

Learners' Interest in Science and Perceived Relevance of Science Lessons as Predictors of Science Academic Performance Among JHS Learners of Bigaan National High School, Division of Surigao del Sur: A Predictive-Correlational Approach

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ABSTRACT

This study examined learners' interest in science and perceived relevance of science lessons as predictors of science academic performance among Junior High School learners of Bigaan National High School, Division of Surigao del Sur. A quantitative predictive-correlational design was employed. Total enumeration was attempted among 133 Grades 7–10 learners, and 110 complete and valid cases comprised the final analytic sample. Data were gathered using the adapted and contextualized Science Interest and Perceived Relevance Questionnaire (SIPRQ), while Science academic performance was obtained from official school records. Weighted means, standard deviations, rank ordering, Pearson product-moment correlation, and multiple linear regression were used. Learners reported high overall interest in science ($M =$

3.1614, $SD = 0.5028$) and high perceived relevance of science lessons ($M = 3.0739$, $SD = 0.4108$). Their mean Science grade was 84.1636 ($SD = 6.5421$). Interest showed a weak but significant positive relationship with science performance ($r = 0.2066$, $p = 0.0303$), whereas perceived relevance showed a moderate positive relationship ($r = 0.5315$, $p < 0.001$). Together, interest and perceived relevance significantly predicted Science grades, $F(2,107) = 25.5838$, $p < 0.001$, explaining 32.35% of the variance ($R^2 = 0.3235$). Perceived relevance was the strongest unique predictor ($\beta = 0.7150$, $p < 0.001$). The findings indicate that strengthening the usefulness and meaningfulness of science lessons, alongside strategies that sustain curiosity and engagement, provides an evidence-based direction for a school-based Science Motivation and Relevance Enhancement Program.

Keywords: *science academic performance, science interest, perceived relevance, utility value, junior high school, predictive-correlational research*

INTRODUCTION

Science academic performance is a persistent concern in basic education because it reflects learners' mastery of scientific concepts and practices needed for informed decision-making, environmental and health literacy, and progression to higher levels of learning. International evidence continues to show substantial disparities in science proficiency. In PISA 2022, the Philippines obtained an average science score of 356 compared with the OECD average of 485, and only about 23% of Filipino learners reached at least Level 2 proficiency (OECD, 2023; OECD, 2023b). These results underscore the need to identify school- and learner-level factors that can be strengthened within ordinary classroom conditions.

Within the Caraga Region and rural public-school settings such as Surigao del Sur, schools operate within diverse socioeconomic and geographic conditions. Although material resources matter, motivational factors offer an instructionally actionable area for improvement because they can be addressed through classroom practices that make learning more engaging and meaningful. Learners' interest in science reflects enjoyment, engagement, persistence, curiosity, and willingness to invest effort, while perceived relevance concerns the extent to which learners consider science useful for daily life, future studies, future work, and personal or community concerns (Glynn et al., 2011; Eccles & Wigfield, 2020).

Existing research generally links positive science attitudes and motivational beliefs with stronger performance, but the magnitude of these relationships varies by context and measurement. Meta-analytic evidence reports a positive association between attitudes toward science and science performance (Mao et al., 2021), while large-scale modeling indicates that both science interest and utility value can contribute to performance through self-efficacy and identity-related pathways (Alhadabi, 2021). Philippine studies likewise show mixed results, suggesting that local learning conditions may influence whether motivation translates into measurable achievement (Mutya et al., 2023; Sabanal et al., 2023).

A practical gap therefore remains in localized predictive-correlational evidence that simultaneously examines learners' interest in science and their perceived relevance of science lessons using official Science grades in a rural Philippine Junior High School context. Addressing this gap can help determine which motivational lever deserves greater emphasis when school resources require focused interventions. Accordingly, this study examined the levels of learners' interest and perceived relevance, described Science academic performance, tested the relationships between each motivational predictor and Science grades, and determined their joint predictive contribution. The findings were intended to provide an empirical basis for a Science Motivation and Relevance Enhancement Program for Bigaan National High School.

Literature Review

Science Academic Performance

Science academic performance refers to learners demonstrated mastery of science content and skills within a curriculum and grading period. It may be measured through standardized science-literacy assessments or through school-based indicators such as official subject grades. In Philippine basic education, classroom assessment is integrated with curriculum implementation, and grades synthesize evidence from multiple learning tasks across a grading period (Department of Education, 2015). Thus, official Science grades provide a practical curriculum-embedded outcome for school-based quantitative research.

Grades nevertheless require careful interpretation because they may capture both academic mastery and other classroom-related factors. Research has documented differences between teacher-assigned grades and standardized assessments, while large-sample evidence indicates that dispositions and grading practices can contribute to grade variance beyond test performance (Westphal et al., 2021; Arencibia Alemán et al., 2024). For this reason, the present study treated Science grades as an authentic school-based indicator of performance rather than as a direct equivalent of standardized scientific-literacy scores.

Learners' Interest in Science

Learners' interest in science is a motivational tendency to find science learning enjoyable, engaging, and worthy of sustained attention. It is expressed through enjoyment and intrinsic interest, engagement and persistence, curiosity and exploration, and related confidence or goal-directed behaviors. The Science Motivation Questionnaire II established a widely used basis for measuring science motivation through structured self-report indicators, and subsequent research has continued to support the usefulness of motivation constructs in science education (Glynn et al., 2011; Karaca et al., 2026).

Empirical evidence generally associates stronger science interest with better performance. Alhadabi (2021), using a large secondary-school dataset, reported a significant total effect of science interest on science performance, while Katsantonis et al. (2023) found that interest and enjoyment significantly predicted science performance in multilevel structural modeling. Meta-analytic evidence similarly indicates a positive overall attitude-performance relationship, although its strength differs by construct, grade level, and context (Mao et al., 2021).

Philippine findings reinforce the need for contextualized analysis. Mutya et al. (2023) reported no significant correlation between attitudes toward science and academic performance in a distance-learning setting, whereas other local evidence has shown significant relationships between motivation, self-efficacy, and science proficiency. Such variation suggests that interest may support achievement, but the way it translates into grades depends on learning conditions and the specific dimensions measured.

Perceived Relevance of Science Lessons

Perceived relevance refers to learners' beliefs that science lessons are useful, important, and meaningful for present life and future goals. Situated Expectancy-Value Theory explains this through subjective task value, particularly utility value, which influences choices, effort, persistence, and performance (Eccles & Wigfield, 2020). In school settings, relevance can be reflected in daily-life utility, future utility and importance, connections to local or societal issues, and the extent to which learners reject perceptions that science is irrelevant.

Large-scale evidence supports the link between valuing science and performance. TIMSS 2019 showed that Grade 8 learners who strongly valued science had higher average science performance than those who valued it less, while Alhadabi (2021) reported a significant total effect of science utility on performance. Relevance-focused interventions further suggest that helping learners connect scientific content to personal goals can preserve or strengthen utility value, although immediate grade effects are not always guaranteed (Mullis et al., 2020; Söylemez & Sungur, 2025).

Contextualization is especially relevant in Philippine science instruction because it connects abstract concepts with local experiences, community issues, health, environment, and livelihood. A Philippine meta-analysis reported a large overall effect of contextualized science instruction on performance, although effects varied across settings (Picardal & Sanchez, 2022). Evidence from localized teaching likewise indicates that context-rich science lessons can produce substantial gains in learning performance, supporting the instructional value of relevance-building strategies (Bello et al., 2023).

Interest, Relevance, and Science Performance

Interest and perceived relevance can operate together rather than independently. Interest supplies enjoyment and willingness to engage, while relevance provides reasons for investing effort by connecting science to valued goals. Alhadabi (2021) found that both science interest and utility value contributed to science performance within the same model, although interest showed the larger total effect in that dataset. Profile-based analyses likewise show that students with stronger combinations of intrinsic and utility motivation tend to demonstrate stronger science outcomes (Liou et al., 2024).

Cross-cultural research suggests that utility value can be particularly important when intrinsic interest is limited, indicating a potentially compensatory function for relevance-building (Liu et al., 2023). This is important for school interventions because not all learners begin with strong curiosity about science. Explicitly demonstrating how lessons connect to daily decisions, future studies, careers, and community concerns may provide a motivational bridge while teachers continue to cultivate enjoyment, inquiry, and persistence.

However, the relative contribution of interest and relevance may differ across contexts. Outcomes also depend on whether performance is represented by standardized scores or school grades, how motivational constructs are operationalized, and whether instructional environments allow motivation to translate into sustained learning behavior. Simultaneous testing of both predictors is therefore necessary to determine their unique contributions within the target school rather than assuming that international patterns will be reproduced locally.

Theoretical Synthesis and Research Gap

The study was informed by three complementary perspectives. Carroll's Model of School Learning emphasizes the role of time, opportunity, perseverance, and quality instruction in learning outcomes (Carroll, 1963). Hidi and Renninger's (2006) Four-Phase Model of Interest Development explains how situational interest can develop into sustained individual interest. Situated Expectancy-Value Theory explains how expectancies for success and the perceived value of tasks, particularly utility value, shape engagement and performance (Eccles & Wigfield, 2020). Together, these perspectives position interest and relevance as motivational conditions that can support the persistence and learning investment associated with higher Science performance.

The reviewed literature provides substantial support for relationships among science motivation, task value, and performance, yet localized evidence remains limited for rural Philippine Junior High School settings using official Science grades. Further, fewer studies test interest and perceived relevance simultaneously to estimate their unique predictive contributions. This study addressed that gap among JHS learners of Bigaan National High School and used the resulting evidence to identify priorities for a school-based Science Motivation and Relevance Enhancement Program.

Conceptual Framework

The study conceptualized learners' interest in science and perceived relevance of science lessons as independent variables that may predict the dependent variable, Science academic performance. Interest was operationalized through enjoyment and intrinsic interest, engagement and persistence, and curiosity and exploration. Perceived relevance was represented by daily-life utility, future utility and importance, contextual and societal relevance, and reverse-scored irrelevance indicators. Science academic performance was represented by the learners' official Science grades.

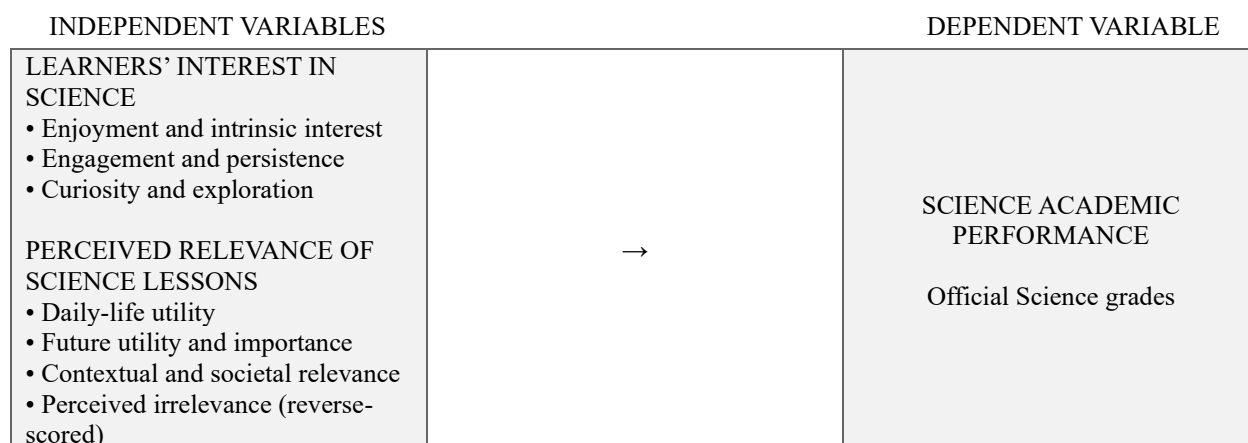


Figure 1. *Schematic Diagram of the Study*

METHODS

Research Design

The study employed a quantitative predictive-correlational research design. The descriptive component determined the levels of learners' interest in science, perceived relevance of science lessons, and Science academic performance. Pearson product-moment correlation examined the direction and strength of the relationships between each motivational predictor and Science grades. Multiple linear regression determined whether interest and perceived relevance, taken together, significantly predicted Science academic performance and estimated the unique contribution of each predictor. Because variables were measured as they naturally occurred and were not

manipulated, the results were interpreted as predictive associations rather than evidence of causality (Creswell & Creswell, 2018).

Research Locale

The study was conducted at Bigaan National High School in Barangay Bigaan, Municipality of Hinatuan, Province of Surigao del Sur, under the DepEd Schools Division of Surigao del Sur in the Caraga Region. The public secondary school serves Junior High School learners and implements DepEd curriculum and classroom assessment policies. The locale provided the rural school context in which learners' motivational beliefs were examined alongside official Science grades during School Year 2025–2026.

Participants and Sampling Technique

The target population consisted of 133 Junior High School learners: 40 in Grade 7, 33 in Grade 8, 26 in Grade 9, and 34 in Grade 10. Total enumeration of the eligible JHS population was attempted. Learners were included when they were officially enrolled during School Year 2025–2026, voluntarily participated, met applicable consent and assent requirements, completed the questionnaire, and had a valid corresponding Science grade. Cases with incomplete responses, missing required data, or unmatched school records were excluded. After screening, 110 complete and valid cases comprised the final sample.

Table 1. *Population and Final Analytic Sample*

Grade Level	Population	Final Sample
Grade 7	40	22
Grade 8	33	29
Grade 9	26	26
Grade 10	34	33
Total	133	110

Note. Total enumeration was attempted across Grades 7–10; the final sample contained complete and valid cases used for statistical analysis.

Research Instrument

The study used the Science Interest and Perceived Relevance Questionnaire (SIPRQ), an adapted and contextualized 28-item learner questionnaire using a four-point Likert scale: 4 = Strongly Agree, 3 = Agree, 2 = Disagree, and 1 = Strongly Disagree. Part A contained 12 items measuring enjoyment and intrinsic interest, engagement and persistence, and curiosity and exploration. Part B contained 16 items measuring daily-life utility, future utility and importance, contextual and societal relevance, and perceived irrelevance through reverse-worded indicators.

Interest items were patterned primarily from the Science Motivation Questionnaire II (Glynn et al., 2011), while relevance items drew from task-value and utility-value indicators in the Motivated Strategies for Learning Questionnaire and expectancy-value research (Pintrich et al., 1991; Eccles & Wigfield, 2020). Qualified validators reviewed the instrument for clarity, language appropriateness, construct relevance, and alignment with the study variables. The instrument was pilot-tested among JHS learners who were not part of the final respondents, and internal consistency was assessed using Cronbach's alpha, with .70 treated as the minimum acceptable benchmark for Likert-type scales (Taber, 2018).

Data Gathering Procedure

Before data collection, the researcher finalized the adapted questionnaire, prepared consent and assent forms and respondent coding procedures, and secured permission from the Schools Division Superintendent and the administration of Bigaan National High School. Coordination with grade-level advisers and Science teachers established an administration schedule that would not disrupt regular classes.

During data collection, participating learners were informed of the study's purpose, voluntary nature, and confidentiality safeguards before independently answering the questionnaire. Completed questionnaires were checked for completeness. Science grades for the identified grading period were then obtained from official school

records through authorized personnel. Respondent codes rather than names were used to match questionnaire data with grades. The data were encoded, cleaned, verified for completeness and valid ranges, and retained only when questionnaire and grade records could be correctly matched.

Data Analysis

Weighted means, standard deviations, and rank ordering described learners' interest and perceived relevance. Descriptive statistics summarized official Science grades and their performance classifications. Pearson product-moment correlation tested the relationships between overall interest and Science performance and between overall perceived relevance and Science performance at the .05 level of significance. Multiple linear regression treated Science grade as the dependent variable and overall interest and perceived relevance as predictors. Model significance was evaluated using the F test, predictive contribution was interpreted through unstandardized and standardized coefficients (B and β), and explanatory power was reported using R^2 and adjusted R^2 (University of Southern Queensland, 2022).

Ethical Consideration

The study followed school permission procedures and used informed consent and learner assent as applicable. Participation was voluntary, and learners were informed that their responses would be kept confidential. A coded matching system replaced names when questionnaire responses were linked with official Science grades, and only data necessary for the study were retrieved through authorized school personnel. Results were reported in aggregate form. These safeguards were consistent with the confidentiality and personal-data protection principles of the Data Privacy Act of 2012 (Republic Act No. 10173).

RESULTS AND DISCUSSION

Learners' Interest in Science

The respondents reported a High overall level of interest in science ($M = 3.1614$, $SD = 0.5028$). Enjoyment and Intrinsic Interest obtained the highest mean ($M = 3.2159$), followed by Engagement and Persistence ($M = 3.1727$), while Curiosity and Exploration obtained the lowest mean ($M = 3.0955$). Although all dimensions were interpreted as High, the pattern suggests that learners were more positive about enjoying science than about extending curiosity into exploration beyond immediate classroom activities.

Table 2. *Summary of Learners' Interest in Science (n = 110)*

Dimension	Mean	SD	Interpretation	Rank
Enjoyment and Intrinsic Interest	3.2159	0.5600	High	1
Engagement and Persistence	3.1727	0.5426	High	2
Curiosity and Exploration	3.0955	0.5595	High	3
Overall Interest in Science	3.1614	0.5028	High	—

Note. Mean interpretation: 3.25–4.00 = Very High; 2.50–3.24 = High; 1.75–2.49 = Moderate; 1.00–1.74 = Low.

The generally positive interest profile is consistent with research treating interest as a multidimensional motivational construct that supports attention, effort, and persistence (Glynn et al., 2011; Hidi & Renninger, 2006). The comparatively lower curiosity and exploration score also points to an actionable area for instruction: inquiry-oriented questions, locally relevant investigations, and opportunities to seek explanations may help move learners from general enjoyment toward more sustained exploratory engagement.

Perceived Relevance of Science Lessons

Perceived relevance was also High overall ($M = 3.0739$, $SD = 0.4108$). Future Utility and Importance received the highest mean ($M = 3.2932$, $SD = 0.5469$), interpreted as Very High. Daily-Life Utility and Contextual and Societal Relevance were High, while the reverse-scored irrelevance dimension produced the lowest mean ($M = 2.5841$, $SD = 0.7798$). These results indicate that learners strongly recognized the future value of science but that some residual perceptions of irrelevance remained.

Table 3. *Summary of Perceived Relevance of Science Lessons ($n = 110$)*

Dimension	Mean	SD	Interpretation	Rank
Future Utility and Importance	3.2932	0.5469	Very High	1
Daily-Life Utility	3.2114	0.6524	High	2
Contextual and Societal Relevance	3.2068	0.4629	High	3
Perceived Irrelevance (reverse)	2.5841	0.7798	High	4
Overall Perceived Relevance	3.0739	0.4108	High	—

Note. Reverse-worded irrelevance items were reverse-scored before interpretation.

The prominence of future utility is consistent with Situated Expectancy-Value Theory, which identifies utility value as a reason learners invest effort in academic tasks (Eccles & Wigfield, 2020). TIMSS evidence likewise shows higher science performance among learners who more strongly value science (Mullis et al., 2020). The present pattern supports instructional strategies that make future utility explicit while also strengthening immediate daily-life and community connections so that science is experienced as meaningful in both present and future contexts.

Science Academic Performance

The mean official Science grade was 84.1636 ($SD = 6.5421$), with scores ranging from 75 to 97. The largest group was classified as Fairly Satisfactory (33 learners, 30.0%), followed by Outstanding (29, 26.4%), Very Satisfactory (25, 22.7%), and Satisfactory (23, 20.9%). No learner in the analyzed sample had a grade below 75. The distribution shows substantial variation despite the mid-80s overall mean, indicating that motivational predictors were examined across learners with differing levels of school-recorded performance.

Table 4. *Distribution of Science Academic Performance ($n = 110$)*

Classification	Frequency	Percentage
Outstanding (90–100)	29	26.4
Very Satisfactory (85–89)	25	22.7
Satisfactory (80–84)	23	20.9
Fairly Satisfactory (75–79)	33	30.0
Did Not Meet Expectations (<75)	0	0.0

Note. Mean = 84.1636, $SD = 6.5421$, range = 75–97. Classifications followed the descriptors used for official school grades.

Official grades provide a practical school-based performance indicator because they summarize assessed learning across a grading period (Department of Education, 2015). At the same time, they should be interpreted as classroom-based outcomes rather than direct equivalents of standardized science-literacy measures, since grading can also reflect contextual and non-cognitive influences (Westphal et al., 2021).

Relationships of Interest and Relevance with Science Performance

Learners' interest in science had a weak but statistically significant positive relationship with Science academic performance ($r = 0.2066$, $p = 0.0303$). Thus, learners reporting greater interest tended to obtain higher

Science grades, although the association was small. Perceived relevance showed a stronger, moderate positive relationship with science performance ($r = 0.5315$, $p < 0.001$), indicating that learners who viewed science lessons as more useful and meaningful tended to have substantially higher grades.

Table 5. *Correlations with Science Academic Performance (n = 110)*

Variable Pair	r	p	Decision at .05
Interest in Science – Science Performance	0.2066	0.0303	Reject H_0
Perceived Relevance – Science Performance	0.5315	<0.001	Reject H_0

Note. Pearson product-moment correlations were tested at the .05 level of significance.

The interest result is compatible with meta-analytic findings that science attitudes are positively related to performance but vary in effect size across contexts (Mao et al., 2021). The stronger relevance association aligns with expectancy-value evidence showing that perceived usefulness can sustain academic investment by giving learners clear reasons to engage with difficult content (Alhadabi, 2021; Eccles & Wigfield, 2020). In this school context, usefulness and meaningfulness appear more closely connected with grades than general interest alone.

Joint Prediction of Science Academic Performance

Multiple regression showed that interest and perceived relevance jointly predicted Science academic performance, $F(2, 107) = 25.5838$, $p < 0.001$. The model produced $R = 0.5688$, $R^2 = 0.3235$, and adjusted $R^2 = 0.3109$, indicating that the two motivational variables explained approximately 32.35% of the variance in Science grades. Perceived relevance was the strongest unique predictor ($B = 11.3879$, $\beta = 0.7150$, $p < 0.001$). Interest in science also had a statistically significant unique coefficient after controlling for relevance ($B = -3.5575$, $\beta = -0.2734$, $p = 0.012$).

Table 6. *Multiple Regression Predicting Science Academic Performance (n = 110)*

Predictor	B	SE	β	t	p
Constant	60.4055	4.0257	—	15.0050	<0.001
Interest in Science	-3.5575	1.3959	-0.2734	-2.5485	0.012
Perceived Relevance	11.3879	1.7088	0.7150	6.6643	<0.001

Note. Dependent variable: Science quarterly grade. Model summary: $R = 0.5688$, $R^2 = 0.3235$, adjusted $R^2 = 0.3109$, $F(2,107) = 25.5838$, $p < 0.001$.

The negative unique coefficient for interest should not be interpreted as evidence that greater interest lowers performance. Its bivariate relationship with grades was positive, and interest was strongly correlated with perceived relevance ($r = 0.6714$). When correlated predictors enter the same regression model, coefficients represent their unique contributions after shared variance is controlled. In this dataset, relevance accounted for most of the performance-linked motivational variance, while the coefficient for interest reflected a smaller overlapping contribution. This distinction reinforces the study's predictive, non-causal design and supports prioritizing relevance-building while continuing to nurture curiosity and engagement.

Taken together, the results provide a specific empirical basis for a Science Motivation and Relevance Enhancement Program. The strongest statistical signal was perceived relevance, particularly the future utility and importance of science, while curiosity and exploration represented the relatively lowest-rated interest area. Evidence-based program priorities therefore include linking concepts to daily life and community issues, clarifying pathways from science to further study and careers, and embedding inquiry, reflection, and exploration activities that sustain interest (Picardal & Sanchez, 2022; Söylemez & Sungur, 2025).

CONCLUSION

Junior High School learners of Bigaan National High School generally demonstrated high interest in science and high perceived relevance of science lessons, while their official Science grades averaged within the mid-80s and varied across performance classifications. Interest in science was positively and significantly related to science academic performance, but the relationship was weak. Perceived relevance had a stronger, moderate positive relationship with science grades. When the two motivational factors were analyzed simultaneously, the regression model significantly predicted academic performance and explained 32.35% of the variance, with perceived relevance emerging as the dominant unique predictor. These findings indicate that motivational beliefs are meaningfully associated with school-based Science performance in this sample, particularly when learners see science as useful and consequential for their present experiences and future goals. Because the study was predictive-correlational, the results do not establish causality, and much of the variance in grades remains attributable to factors outside the model. The study nevertheless contributes localized evidence that can guide practical, resource-conscious efforts to strengthen relevance, curiosity, engagement, and sustained participation in science learning.

Recommendation

Science teachers should systematically strengthen the perceived relevance of lessons by connecting concepts to daily-life decisions, local environmental and community issues, future studies, and career pathways. Brief relevance prompts, contextualized examples, problem scenarios, and reflective tasks may be embedded in ordinary lessons so learners repeatedly articulate why particular science ideas matter.

Instruction should also address curiosity and exploration, the relatively lowest-rated interest dimension, through inquiry-oriented questioning, simple investigations, locally feasible mini-projects, science clubs or challenges, and learner goal-setting routines. These activities should complement rather than replace relevance-building because the results indicate that interest remains positively associated with performance even though perceived relevance was the stronger predictor.

Bigaan National High School may use the findings as a baseline for developing and implementing a Science Motivation and Relevance Enhancement Program with explicit objectives, low-cost classroom strategies, implementation indicators, and periodic monitoring of interest, perceived relevance, and Science grades. Learners in the Fairly Satisfactory range may receive targeted formative support and feedback alongside motivation-focused strategies.

Future researchers should test additional predictors such as attendance, learning strategies, classroom climate, teacher practices, self-efficacy, and access to learning resources. Longitudinal or quasi-experimental studies may also evaluate whether deliberate relevance-building and interest-enhancement interventions produce changes in motivation and Science performance over time and clarify possible mediating or interaction mechanisms.

References

- Alhadabi, A. (2021). Science interest, utility, self-efficacy, identity, and science performance among high school students: An expectancy-value theory approach. *Frontiers in Psychology*, 12, 634120. <https://pmc.ncbi.nlm.nih.gov/articles/PMC8458621/>
- Arencibia Alemán, J. M., Núñez, J. C., Rodríguez, C., Jiménez, J. E., & Marín-Martínez, F. (2024). Teacher-assigned grades and external exams: Sources of discrepancy. *Educational Assessment, Evaluation and Accountability*. <https://pmc.ncbi.nlm.nih.gov/articles/PMC11221518/>
- Bello, J. B., Concon, L. S., Polache, M. C. C., Ayaton, M. J. C., Manlicayan, R. D., Campomanes, J. P., & Saro, J. M. (2023). Contextualized and localized science teaching and learning materials and its characteristics to improve students' learning performance. *Psych Educ*, 7, 77–84. <https://doi.org/10.5281/zenodo.7607686>
- Carroll, J. B. (1963). A model of school learning. *Teachers College Record*, 64(8), 723–733. <https://doi.org/10.1177/016146816306400801>

- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Department of Education. (2015). DepEd Order No. 8, s. 2015: Policy guidelines on classroom assessment for the K to 12 Basic Education Program. <https://www.deped.gov.ph/2015/04/01/do-8-s-2015-policy-guidelines-on-classroom-assessment-for-the-k-to-12-basic-education-program/>
- Eccles, J. S., & Wigfield, A. (2020). From expectancy-value theory to situated expectancy-value theory: A developmental, social cognitive, and sociocultural perspective on motivation. *Contemporary Educational Psychology*, 61, 101859. <https://doi.org/10.1016/j.cedpsych.2020.101859>
- Glynn, S. M., Brickman, P., Armstrong, N., & Taasobshirazi, G. (2011). Science Motivation Questionnaire II: Validation with science majors and nonscience majors. *Journal of Research in Science Teaching*, 48(10), 1159–1176. <https://doi.org/10.1002/tea.20442>
- Hidi, S., & Renninger, K. A. (2006). The four-phase model of interest development. *Educational Psychologist*, 41(2), 111–127. https://doi.org/10.1207/s15326985ep4102_4
- Karaca, D., Namdar, B., Nalbantoğlu, F. G., Tümer, B., & Aydin, B. (2026). A reliability generalization meta-analysis of the Science Motivation Questionnaire II. *International Journal of Science and Mathematics Education*, 24, Article 16. <https://doi.org/10.1007/s10763-025-10637-9>
- Katsantonis, I., McLellan, R., & Torres, P. E. (2023). Unraveling the complexity of the associations between students' science performance, motivation, and teachers' feedback. *Frontiers in Psychology*, 14, 1124189. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10097932/>
- Liou, P.-Y., Jang, J., & Myoung, E. (2024). Synergistic effects of students' mathematics and science motivational beliefs on performance, and their determinants. *International Journal of STEM Education*, 11, 50. <https://doi.org/10.1186/s40594-024-00509-z>
- Liu, Y., Zheng, X., & Hau, K.-T. (2023). Would emphasizing the instrumental value of learning help unmotivated students? Large-scale cross-cultural comparisons. *Personality and Individual Differences*, 207, 112148. <https://doi.org/10.1016/j.paid.2023.112148>
- Mao, P., Li, H., & Chi, S. (2021). The relationship between attitude toward science and academic performance in science: A three-level meta-analysis. *Frontiers in Psychology*, 12, 784068. <https://doi.org/10.3389/fpsyg.2021.784068>
- Mullis, I. V. S., Martin, M. O., Foy, P., Kelly, D. L., & Fishbein, B. (2020). TIMSS 2019 international results in mathematics and science. TIMSS & PIRLS International Study Center, Boston College. <https://timss2019.org/reports/>
- Mutya, R. C., Alcantara, G. A., Sala, A. M. V., Carascal, I. C., Terana, C. C., & Presbitero, M. S. C. (2023). Students' attitudes, study habits, and academic performance in science using self-learning modules. *Jurnal Pendidikan IPA Indonesia*, 12(3), 460–469. <https://doi.org/10.15294/jpii.v12i3.43957>
- OECD. (2023). PISA 2022 results (Volume I): The state of learning and equity in education. OECD Publishing. https://www.oecd.org/en/publications/pisa-2022-results-volume-i_53f23881-en.html
- OECD. (2023b). PISA 2022 results (Volume I and II): Country note—Philippines. https://www.oecd.org/en/publications/pisa-2022-results-volume-i-and-ii-country-notes_ed6fbcc5-en/philippines_a0882a2d-en.html
- Picardal, M. T., & Sanchez, J. M. P. (2022). Effectiveness of contextualization in science instruction to enhance science literacy in the Philippines: A meta-analysis. *International Journal of Learning, Teaching and Educational Research*, 21(1), 140–156. <https://ijlter.net/index.php/ijlter/article/view/1234>
- Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1991). *A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ)*. National Center for Research to Improve Postsecondary Teaching and Learning, University of Michigan. <https://files.eric.ed.gov/fulltext/ED338122.pdf>
- Republic Act No. 10173. (2012). Data Privacy Act of 2012. Official Gazette of the Republic of the Philippines. <https://www.officialgazette.gov.ph/2012/08/15/republic-act-no-10173/>
- Sabanal, G. J. A., Reputana, K. G. D., Palwa, S. S., Labandero, C. L. H., & Alimbon, J. A. (2023). Motivation and academic performance of secondary students in science: A correlational study. *Asian Journal of Science Education*, 5(2), 20–29. <https://doi.org/10.24815/ajse.v5i2.31668>
- Söylemez, S., & Sungur, S. (2025). Uncovering the effectiveness of utility value intervention in enhancing middle school students' personal interest and utility value in science. *Current Psychology*, 44, 11799–11813. <https://doi.org/10.1007/s12144-025-07953-2>

- Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, 48, 1273–1296. <https://doi.org/10.1007/s11165-016-9602-2>
- University of Southern Queensland. (2022). Multiple regression: Explanation, assumptions, interpretation, and write-up. In *Statistics for research students*. <https://usq.pressbooks.pub/statisticsforresearchstudents/chapter/multiple-regression-assumptions/>
- Westphal, A. W., Vock, M., & Kretschmann, J. K. (2021). Unraveling the relationship between teacher-assigned grades, student personality, and standardized test scores. *Frontiers in Psychology*, 12, 627440. <https://doi.org/10.3389/fpsyg.2021.627440>