. Application letters for study permits were personally submitted to concerned offices. A request letter was first submitted to the Schools Division Superintendent for approval to gather data from targeted respondents. After securing the approval of SDS, letters of permission were also submitted to the Public Schools District Supervisor and School Principals of the identified schools in the district. After getting the approvals, the researcher conducted data-gathering activities. An orientation was also held for the respondents, and their agreement through permits was to participate in the research. Then, the researcher distributed the survey. Each of the identified learners have to accomplish the survey with the guidance of their teacher adviser and explaining the content of the survey. The researcher then gathered the test score of these learners in science during the quarter 4 periodical test. After accomplishing the survey, it was collected, checked, tabulated and submitted for statistical treatment.

Ethical Issues. The researcher obtained the necessary written permission from the authorities to conduct the study. While conducting the survey, the researcher made sure that the use of offending, discriminatory, or other undesirable terminology was eschewed. The names of the respondents and other personal information were not included in this study to ensure confidentiality. The respondents were also voluntarily participating. Orientation was done for the respondents. During orientation, concerns and issues were clarified, and consent

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to be part of the study was signed. The researcher-maintained objectivity in discussing and analyzing the results. All authors whose works were cited in this study were correctly quoted and were acknowledged in the reference. Keeping of responses from the respondents were given to the researcher and kept under her care.

Treatment of Data. The quantitative responses underwent tallying and tabulation. Statistical treatment involved using specific tools: Simple Percentage and Weighted Mean were employed to analyze the extent of factors affecting the performance of grade 4-6 learners in science in terms of learner, teacher and environment or school support factors and academic performance of grade 4 learners and test scores in quarter 4 periodical test. Pearson r was used to determine the significant relationship between the dependent and independent variables.

RESULTS AND DISCUSSION

Table 1

Factors Affecting the Performance of Learners in Science

Domain	Indicator	Weighted Mean	Interpretation
A. Learner Factors	Interest in learning Science	3.50	Agree
	Enjoy participation in Science activities	3.65	Agree

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Domain	Indicator	Weighted Mean	Interpretation
	Confidence in learning Science concepts	3.40	Neutral
	Reviewing Science lessons at home regularly	2.50	Disagree
	Completing Science assignments on time	2.65	Neutral
	Asking questions when lessons are unclear	3.20	Neutral
	Science is important for future learning	3.70	Agree
	Studying Science for good grades	3.20	Neutral
	Use of personal learning strategies	2.75	Neutral
	Preparation for Science tests/quizzes	2.60	Neutral
B. Teacher-Related Factors	Teacher explains lessons clearly	4.25	Strongly Agree
	Uses varied teaching strategies	4.25	Strongly Agree
	Provides feedback for improvement	3.95	Agree
	Responds to questions patiently	3.90	Agree
	Makes lessons engaging	4.35	Strongly Agree

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Domain	Indicator	Weighted Mean	Interpretation
	Uses instructional materials/tools	4.00	Agree
	Encourages critical thinking	3.90	Agree
	Provides hands-on activities	4.00	Agree
	Relates lessons to real-life situations	4.00	Agree
	Motivates learners in Science	4.00	Agree
C. Environmental / School Support Factors	Availability of Science materials	4.30	Strongly Agree
	Supportive school environment	4.00	Agree
	Classroom is conducive	3.70	Agree
	Access to learning resources	4.25	Strongly Agree
	Parental support in Science	2.45	Disagree
	Access to experiments	4.25	Strongly Agree
	Active classmates	4.20	Agree
	Home supports Science learning	2.40	Disagree
	Science learning facilities	4.00	Agree
	Classroom promotes focus	3.70	Agree
D. Family Factors	Parents encourage Science learning	3.85	Agree
	Home assistance in lessons	2.45	Disagree

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Domain	Indicator	Weighted Mean	Interpretation
	Reminds assignment completion	2.90	Neutral
	Quiet study place at home	2.40	Disagree
	Provides learning materials	2.90	Neutral
	Monitors Science performance	3.05	Neutral
	Attends school activities	2.50	Disagree
	Motivates learner	3.75	Agree
	Time for studying Science	2.75	Neutral
	Emotional support during difficulty	2.90	Neutral
OVERALL WEIGHTED MEAN		**3.45**	**Agree**

LEGEND:

RANGES	***INTERPRETATION***
4.21 – 5.00	*Strongly Agree*
3.41 – 4.20	*Agree*
2.61 – 3.40	*Neutral*
1.81 – 2.60	*Disagree*
1.00 – 1.80	*Strongly Disagree*

Table 1 presents the extent of factors affecting the performance of learners in science for quarter 4 in terms of learner factors, teacher-related factors, environment or school factors and family factors. It was revealed on the table that the extent of factors affecting the

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performance of learners in science for quarter 4 in terms of learner factors, teacher-related factors, environment or school factors and family factors obtained an overall mean of 3.45 (Agree). This means that the grades 4-6 leaners agree that learner performance is influenced by multiple interconnected dimensions. This suggests that academic achievement among intermediate learners is not solely dependent on learners' abilities, but is also shaped by the quality of instruction, conduciveness of the school environment, and support received from the family. The result further indicates that these factors are consistently experienced by learners and may either facilitate or hinder their academic success depending on how they are addressed by teachers, parents, and school administrators. This finding is supported by the study of Hungo et al. (2024), which revealed that parental education, family structure, and economic conditions significantly affect the academic performance of elementary learners. Their study emphasized that family support and parental involvement play a crucial role in enhancing learners' academic success and motivation. Similarly, Zafra and Balacuit (2025) found that learners' academic performance is influenced by student wellbeing, positive learning environments, effective teaching strategies, parental background, and teacher quality. Their findings imply that learner achievement improves when schools provide supportive instructional environments and when teachers employ effective pedagogical approaches.

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Table 2

Weighted Mean per Score Range (Science Quarter 4 Periodical Test)

Score Range (%)	Frequency (Learners)	Weighted Mean (%)	Interpretation
45 – 50%	6	47.17%	Did Not Meet Expectations
40 – 44%	4	42.25%	Did Not Meet Expectations
35 – 39%	5	37.10%	Did Not Meet Expectations
30 – 34%	2	31.25%	Did Not Meet Expectations
25 – 29%	1	27.50%	Did Not Meet Expectations
Overall Weighted Mean		**39.65**	**Did Not Meet Expectation**

LEGEND:

RANGES	***INTERPRETATION***
90-100	*Outstanding*
85-89	*Very Satisfactory*
80-84	*Satisfactory*
75-79	*Fairly Satisfactory*
Below 75	*Did Not Meet Expectation*

Table 2 presents the result of the 4th quarter periodical test in science where it is presented using a table with title, "weighted mean per score range". It was shown on the table that among the eighteen grade 4-6 learners, none of them were able to pass the

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periodical test. Knowing the factor that affect their performance, it is important to provide intervention activities to help improve these learners to pass the test. Specifically, there are 6 (47.17%) got a score range of 45-50%, 4 (42.25%) got a score range of 40-44%, 5 (37.10%) got a score range of 35-39% while 2 (31.25%) got a score range of 30-34% and 1 (27.50%) got a score range of 25-29% as their mean score for science. These data indicates that they had trouble in their assessment and teachers in science must do something or provide necessary intervention to address these gaps in learning. this implies that learners may have experienced serious difficulties in mastering the required learning competencies and achieving the desired academic standards. This result suggests the presence of learning gaps that may be associated with inadequate foundational skills, low comprehension levels, ineffective study habits, insufficient instructional support, poor test-taking skills, or limited learning resources. The result further indicates that the current instructional strategies and interventions may not have been sufficient to address the diverse learning needs of the learners. The finding is supported by the study of Bantoc (2018), which revealed that many Grade 8 learners categorized as "Did Not Meet Expectations" demonstrated low mastery of science competencies and required learning aid modules and remediation programs to improve academic performance. The study emphasized that intervention materials and reinforcement activities significantly help struggling learners improve their understanding and achievement. In addition, Cuajao (2024) emphasized that low academic performance and poor achievement test results are often associated with variations in learning competencies, instructional methods, and access to learning resources. The study recommended implementing targeted

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intervention programs and strengthening instructional practices to improve learners' academic achievement.

Table 3

Test of Relationship

Variables Correlated	r (Pearson)	Computed t	Table Value @ 0.05	Decision on Ho	Interpretation
Learner Factors (Table 1 – WM = 3.10) and Science Performance (Table 2 – Overall Mean = 39.65%)	0.68	3.82	1.96	Reject Ho	Significant Relationship (Moderate Positive Relationship)
Teacher-Related Factors (Table 1 – WM = 4.05) and Science Performance (Table 2 – Overall Mean = 39.65%)	0.85	6.74	1.96	Reject Ho	Significant Relationship (Very Strong Positive Relationship)
Environmental / School Support Factors (Table 1 – WM = 3.80) and Science Performance (Table 2 – Overall Mean = 39.65%)	0.77	4.91	1.96	Reject Ho	Significant Relationship (Strong Positive Relationship)
Family Factors (Table 1 – WM = 3.05) and Science	0.62	3.21	1.96	Reject Ho	Significant Relationship

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Variables Correlated	r (Pearson)	Computed t	Table Value @ 0.05	Decision on Ho	Interpretation
Performance (Table 2 – Overall Mean = 39.65%)					(Moderate Positive Relationship)

Table 3 presents the test of relationship between the factors affecting the learners' performance in science and quarter 4 periodical test results. It was revealed on the table that the extent of factors affecting the performance of learners in science for quarter 4 in terms of learner factors and quarter 4 periodical test results received a computed t of 3.82 which is higher than the table value of 1.96 at 0.05 level of significance, so null hypothesis is rejected. This means that there is a significant relationship between the learner factors that affect the performance of grades 4-6 learners in science and quarter 4 periodical test result. The r value of 0.68 shows moderate positive correlation.

Further, the table also shows the test of relationship between the extent of teacher-related factors that affects the performance of grades 4-6 learners in science and their test scores in quarter 4 periodical test. It was revealed on the table that the extent of teacher-related factors that affects the performance of grades 4-6 learners in science and their test scores in quarter 4 periodical test received a computed t of 6.74 which is higher than the table value of 1.96 at 0.05 level of significance, so null hypothesis is rejected. This means that teacher-related factors significantly affect the performance of the grades 4-6 learners in

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science based on the test score on quarter 4 periodical test conducted. The r value of 0.85 shows a very strong positive correlation between the variables.

Moreover, the table also shows the test of relationship between the extent of school or environmental factors that affects the performance of grades 4-6 learners in science and their test scores in quarter 4 periodical test. It was revealed on the table that the extent of school or environmental factors that affects the performance of grades 4-6 learners in science and their test scores in quarter 4 periodical test received a computed t of 4.91 which is higher than the table value of 1.96 at 0.05 level of significance, so null hypothesis is rejected. This means that school or environment where the learners come from significantly affect their performance in science based on the test score on quarter 4 periodical test conducted. The r value of 0.77 shows a strong positive correlation between the variables.

Finally, the table shows the test of relationship between the extent of family-related factors that affects the performance of grades 4-6 learners in science and their test scores in quarter 4 periodical test. It was revealed on the table that the extent of family-related factors that affects the performance of grades 4-6 learners in science and their test scores in quarter 4 periodical test received a computed t of 3.21 which is higher than the table value of 1.96 at 0.05 level of significance, so null hypothesis is rejected. This means that family-related factors significantly affect the performance of the grades 4-6 learners in science based on the test score on quarter 4 periodical test conducted. The r value of 0.62 shows a moderate positive correlation between the variables.

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These findings implies that learners' success in science is not determined solely by intellectual ability, but also by the quality of teaching, availability of learning resources, school climate, learner motivation, parental support, and home learning conditions. The significant relationship further indicates that improvements or deficiencies in these factors may directly affect learners' achievement in science assessments. This finding is supported by the study of Hungo et al. (2024), which revealed that family-related factors such as parental education, family support, and socioeconomic conditions significantly influence the academic performance of Grades 4–6 learners. The study emphasized that academic achievement is closely associated with both learner and environmental conditions. Similarly, the study of Escol (2025) found a significant relationship between individual, teacher, school, and family factors and the academic performance of intermediate learners. The study stressed that learner achievement improves when schools provide strong instructional support and when families actively participate in the educational process.

Conclusion

Based on the findings of the study, it can be concluded that several factors significantly influence the academic performance of Grades 4–6 learners in science, particularly learner factors, teacher-related factors, school or environmental factors, and family factors. The respondents generally agreed that these factors affect learners' performance, as reflected by the overall weighted mean. This indicates that learners' achievement in science is shaped by both internal and external conditions that influence the teaching-learning process.

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Furthermore, the study revealed that none of the learners met the expected passing rate of 75% in the Quarter 4 periodical test, indicating that the learners experienced difficulties in mastering the required Science competencies. This suggests the presence of learning gaps that may be associated with inadequate academic preparation, ineffective learning strategies, insufficient instructional support, and limited reinforcement at home and in school. Moreover, the significant relationship between the factors affecting learner performance and the learners' Quarter 4 test scores confirms that learner achievement in science is strongly associated with the quality of instruction, learning environment, learner motivation, and family support. Hence, improving these factors may contribute to better academic outcomes and higher learner achievement in science. These emphasize the importance of collaborative efforts among teachers, school administrators, parents, and learners in addressing academic difficulties and strengthening Science instruction to improve learners' performance.

Recommendations

1. Teachers should implement the proposed intervention plan of the study to address learning gaps in science and to improve the teaching performance of teachers.
2. Teachers should strengthen Science instruction by employing varied, learner-centered, and differentiated teaching strategies that cater to the diverse learning needs of Grades 4–6 learners.
3. Teachers should provide regular remediation activities, enrichment exercises, and formative assessments to help learners improve mastery of Science competencies.

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4. Teachers should continuously motivate learners and develop positive study habits, critical thinking skills, and active classroom participation.

5. School Head should intensify instructional supervision and monitoring of Science instruction to ensure effective classroom practices.

6. School Head should organize capacity-building activities, seminars, and professional development programs focused on innovative Science teaching strategies and assessment practices.

7. School Head should strengthen intervention programs and ensure the availability of adequate instructional materials and learning resources to support Science learning.

8. Future researchers are encouraged to conduct similar studies involving larger populations, other grade levels, or different learning areas to validate and expand the findings of the present study. They may also explore additional variables such as learners' attitudes toward science, teaching methodologies, technological integration, and socioeconomic conditions that may influence academic performance.

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AUTHOR'S PROFILE

MS. INGRID O. POGOY

Ingrid O. Pogoy, born on July 26, 1996, in Brgy Poblacion, Kananga, Leyte, is a dedicated educator known for her commitment to nurturing continuous learning and empowerment among her students. Her journey in education began at Kananga Central School, followed by her secondary education at Kananga National High School.

During her foundational stages, Ingrid was actively involved in sports, which fostered her physical development and in different academic competitions such as School Campus Journalism, which greatly contributed to her pursuit for higher education in a prestigious university. The knowledge and skills she gained provided significant support in finishing her degree and molding her character. Her interactions with various groups through sports, academic pursuits, and community events enriched her experience, fostering her growth and resilience.

Ingrid continued her academic journey at a prestigious university, Cebu Normal University (CNU), where she earned her Bachelor of Elementary Education, specializing in

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Special Education, in 2016. That same year, she passed the Licensure Examination for Teachers (LET), marking the official start of her teaching career.

Ingrid has consistently pursued professional growth. Her commitment to lifelong learning led her to enroll in a Master of Arts in Education (MAEd) program, majoring in Elementary Education. She successfully completed the academic requirements for her MAEd in December 2022, driven by her diverse experiences and the support of different groups she encountered through her sports and academic journey.

At present, Ingrid is an esteemed Grade 4 teacher at Rizal Elementary School. Her dedication to education, combined with her copious background in sports, academic competitions, and community involvement, continues to inspire her students and peers, highlighting her unwavering commitment to making a meaningful impact in the educational landscape.