



MOTIVATIONAL STRATEGIES OF SCIENCE TEACHERS AND STUDENT GRADE PERFORMANCE BASIS FOR INTERVENTION PROGRAM

Ria V. Ricalde, Galileo C. Gervacio

*Graduate School of Education, University of Perpetual Help System-DALTA
Las Piñas City, Metro Manila, Philippines*

ABSTRACT

The motivational strategies used by Science teachers and their relationship with students' engagement and academic performance were assessed in this study as a basis for an intervention program. The study was conducted from June to November 2025. It examined teachers' use of intrinsic and extrinsic motivational strategies, students' behavioral, emotional, and cognitive engagement, their academic performance in Science, and their relationships. Quantitative descriptive-correlational research was conducted to 147 Grade 7 learners. Validated survey questionnaires and academic grade performance in Science were utilized to collect data. Descriptive statistics, such as the weighted mean and standard deviation, were used to characterize the variables, while Spearman's rho was used to assess relationships among motivational strategies, student engagement, and academic grade performance. The results indicated that science teachers actively used extrinsic and intrinsic motivational strategies. Most students demonstrated behavioral, emotional, and cognitive engagement, and their first-quarter performance in Science showed strong academic competence. Furthermore, the intrinsic and extrinsic motivational strategies had a weak positive, statistically significant link with grade performance. However, no significant association was identified between the motivational strategies and students' behavioral, emotional, or cognitive engagement. The study indicates that motivational strategies have some impact on students' academic performance, but the effect is very limited. The study led to the development of the Science Motivation and Engagement Enhancement Program (SMEEP) as an intervention to improve students' motivation, engagement, and academic achievement in Science. The program involves intrinsic and extrinsic motivational strategies through well-organized pre-assessment, implementation, and post-assessment activities.

Keywords: *motivational strategies, engagement, intrinsic, extrinsic, behavioral, emotional, cognitive*

INTRODUCTION

Science education promotes students' problem-solving and critical thinking abilities, but Science is complex and demanding. Teachers have to find ways to keep students interested in learning. These strategies may work one time and not another, so teachers need to analyze and make modifications to improve them. Many factors, such as the relevance of the content, pedagogical approaches, and the general classroom environment, affect students' motivation and academic achievement in Science.

Motivation is a psychological approach used in education to improve the students' academic performance. Motivating students in secondary schools is an important issue, especially given the high number of test failures in the country (Vermote et al., 2020). Students also learn differently; teachers must employ a range of techniques to hold their attention (Guo & Leung, 2021). However, these strategies are not always implemented because teachers lack the proper equipment or training, which puts some students at a disadvantage (DeCoito & Estaiteyeh, 2022). Classrooms have more students from diverse linguistic and cultural backgrounds, and culturally responsive teaching approaches need to be implemented, yet many teachers are not sufficiently trained in this area, and students who do not see themselves reflected in the curriculum lose interest (De Loof et al., 2021).

Lin et al. (2021) conducted a study in Nigeria to determine the causes of low academic performance. Some reasons include fear of the subject, a lack of qualified professors, a lack of books and learning materials, and a lack of motivation to learn. Same for Hasan et al. (2021) their study suggests students might perform well in academic if they like the topic and feel motivated by their teachers. In the same vein, Arthur et al. (2022) reported declining student performance in Northern Mindanao, Philippines. Poor instructional materials, inadequate learning resources, and insufficient motivational strategies are among the reasons for students' failure, resulting in low performance (Lai et al., 2020). Similarly, a study in Manila found the same outcome: poor performance in Science was observed over multiple years, and a large proportion of students failed to achieve the required grades in the Science tests (Vermote et al. 2020). While several studies have investigated the determinants of Science achievement, few studies have examined the role of extrinsic and intrinsic motivational strategies in improving student engagement and academic achievement. There are few studies that have examined the function of motivation in secondary schools, and there is a lack of quantitative research that explicitly relates motivational strategies with engagement and Science performance.

The researcher intended to determine whether extrinsic and intrinsic motivational strategies have a positive and significant impact on academic achievement, and whether there was a significant association between motivational strategies and student engagement. The study identified the use of extrinsic and intrinsic motivational strategies to enhance Grade 7 students' performance in Science. The study aimed to evaluate the

effectiveness of these motivational strategies in achieving significant improvements in students' academic performance. The research aimed to provide relevant information to students, parents, and academic stakeholders to promote education for a sustainable future. The study proposed an environment that supports enthusiasm, potential, and meaningful creative partnerships at home and at school. The results of the present study were used to build an intervention program to help Science teachers adopt effective motivational methods to maximize student learning outcomes.

Research Questions

The study aimed to evaluate the motivational strategies of Science teachers which may be a basis for an intervention program. Specifically, this study sought to answer the following questions:

1. What is the extent of implementation of motivational strategies in teaching Science in terms of:
 - 1.1 Extrinsic motivational strategies
 - 1.2 Intrinsic motivational strategies
2. What is the level of engagement of students when motivational strategies in teaching Science were employed in terms of
 - 2.1 Behavioral
 - 2.2 Emotional and
 - 2.3 Cognitive
3. What is the grade performance of students in Science during the first quarter in relation to the use of motivational strategies?
4. Is there a significant relationship between the extent of motivational strategies and students' grade performance in Science?
5. Is there a significant relationship between the motivational strategies and the level of student engagement in Science?
6. Based on the findings of the study, what intervention program may be proposed?

METHODOLOGY

Research Design

A quantitative descriptive correlational approach was used for this investigation. In this study, the researcher sought links between two factors. Furthermore, no factors were manipulated in this study. The degree of variance between different qualities within a group was investigated through correlational research.

Population and Sampling

The respondents in this study were seventh graders from Manuel G. Araullo High School. The criteria in choosing the respondents were as follows: the students must be enrolled in Grade 7 at Manuel G. Araullo High School during the academic year 2025-

2026 and must have a basic knowledge of the Science subject, as the study specifically focused on their motivation, engagement, and achievement in the subject. The researcher employed a purposive sampling technique to select the study's respondents. Purposive sampling is a sampling method used to select participants based on the criteria, requirements, or experiences needed for the project.

Research Instrument

The research instrument used in this study was a researcher-made survey questionnaire to determine the motivational strategies in teaching Science. The survey aimed specifically to assess the extent of extrinsic and intrinsic motivational strategies in the classroom. The reliability test for this motivation questionnaire yielded an alpha coefficient of 0.75. According to George and Mallery (2003), Cronbach's alpha of ≥ 0.7 can be characterized as acceptable, ≥ 0.8 as good, and ≥ 0.9 as excellent. Therefore, the instruments were deemed reliable and can be used to measure learners' motivation. Responses in this study were measured on a 4-point Likert scale, allowing evaluation of the strategies' effectiveness.

To measure students' engagement, the researcher used a validated survey questionnaire developed by Fredricks et al. (2004) with a Cronbach's alpha of 0.77 for behavioral engagement, 0.86 for emotional engagement, and 0.82 for cognitive engagement. In this study, though the learning engagement questionnaire was validated, the researcher retested the instrument among the selected Grade 7 students. The reliability results showed that the learning engagement questionnaire has a Cronbach's alpha of 0.75. Therefore, the instruments were deemed reliable and can be used to measure the learner's engagement in Science class.

Pilot testing was done to establish the reliability and validity of the instruments. Before the pilot testing, the researcher carefully stated the objectives and scope of the pilot test, including specific areas to be tested, such as experience, functionality, and reliability of the assessment tool. The pilot test sample was representative of the target respondents, ensuring the sample reflected the characteristics of the actual study population. The participants were told about the objective of the pilot test and what was expected of them, and their consent was requested.

Data Gathering Procedure

Prior to data collection, the researcher secured permission to conduct the study. The researcher secured the endorsement signed by the Schools Division Superintendent of Manila, along with the permission letters sent to the principal authority of Manuel G. Araullo High School to conduct the survey. Upon approval, the researcher obtained written assent forms to each participant in the study. The researcher administered the test and questionnaire to the respondents during the Science classes. Afterwards, the collected data was subjected to quantitative analysis.

Statistical Treatment of Data

In analyzing the data, the frequency and percentage, mean, standard deviation, and Spearman's Rank-Order Correlation Coefficient (Spearman's Rho) were used. Frequency and percentage were used to assess the implementation of motivational strategies in Science during the first quarter. The mean score was used to determine the extent of motivational strategies in teaching Science. The standard deviation was used to indicate how measurements for a group were spread out around the mean (expected value) across indicators. The study used Spearman's Rank-Order Correlation Coefficient (Spearman's Rho) to assess whether motivational strategies are significantly correlated with students' grade performance and level of engagement.

Scope and Delimitation of the Study

This study was undertaken to determine the motivational strategies of Science teachers as a basis for an intervention program; determine the extent of implementation of extrinsic and intrinsic motivational strategies; and assess the influence of these strategies on the level of engagement and academic grade performance of Grade 7 students in Manuel G. Araullo High School, Manila, for the academic year 2025-2026. The study adopted a quantitative descriptive-correlational research design, utilizing a pre-test and a periodic test to measure changes in student performance and a survey questionnaire to assess the level of motivation in teaching science. The respondents were Grade 7 students enrolled in Manuel G. Araullo High School during the study period. The study was limited to analyzing the relationship between the extent of extrinsic and intrinsic motivational strategies and determining whether a significant relationship exists between these strategies and student performance. The study also analyzed the relationship between motivational strategies and students' level of engagement. It did not include other factors that may influence Science learning, such as teacher qualifications, curriculum design, or external environmental factors. The findings served as the basis for an intervention program aimed at enhancing the effectiveness of motivational strategies in Science education.

RESULTS AND DISCUSSION

This section presents the analysis and interpretation of findings on the motivational strategies of science teachers, which may serve as a basis for an intervention program.

Extent of Implementation of Motivational Strategies

The results presented in Table 1 below indicate that students perceived their teachers' use of extrinsic motivational strategies to be consistently high.

Table 1
Mean Ratings on Extrinsic Motivational Strategies of Science Teachers

Extrinsic Motivation	$\bar{x}$	SD	Description
1. The teacher rewards students for completing assignments on time.	3.36	0.810	Very High
2. The teacher uses grades as a way to motivate students to perform well.	3.41	0.670	Very High
3. The teacher provides praise for good performance in Science.	3.46	0.761	Very High
4. The teacher offers incentives, such as extra credit, to encourage participation.	3.15	0.886	High
5. The teacher recognizes the student to motivate in class	3.14	0.868	High
6. The teacher encourages students to compete in Science-related activities.	3.22	0.920	High
7. The teacher sets up challenges where students can win prizes for achieving goals.	2.94	0.908	High
8. The teacher regularly gives feedback on student work to keep students motivated.	3.27	0.857	Very High
9. The teacher uses visual charts to track progress and motivate students.	2.93	0.900	High
10. The teacher provides opportunities for students to present their work to the class, promoting motivation through external acknowledgment.	3.36	0.819	Very High
Overall	3.22	0.470	High

Note: Very Low (1.00-1.75), Low (1.76-2.51), High (2.52-3.26) and Very High (3.28-4.00)

Mean scores for all ten categories ranged from 2.93 to 3.46, with an overall mean of 3.22 ($SD = 0.470$), interpreted as *High*. *Very high* means were obtained for categories such as “praising students for good performance,” “using grades as reinforcement,” and “rewarding timely completion of activities,” suggesting that teachers were committed to honoring effort and achievement. Notably, the means for “setting up challenges with prizes” ($\bar{x}=2.94$) and “using progress charts to track accomplishment” ($\bar{x}=2.93$) were a little lower. Although still classified as *High*, these values indicate that tangible or visual forms of reinforcement were used less often than verbal praise or grade-based recognition.

These results point towards a place for extrinsic methods in Science classes. The relatively low variability in scores also suggests that most respondents held similar ideas, confirming that these approaches were consistently distributed among teachers. Research over the past five years highlights that extrinsic strategies such as verbal praise, grade-based incentives, and tangible rewards remain core in the classroom Management and instructional practices. For instance, recent classroom-based experiments suggest that teachers’ praise greatly improves on-task behavior, particularly when feedback is linked to students’ effort or strategies rather than to ability labels (Oppermann & Lazarides, 2021).

Table 2
Mean Ratings on Intrinsic Motivational Strategies of Science Teachers

Intrinsic Motivation	$\bar{x}$	SD	Description
1. The teacher makes Science lessons interesting and engaging for students.	3.57	0.619	Very High
2. The teacher encourages students to ask questions and explore topics in depth.	3.41	0.748	Very High
3. The teacher helps students set personal goals for their learning in Science.	3.16	0.794	High
4. The teacher creates a positive learning environment where students feel comfortable sharing ideas.	3.56	0.741	Very High
5. The teacher encourages students to think critically and solve problems on their own.	3.18	0.874	High
6. The teacher connects Science lessons to real-life applications, making the subject more relevant.	3.33	0.804	Very High
7. The teacher praises students for their effort and persistence, not just the outcome.	3.39	0.798	Very High
8. The teacher encourages students to take ownership of their learning in Science.	3.29	0.751	Very High
9. The teacher helps students understand the value of Science beyond grades.	3.45	0.795	Very High
10. The teacher fosters a growth mindset by emphasizing the importance of learning from mistakes.	3.50	0.814	Very High
Overall	3.38	0.464	Very High

Note: Very Low (1.00-1.75), Low (1.76-2.51), High (2.52-3.26) and Very High (3.28-4.00)

Mean scores range from 3.16 to 3.57, and the composite mean of 3.38 ($SD=0.464$) was interpreted as Very High. The most positively evaluated practices were comprised of making lessons stimulating and enjoyable ($\bar{x}=3.57$), creating a positive learning environment where students feel comfortable sharing ideas ($\bar{x}=3.56$), and fostering a growth mindset by emphasizing the importance of learning from mistakes ($\bar{x}=3.50$). Two item-statements that enable students to develop personal learning goals ($\bar{x}=3.16$) and provide opportunities for independent problem-solving ($\bar{x}=3.18$) were rated only “High”. This implies that while teachers are good at initiating curiosity and understanding errors as learning opportunities, they might occasionally overlook activities that strengthen autonomy or goal setting. Across all categories, the consistently very high ratings emphasize that teachers actively cultivate students’ internal drive to learn.

In several educational contexts, research has shown that the more interesting and entertaining classes are, the more they encourage intrinsic motivation in learners. For example, Lai et al. (2020) found that Science teachers who incorporate interactive

activities, experiments, and real-world applications can improve students' attention and sustained engagement. Also, students experience learning as inherently pleasant when courses are enjoyable, thereby reducing the need for external reinforcers (Lazarides & Scheifele, 2021). The results support the category in the data, which highlighted the value of exciting and enjoyable lessons as a primary motivator for intrinsic motivation.

Learning Engagement of Students

Table 3
Behavioral Engagement of Students in Science Classes

Behavioral	$\bar{x}$	s	Interpretation
1. I pay attention in Class	3.65	0.593	All of the time
2. When I am in class, I just act as if I am working	1.95	0.890	Rarely/On Occasion
3. I complete my Homework on time	3.26	0.722	Most of the time
4. I follow the rules at school	3.72	0.507	All of the time
5. I get in trouble at school	1.18	0.406	Never
Overall	2.75	0.290	Most of the time

Note: Mean ($\bar{x}$); Standard Deviation (s); Never (1.00-1.79), Rarely/On Occasion (1.80-2.59), Sometimes (2.60-3.39), Most of the time (3.40-4.19), and All of the time (4.20-5.00)

Table 3 above presents the level of students' behavioral engagement in Science classes when motivational strategies are employed. The overall mean of 2.75 ($s=0.290$), interpreted as most of the time, indicates that students generally exhibit desirable behavioral patterns in the classroom. High means were obtained for the following school regulations ($\bar{x}=3.72$, $s=0.507$) and for paying attention in class ($\bar{x}=3.65$, $s=0.593$), both of which were interpreted as "all of the time". These monitor students' compliance with classroom standards and attention to instruction. Moreover, students reported completing assignments on time frequently ($\bar{x}=3.26$, $s=0.722$), indicating responsibility and task-oriented behavior.

However, the item "I just act as if I am working" obtained a lower mean of 1.95 ($s=0.890$), interpreted as *rarely/on occasion*. This implies that most students do not merely engage in superficial participation. Furthermore, the lowest mean was recorded for getting into trouble at school ($\bar{x}=1.18$, $s=0.406$), interpreted as "never," indicating minimal behavioral disruptions. These findings reveal that the behavioral indicators reflect a largely desirable learning disposition, which supports teachers' effective implementation of motivational strategies.

Table 4
Emotional Engagement of Students in Science Classes

Emotional	$\bar{x}$	s	Interpretation
6. I feel happy in school	3.24	0.736	Most of the time
7. I feel bored in school	1.62	0.634	Never
8. I feel excited by the work in school	3.14	0.712	Most of the time

9. I like being at school	3.41	0.570	All of the time
10. I am interested in the work at school	3.12	0.640	Most of the time
11. My classroom is a fun place to be	3.39	0.646	All of the time
Overall	2.99	0.347	Most of the time

Note: Mean ($\bar{x}$); Standard Deviation (s); Never (1.00-1.79), Rarely/On Occasion (1.80-2.59), Sometimes (2.60-3.39), Most of the time (3.40-4.19), and All of the time (4.20-5.00)

Table 4 illustrates students' emotional engagement toward Science learning. The overall mean of 2.99 ($s=0.347$), interpreted as *most of the time*, indicates that students generally experience positive emotions in the school environment. Students liked being at school ($\bar{x}=3.41$, $s=0.570$) and perceived their classroom as a fun place to be ($\bar{x}=3.39$, $s=0.646$), both of which were interpreted as "*all of the time*." These suggest an encouraging and enjoyable learning environment.

Positive affective responses were also observed among students who felt joyful at school ($\bar{x}=3.24$, $s=0.736$), thrilled about schoolwork ($\bar{x}=3.14$, $s=0.712$), and interested in academic tasks ($\bar{x}=3.12$, $s=0.640$), all interpreted as "*most of the time*." Specifically, boredom had the lowest mean ($\bar{x} = 1.62$, $s = 0.634$), which was interpreted as "*never*". This implies that kids rarely disconnect or emotionally detach themselves from school activities. Overall, the data indicate a typically pleasant emotional atmosphere in Science classes that may boost students' receptiveness to the teaching tactics.

Table 5
Cognitive Engagement of Students in Science Classes

Cognitive	$\bar{x}$	s	Interpretation
12. When I read a book, I ask myself questions to make sure I understand what it is about	3.25	0.775	Most of the time
13. I study at home even when I don't have a test	2.49	0.839	Rarely/On Occasion
14. I try to watch TV shows about things were doing in school	2.84	0.777	Most of the time
15. I talk with people outside of school about what I am learning in class	3.22	0.580	Most of the time
16. I check my schoolwork for mistakes	3.28	0.774	All of the time
17. If I don't know what a word means when I am reading, I do something to figure it out like look it up in the dictionary or ask someone	3.42	0.749	All of the time
18. I read extra books to learn more about the things we do in school	2.53	0.770	Most of the time
19. If I don't understand what I read, I go back and read it over again	3.71	0.695	All of the time
Overall	3.09	0.429	Most of the time

Note: Mean ($\bar{x}$); Standard Deviation (s); Never (1.00-1.79), Rarely/On Occasion (1.80-2.59), Sometimes (2.60-3.39), Most of the time (3.40-4.19), and All of the time (4.20-5.00)

Table 5 shows that students' cognitive engagement is consistently present, with an overall mean of 3.09 ($s=0.429$), interpreted as "*most of the time*." High levels of metacognitive behaviors were reported, particularly re-reading materials for comprehension ($\bar{x}=3.71$, $s=0.695$), checking schoolwork for mistakes ($\bar{x}=3.28$, $s=0.774$), and seeking clarification for unfamiliar words ($\bar{x}=3.42$, $s=0.749$), all interpreted as *all the time*. These behaviors reflect students' active regulation of their learning processes.

However, some cognitively demanding behaviors were less frequent. Studying at home without an upcoming test ($\bar{x}=2.49$, $s=0.839$) was interpreted as *rarely/on occasion*, while reading extra books for enrichment ($\bar{x}=2.53$, $s=0.770$) and engaging with subject-related media ($\bar{x}=2.84$, $s=0.777$) were only reported *most of the time*. The findings suggest that students actively utilize comprehension and monitoring strategies during learning; however, autonomous enrichment beyond the required tasks should be improved.

Students Grade Performance in Science

Table 6
Descriptive Statistics of Students Grade Performance

Statistic	Grade Performance
Sample (n)	147
Mean ($\bar{x}$)	85.041
Median	86
Standard Deviation (SD)	4.522
Range	18
Minimum	75
Maximum	93

Note: The first quarter grade has a maximum of 100.

Table 6 above presents the respondents' grade performance ($n = 147$) and indicates a high, consistent level of accomplishment for the most part. The computed mean score of 85.041 shows that the students' performance is commendable on average. The mean of 86 was below the median, indicating a minor negative skewness. This trend causes certain low scores to slightly lower the mean.

The standard deviation of 4.522 indicates that there is very little variance in the students' grades and that the grades are tightly distributed around the mean. Standard deviation is an important measure of dispersion, and smaller values indicate greater consistency across observations (Triola, 2022). This would imply a very uniform level of performance among the participants. Most students scored in a small range around the mean, indicating a high degree of academic success.

The results demonstrate that the respondents' academic performance is generally strong, with minimal variation. Motivation-based discussions foster curiosity and active engagement, both of which are essential for grasping complex scientific concepts. These

results are consistent with the present study, in which the periodic test scores of the students dramatically improved after being exposed to motivationally enriched lessons (Hsu, 2020; DeCoito & Estaiteyeh, 2022)

Relationship Between Motivational Strategies and Grade Performance

Table 7
Descriptive Data for Grades Performance and Motivational Strategy

Statistic	Grade Performance	Extrinsic Motivation	Intrinsic Motivation
Sample (n)	147	147	147
Mean ($\bar{x}$)	85.041	3.225	3.384
Standard Deviation (SD)	4.522	0.47	0.464
Shapiro-Wilk W	0.9483	0.937	0.9086
Shapiro-Wilk p	< .001	< .001	< .001

Note: A p-value <0.05 suggests a violation of the assumption of normality

Table 7 shows the distribution of first-quarter grades alongside extrinsic and intrinsic strategy scores. The grades were concentrated around a mean of 85.04, with most students scoring between 82 and 88. The evaluations supported previous results (extrinsic, $\bar{x}$ =3.23; intrinsic, $\bar{x}$ =3.38), indicating that teachers continued to apply high levels of motivational strategies for the whole grading period.

Research further emphasizes that combining intrinsic and extrinsic strategies in the classroom can be effective in science education, where the difficulty of the content requires strong encouragement and internal drive to improve learning among learners (Trigueros et al., 2020). Stable averages in student grades, as observed in this study, often indicate that motivational strategies were applied uniformly and equitably, minimizing performance gaps among learners (Vale & Barbosa, 2023). Moreover, the alignment between high ratings of motivational strategies and consistently satisfactory academic results demonstrates how teachers' practices directly shape learners' outcomes (Voica et al., 2020).

Table 8
Relationship between motivational strategies and grade performance

Variables	Spearman's rho (ρ)	p-value	result
Extrinsic Motivation	0.186	0.024	significant
Intrinsic Motivation	0.208	0.011	significant

Note: Significant at $p < 0.05$

The correlational study presented in Table 8 revealed a link between motivational strategies and students' grade performance in Science, using Spearman's rho. The

findings indicate that both extrinsic and intrinsic motivation are statistically significant correlates of students' academic success.

Extrinsic motivation yielded a Spearman's rho (ρ) value of 0.186 and a p-value of 0.024, which is below the 0.05 significance threshold. This signifies a small yet statistically significant positive correlation between extrinsic motivational strategies and students' academic achievement. This indicates that an increase in extrinsic motivation—such as prizes, recognition, or external incentives—correlates with a modest enhancement in students' academic performance in Science. Likewise, intrinsic motivation yielded a rho of 0.208 and a p-value of 0.011, both below the 0.05 threshold. This signifies a small but statistically significant positive correlation between intrinsic motivation and academic success. This indicates that students who are intrinsically motivated—driven by interest, enjoyment, or personal fulfillment—tend to excel in Science.

The data demonstrate a significant relationship between motivational strategies and students' grade performance in Science, resulting in the rejection of the null hypothesis. The weak strength of the relationships indicates that, although motivation is a contributing factor, other elements may significantly affect students' academic success. Recent studies have shown that even small correlations can be educationally significant, as repeated exposure to motivationally enriched instruction can yield incremental but meaningful improvements in grades (Zabala-Vargas et al., 2021). Extrinsic strategies such as prizes, praise, and recognition have been associated with measurable short-term performance improvements, reinforcing effort and inspiring students to meet academic requirements (Wu & Wu, 2020).

In addition, intrinsic approaches are more typically closely related to achievement as they can foster self-regulation, curiosity, and resilience in learning (Vlasenko et al., 2020). Research has found that teachers who promote discovery based on curiosity and allow learners to experience satisfaction in problem-solving are more likely to foster greater engagement and achievement (Zepeda et al., 2020). The current findings further support these claims, indicating that intrinsic strategies are more positively associated with science grade performance than extrinsic strategies.

Relationship Between Motivational Strategies and Student Engagement

Table 9
Correlation Between Motivational strategies and Student Engagement

Motivation al Strategies	Level of Engagement	r	Interpretatio n	p- value	Decision	Conclusio n
Extrinsic	Behavioral	-0.177	weak negative	0.032	Reject Ho	Significant
	Emotional	0.035	weak positive	0.676	Retain Ho	Not Significant

	Cognitive	-0.005	weak negative	0.95	Retain Ho	Not Significant
	Behavioral	-0.056	weak negative	0.502	Retain Ho	Not Significant
Intrinsic	Emotional	-0.07	weak negative	0.4	Retain Ho	Not Significant
	Cognitive	-0.052	weak negative	0.531	Retain Ho	Not Significant

Note: Significant at $p < .05$

As shown in Table 9, the statistical significance of the correlation coefficients (r) and p -values between students' levels of engagement (behavioral, affective, and cognitive) and motivational strategies (extrinsic and intrinsic). Behavioral engagement was significantly correlated with extrinsic motivation ($r = -0.177$, $p = 0.032$). The null hypothesis is rejected because the p -value is less than 0.05 level of significance. Nevertheless, the relationship is weak and negative, suggesting a weak negative correlation between higher levels of extrinsic motivation and lower levels of behavioral engagement. On the other hand, extrinsic motivation shows no significant correlation with cognitive engagement ($r = -0.005$, $p = 0.950$) or emotional engagement ($r = 0.035$, $p = 0.676$), as both p -values exceed 0.05. This suggests that students' cognitive investment in academic tasks and their emotional attachment to learning were not substantially influenced by extrinsic motivational strategies. Fredricks et al., (2004) underscore that meaningful learning experiences have a more profound impact on emotional and cognitive engagement than external incentives.

No statistically significant relationships were identified across all engagement dimensions in the context of intrinsic motivation. Cognitive engagement ($r = -0.052$, $p = 0.531$), emotional engagement ($r = -0.070$, $p = 0.400$), and behavioral engagement ($r = -0.056$, $p = 0.502$) all exhibit weak negative correlations with p -values greater than 0.05, supporting retention of the null hypothesis. This suggests that intrinsic motivation, despite its theoretical significance, does not exhibit a measurable direct relationship with engagement in this study. Nevertheless, research by Schunk and DiBenedetto (2020) indicates that intrinsic motivation often influences engagement indirectly through self-regulation and persistence, rather than through the immediate behavioral outcomes observed.

The relationship between motivation and learning engagement is complex and multifaceted. Engagement is an observable activity or indication of motivation, and motivation is the drive underlying students' behaviors. Motivation and engagement could act differently, so that they are not directly related. Motivation may lead to engagement, but motivation alone is not sufficient. Engagement can be influenced by several factors, such as the learning environment, the topic, and individual student interests. Students who are engaged in their education are often more motivated because they are more engaged with the subject matter and the learning process. A similar conclusion was also obtained in a recent study conducted at Don Carlos Bukidnon, where motivation and involvement are not directly related to academic success (Patierrez, 2024)

Proposed Intervention Program

The findings from statistical studies clearly demonstrate that motivational strategies play an important role in students' learning outcomes in Science. Teachers' extrinsic and intrinsic strategies were consistently rated at high to very high levels, while intrinsic practices showed a slightly stronger positive association with students' first-quarter grade performance. Moreover, students' scores increased considerably, indicating that motivationally enriched teaching translates into enduring academic benefits. Based on these findings, a structured intervention program was devised to increase teachers' adoption of effective tactics and to sustain student progress.

Title: Science Motivation and Engagement Enhancement Program (SMEEP)

I. Rationale

The study revealed that motivational strategies employed by Science teachers are strongly correlated with students' academic performance and engagement. Therefore, strengthening both intrinsic and extrinsic motivational strategies can enhance students' involvement, interest, and achievement in Science.

II. Objectives

General Objective

The objective of this study is to improve students' academic performance and engagement in Science through the effective use of motivating strategies.

Specific Objectives

1. Increase students' interest and enthusiasm in Science learning.
2. Enhance students' behavioral, emotional, and cognitive engagement.
3. Strengthen teachers' use of intrinsic and extrinsic motivational strategies.
4. Improve students' Science grade performance.

III. Target Participants

- Science Teachers
- Grade 7 High School Students

IV. Implementation Plan

Preassessment				
Objectives	Activities	Persons Involved	Time Frame	Expected Output
Identify the MPS of students in Science	Administer Test	Science Teachers, Students	Start of School year	Students' Grade

Conduct Meetings with Parents	Set schedule of the meeting	Science Teachers, Parents, students	Start of School year	Minutes of the meeting
Implementation				
Objectives	Activities	Persons Involved	Time Frame	Expected Output
Strengthen extrinsic motivation among students	Provide recognition awards, certificates, praise, and achievement boards	Science Teachers, School Administrators	Monthly	Increased attendance, participation, and task completion
Enhance intrinsic motivation among students	Conduct inquiry-based learning, problem-solving activities, science investigations, reflection journals	Science Teachers, Students	Quarterly	Increased student participation and interest in Science
Improve behavioral engagement	Implement collaborative learning and classroom participation activities	Science Teachers, Students	Weekly	Active classroom participation
Improve emotional engagement	Organize Science games, competitions, and interactive learning activities	Science Teachers, Students	Quarterly	Positive attitudes toward Science
Improve cognitive engagement	Use higher-order thinking activities, experiments, and project-based learning	Science Teachers, Students	Weekly	Improved critical-thinking and problem-solving skills
Improve Science performance	Conduct remediation and enrichment sessions based on students' needs	Science Teachers, Students	After every grading period	Improved quarterly grades in Science
Post Assessment				
Objectives	Activities	Persons Involved	Time Frame	Expected Output
Monitoring Students' progress	Administer Test	Science Teachers, Students	Quarterly	Improved Test Scores

Enhance teachers' motivational practices	Conduct seminars and workshops on motivational teaching strategies	School Heads, Science Teachers	annually	Increased use of effective motivational strategies
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The proposed intervention program comprises objectives, activities, responsible persons, an implementation schedule, and expected outcomes to improve students' motivation, engagement, and academic performance in Science. Its purpose is to increase students' motivation and engagement in Science through a range of activities and strategies. Intrinsic strategies, such as inquiry-based learning and hands-on activities, stimulate students' interest and curiosity, while extrinsic strategies, such as praise and rewards, motivate students to engage and perform well. These strategies are intended to enhance students' behavioral, emotional, and cognitive engagement, resulting in increased participation, positive attitudes towards Science, and deeper learning. The proposed intervention program aims to enhance the use of motivational strategies, both intrinsic and extrinsic, and improve students' engagement by utilizing various classroom activities and strategies.

Conclusions

The following conclusions were drawn based on the findings of the study.

The study found that Science teachers often use both extrinsic and intrinsic motivational strategies in their teaching. Overall evaluation of intrinsic motivation was higher than that of extrinsic motivation. Teachers planned engaging lessons and fostered a positive learning environment. They rewarded students' efforts with praise and academic encouragement.

The results also indicate that students show positive engagement in Science learning across behavioral, emotional, and cognitive dimensions. The findings showed that students were engaged in Science learning for the most part. The results revealed an increase in academic achievement in Science among the respondents, indicating a generally high level of learning.

The results indicate that the students had satisfactory and stable academic performance during the study. Both extrinsic and intrinsic motivational strategies were significantly positively related to academic achievement. The correlations were weak, but intrinsic motivation was slightly more strongly related to grade performance than extrinsic motivation.

The results showed that there was no significant relationship between the use of motivational strategies by Science teachers and the students' engagement in Science in terms of the behavioral, emotional, and cognitive dimensions; both extrinsic and intrinsic motivating strategies had weak positive or negative relationships with some aspects of engagement, but the relationships were mostly not significant. This implies that motivating strategies alone may be inadequate to influence students' participation in Science.

The study's findings led to the development of the Science Motivation and Engagement Enhancement Program (SMEEP) as an intervention to improve students' motivation, engagement, and academic achievement in Science. The program involves intrinsic and extrinsic motivational strategies through well-organized pre-assessment, implementation, and post-assessment activities. When implemented consistently and monitored effectively, SMEEP is expected to increase students' interest and participation in Science, improve their academic achievement, and create a more engaging and supportive learning environment.

Recommendations

The following recommendations were hereby presented based on the findings and conclusions of the study.

1. It is advised that science teachers continue to use intrinsic and extrinsic motivational strategies to provide opportunities among the students to set personal learning goals, to make choices in learning activities, and to solve issues independently to boost students' motivation and responsibility for learning.
2. To keep the students' interest and involvement in Science, there is a need for adequate instructional materials, laboratory facilities, and continuous teachers' training.
3. The positive effect of the observed increase in student academic performance suggests that motivational strategies should be an integral part of Science teaching. It is recommended that teachers consistently integrate both extrinsic and intrinsic approaches into their lesson design to ensure the acquisition and retention of learning gains over time.
4. The conclusion that there was no significant association between the motivational strategies and students' engagement suggests that it should not be claimed that motivation alone will improve engagement. Instead, explore other important factors that contribute to better teaching practices.
6. School administrators are urged to adopt and assess the Science Motivation and Engagement Enhancement Program (SMEEP). Pre-assessment, implementation, and post-assessment should be conducted on an ongoing basis to determine the program's effectiveness in increasing students' motivation, attention, and academic achievement in Science.
7. The author suggests that future research might investigate other aspects that may affect students' involvement in Science, and employing larger sample sizes or alternative educational environments could validate and extend the findings of this study

Compliance with Ethical Standards

The author of this study declares full compliance with ethical standards in conducting the research. All the participants were informed about the purpose and procedures of the research, and informed consent was obtained. Participants were

informed of their right to withdraw from the study at any time without consequences. This research adhered to the principles of confidentiality under the Data Privacy Act of 2012. Furthermore, there were no conflicts of interest during the study, and the results are presented objectively for academic research. The author discloses that Artificial Intelligence (AI) tools were used only to assist in refining the manuscript's grammar and structure.

Acknowledgments

The researcher would like to express deepest gratitude to her thesis adviser, Galileo C. Gervacio, PhD., for his invaluable guidance, patience, and insightful feedback throughout the development and completion of this research, Special appreciation to the rest of her oral examination committee for their constructive comments and recommendations, which significantly improved this study and to the experts and participants who generously shared their time, experiences, and insights during the data collection process.

The researcher also extends her gratitude to her family, friends and colleagues for the engaging discussions, encouragement, and moral support that contribute significantly to the completion of this study.

And above all, to our Heavenly Father, for the countless blessings, strength, and guidance in accomplishing this study. Without His divine guidance and grace, this research would not have been made possible.

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APA Citation:

Ricalde, R. V., & Gervacio, G. C. (2026). MOTIVATIONAL STRATEGIES OF SCIENCE TEACHERS AND STUDENT GRADE PERFORMANCE BASIS FOR INTERVENTION PROGRAM. *Ignatian International Journal for Multidisciplinary Research*, 4(9), 1764–1783.
<https://doi.org/10.5281/zenodo.22957513>

Corresponding author: *ricalderia@gmail.com*