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DEVELOPING POSITIVE ATTITUDES IN SCIENCE FOR GRADE 8 STUDENTS THROUGH PROJECT DESC (DEMONSTRATION, EXPERIMENT, SOLVING PROBLEMS AND CAPSTONE TASKS): A WAY TO IMPROVE ACADEMIC PERFORMANCE

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ABSTRACT

Science is one of the most complex subjects of a junior high school student resulting to their low scores during quizzes. Due to this problem the teachers must do all means in order to help the students obtain good scores as well as help the students to easily retrieve their knowledge gained through the discussion and laboratory works presented. This research is focused on the use of Project DESC (Demonstration, Experiment, Solving Problems and Capstone tasks) a form of Performance Test which aims to improve the student's attitude towards science and improve their grades. Pre-Experimental Design was used to gather the data and purposive sampling was used by the researcher. Revised Attitude Questionnaire was used by the researcher to determine the effect of performance test toward the attitude of students after taking Project DESC. In order to get the effect of performance test on the scores and topic retention and redemption of the students, Project DESC and written test were used. Based on the findings, Project DESC strengthened the positive attitudes of students towards taking a Science Test and the use of performance test increased the academic performance of students in Science.

Keywords: *Project DESC, Performance Assessment, Written Test, Pre-experimental design, Purposive sampling*

Introduction

Science education is essential in preparing learners with the knowledge, skills, and attitudes needed to understand the natural world, solve real-life problems, and make informed decisions. In the Philippine K–12 curriculum, Science is designed not only to develop conceptual understanding but also to cultivate scientific inquiry, critical thinking, collaboration, and positive attitudes toward learning. Learners who develop favorable attitudes toward Science are more likely to participate actively in classroom activities, persevere in solving scientific problems, and achieve better academic outcomes. Consequently, creating learning environments that foster both positive attitudes and academic success has become a priority among science educators.

Despite continuous curriculum improvements, many Filipino learners continue to encounter difficulties in Science. National and local assessment results indicate that Science remains one of the learning areas where students demonstrate relatively lower achievement compared with other subjects. Research has shown that learners' poor academic performance is often associated with low motivation, limited engagement in authentic learning experiences, and negative attitudes toward the subject. These challenges affect students' willingness to participate in classroom activities and reduce their confidence in learning scientific concepts.

This situation is likewise evident in one of the schools in Mindanao. Based on the school's Mean Percentage Score (MPS), Science obtained a score of 87, ranking as the second-lowest among all Junior High School learning areas. Although the result falls within the satisfactory level, it suggests that many Grade 8 learners continue to experience difficulties in understanding scientific concepts and applying them during classroom activities and assessments. Classroom observations further revealed that some students exhibit low interest in Science lessons, hesitate to participate during discussions and laboratory activities, and demonstrate limited confidence in completing science-related tasks. These observations indicate that improving students' attitudes toward Science may also contribute to enhancing their academic performance.

Educational researchers emphasize that students' attitudes toward learning significantly influence their academic achievement. Learners who possess positive attitudes are more motivated to participate in classroom activities, persist when confronted with challenging tasks, and demonstrate greater responsibility for their own learning. Conversely, negative attitudes often result in decreased participation, low motivation, and poor academic performance. Recent studies likewise suggest that authentic and performance-based assessments provide meaningful opportunities for learners to engage actively in the learning process while developing both cognitive and affective competencies. Through demonstrations, experiments, collaborative problem-solving, and project-based learning, students become active participants rather than passive recipients of information, thereby increasing their interest, confidence, and appreciation for Science.

Performance-based assessment has gained considerable attention because it enables learners to demonstrate knowledge and skills in authentic situations instead of merely recalling information through traditional paper-and-pencil tests. In science education, performance tasks allow learners to investigate phenomena, conduct experiments, analyze data, communicate scientific explanations, and apply concepts to real-world situations. These learning experiences promote deeper understanding, improve knowledge retention, and strengthen positive attitudes toward Science. Furthermore, authentic assessment aligns with the Department of Education's competency-based curriculum, which emphasizes meaningful demonstrations of learning rather than simple memorization.

Although previous studies have established the positive effects of performance-based assessment on learner engagement and academic achievement, most investigations have focused on students' perceptions, teachers' assessment practices, or the effectiveness of individual performance tasks. Limited action research has examined the combined implementation of demonstrations, experiments, scientific problem-solving, and capstone tasks as a comprehensive classroom intervention aimed at simultaneously improving students' attitudes toward Science and their academic performance. Moreover, few studies have explored this intervention among Grade 8 learners in public secondary schools within the Division of Misamis Occidental, where contextual factors may influence students' learning experiences and achievement.

With this, the researcher developed Project DESC (Demonstration, Experimentation, Solving Problems, and Capstone Tasks) as an instructional intervention that integrates varied performance-based learning activities into

Grade 8 Science instruction. The intervention is intended to provide learners with meaningful and authentic learning experiences that encourage active participation, strengthen conceptual understanding, develop positive attitudes toward Science, and improve academic performance.

Specifically, this study aims to determine the effectiveness of Project DESC in enhancing the attitudes of Grade 8 students toward Science and improving their academic performance. It seeks to determine the level of students' attitudes toward Science before and after the implementation of Project DESC, examine whether significant differences exist in their attitudes before and after the intervention, determine their academic performance before and after the intervention, and investigate whether a significant relationship exists between students' attitudes toward Science and their academic performance. The findings of this study are expected to provide empirical evidence that may guide science teachers, school administrators, and curriculum planners in designing learner-centered instructional and assessment strategies that promote both positive attitudes and improved learning outcomes in Science.

Methods

This study employed a quantitative pre-experimental one-group pretest–posttest research design to determine the effectiveness of Project DESC (Demonstration, Experimentation, Solving Problems, and Capstone Tasks) in improving Grade 8 students' attitudes toward Science and their academic performance. The participants consisted of 50 Grade 8 students enrolled in one section of a national high school during the School Year 2025–2026, all of whom were selected through total enumeration sampling because the intervention was conducted as classroom-based action research. Data were collected using two validated instruments: (1) an adapted Attitude toward Science Scale, rated on a four-point Likert scale and reviewed by the Head Teacher and School Principal for content validity, with reliability established using Cronbach's alpha; and (2) a 50-item teacher-made achievement test aligned with the Grade 8 Science Most Essential Learning Competencies (MELCs), whose reliability was determined using the Kuder–Richardson Formula 20 (KR-20). Following approval from the school administration and the acquisition of informed consent from students and their parents or guardians, participants completed the attitude questionnaire and achievement pretest prior to the implementation of Project DESC. The intervention was then integrated into regular Science instruction through demonstrations, laboratory experiments, problem-solving activities, and capstone tasks. Upon completion of the intervention, the same attitude scale and achievement test were administered as posttests to measure changes in students' attitudes and academic performance. The collected data were analyzed using the weighted mean, mean, standard deviation, paired-samples t-test, and Pearson Product–Moment Correlation Coefficient (r), with all statistical tests evaluated at the 0.05 level of significance. Throughout the study, ethical principles were strictly observed by ensuring voluntary participation, maintaining the confidentiality and anonymity of participants, safeguarding all research data, and conducting the intervention as part of the regular instructional program without exposing students to any physical, psychological, or academic risks.

Results and Discussions

Table 3.
Attitudes toward Science Before Project DESC

Overall Mean	Interpretation
1.84	Slightly Negative

Before the implementation of Project DESC, the students generally exhibited a slightly negative attitude toward Science (M = 1.84), indicating limited interest, confidence, and enjoyment in learning the subject. The lowest-rated responses reflected students' lack of confidence in taking Science examinations and their perception of Science as a difficult subject. This finding suggests that traditional teacher-centered instructional approaches may not sufficiently stimulate learners' curiosity or foster meaningful engagement with scientific concepts. Previous studies have shown that negative attitudes toward Science are often associated with low self-confidence, reduced motivation, and passive learning experiences, which consequently hinder academic achievement (Osborne et al., 2003; Potvin & Hasni, 2014). According to Bandura's (1986) Social Cognitive Theory, students' beliefs about their capabilities influence their willingness to engage in challenging academic tasks. When learners possess low self-efficacy, they are less likely to participate actively, persist through difficulties, or develop positive attitudes

toward learning Science. These findings underscore the importance of creating authentic and engaging learning environments that cultivate students' confidence and interest in scientific inquiry.

Table 4.
Attitudes toward Science After Project DESC

Overall Mean	Interpretation
3.43	Positive

Following the implementation of Project DESC, students' overall attitude toward Science increased to a positive level (M = 3.43), indicating substantial improvements in their enjoyment, confidence, motivation, and appreciation of the subject. Participation in demonstrations, laboratory experiments, collaborative problem-solving activities, and capstone tasks enabled learners to experience Science as an active and meaningful process rather than a collection of abstract concepts. These authentic learning experiences allowed students to construct knowledge through direct participation, thereby increasing their confidence and intrinsic motivation to learn. The findings support Kolb's (1984) Experiential Learning Theory, which posits that meaningful learning occurs through concrete experiences, reflection, conceptualization, and active experimentation. Similarly, authentic performance-based instruction has been shown to enhance learner engagement, promote scientific curiosity, and improve students' attitudes toward Science by providing opportunities to apply theoretical concepts to real-life situations (Darling-Hammond & Adamson, 2014; OECD, 2019). The results therefore suggest that Project DESC successfully transformed students' perceptions of Science into a more positive and engaging learning experience.

Table 5.
Paired t-test on Students' Attitudes

Group	Mean	t	p	Interpretation
Before	2.24			
After	4.12	-14.20	.001	Significant

The paired-samples t-test revealed a statistically significant improvement in students' attitudes toward Science following the implementation of Project DESC ($t = –14.20$, $p = .001$). The null hypothesis was therefore rejected, confirming that the intervention significantly enhanced students' attitudes toward learning Science. The magnitude of this improvement indicates that engaging learners in demonstrations, experimentation, collaborative problem-solving, and capstone projects effectively fostered greater confidence, interest, and enjoyment in the subject. These findings align with previous research demonstrating that learner-centered and inquiry-based instructional approaches significantly improve students' motivation, self-efficacy, and attitudes toward Science (Lazonder & Harmsen, 2016; Hattie, 2023). Moreover, Self-Determination Theory (Deci & Ryan, 2000) explains that learning environments promoting autonomy, competence, and collaboration strengthen intrinsic motivation, resulting in more positive attitudes toward academic tasks. Thus, Project DESC appears to have created a supportive learning environment that encouraged active participation and meaningful engagement.

Table 6.
Academic Performance

Group	N	Mean	D	t	p	Interpretation
Before	50	8.40	5.70			
After	50	7.40	0.44	8.22	.001	Significant

Students' academic performance significantly improved following the implementation of Project DESC, with an average gain of 19 points from the pretest to the posttest ($t = 8.22$, $p = .001$). This substantial increase indicates that authentic performance-based instructional activities effectively enhanced students' conceptual understanding, scientific reasoning, and retention of scientific concepts. Through demonstrations, laboratory investigations, problem-solving activities, and capstone projects, students actively constructed knowledge by connecting theoretical concepts with practical experiences. Such learning experiences promote deeper understanding compared with passive instructional approaches. These findings are consistent with research showing that authentic assessment and experiential learning significantly improve academic achievement because students are

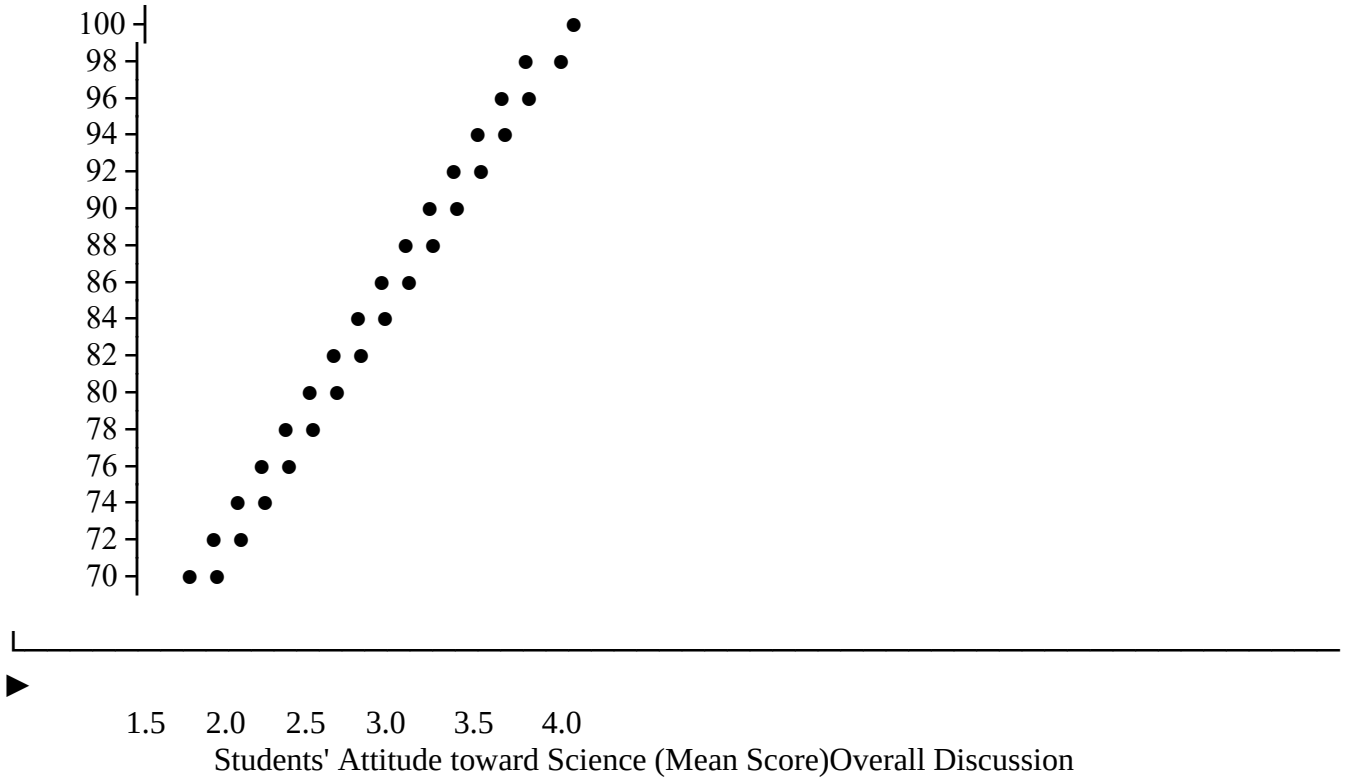
required to apply knowledge, analyze evidence, and solve real-world problems (Wiggins, 1998; Darling-Hammond et al., 2020). Likewise, inquiry-based Science instruction has consistently been associated with higher academic achievement and stronger conceptual understanding among secondary school learners (National Research Council, 2012; OECD, 2019). The findings therefore provide strong empirical evidence that Project DESC enhances both the quality of instruction and students' academic performance.

Table 7.
Correlation Analysis

Variable	r	p	Interpretation
Attitude vs Academic Performance	0.908	.001	Positive Relationship

The Pearson Product-Moment Correlation analysis revealed a very strong positive relationship between students' attitudes toward Science and their academic performance ($r = .908$, $p = .001$). This finding indicates that students who developed more positive attitudes toward Science likewise achieved higher academic performance following the implementation of Project DESC. Positive attitudes appear to enhance learners' willingness to participate in classroom activities, persevere through challenging learning tasks, and invest greater effort in understanding scientific concepts. Conversely, improved academic success may further reinforce students' confidence and motivation, creating a reciprocal relationship between affective and cognitive learning outcomes. These findings are supported by previous studies demonstrating that positive attitudes toward Science significantly predict academic achievement, learning motivation, and persistence in Science education (Toma & Greca, 2018; Glynn et al., 2011). From the perspective of Social Cognitive Theory (Bandura, 1986), positive learning experiences strengthen students' self-efficacy, which subsequently promotes greater academic engagement and achievement. The exceptionally high correlation observed in this study suggests that fostering positive attitudes should be considered a fundamental objective of effective Science instruction.

Figure 3.
Scatter Plot (Illustrative)



Overall Discussion

The findings consistently demonstrate that Project DESC positively influenced both students' attitudes toward

Science and their academic performance. Students became more interested, confident, and engaged after participating in demonstrations, experiments, problem-solving activities, and capstone tasks. The improvement in attitudes was accompanied by a significant increase in academic performance, while the very strong positive correlation (r = .908) indicates that students with more positive attitudes tended to achieve better learning outcomes. These findings support experiential learning, authentic assessment, and social cognitive perspectives, which emphasize that meaningful participation in learning activities strengthens motivation, confidence, and achievement. They are likewise consistent with recent studies reporting that authentic assessment promotes learner engagement, self-efficacy, and improved academic performance.

Conclusions

The findings of the study demonstrated that Project DESC (Demonstration, Experimentation, Solving Problems, and Capstone Tasks) is an effective instructional intervention for enhancing both the attitudes toward Science and the academic performance of Grade 8 students. Prior to the implementation of the intervention, students generally exhibited a slightly negative attitude toward Science, reflecting limited interest, confidence, and engagement with the subject. Following participation in Project DESC, their attitudes significantly improved to a positive level, indicating that authentic, learner-centered, and performance-based learning experiences fostered greater motivation, appreciation, and confidence in learning Science. Similarly, students' academic performance significantly increased, as evidenced by higher posttest mean scores, suggesting that demonstrations, laboratory experiments, problem-solving activities, and capstone tasks enhanced their conceptual understanding, critical thinking, and retention of scientific concepts. Furthermore, the study established a very strong positive relationship between students' attitudes toward Science and their academic performance, indicating that learners with more positive attitudes were more likely to achieve better academic outcomes. These findings provide empirical support for the integration of authentic performance-based learning experiences into Science instruction, highlighting Project DESC as a practical, learner-centered intervention that effectively promotes both affective and cognitive development while supporting the competency-based goals of the K–12 curriculum.

Recommendations

Based on the findings of the study, it is recommended that Science teachers integrate Project DESC (Demonstration, Experimentation, Solving Problems, and Capstone Tasks) into regular classroom instruction to foster active learning, enhance students' attitudes toward Science, and improve academic performance through authentic, performance-based learning experiences. School administrators should support the effective implementation of such interventions by providing adequate instructional resources, laboratory facilities, and continuous professional development opportunities that strengthen teachers' competencies in designing and implementing learner-centered and authentic assessments. Curriculum planners and instructional leaders are likewise encouraged to incorporate Project DESC or similar innovative instructional approaches into Science programs and school improvement initiatives to reinforce competency-based teaching and learning. Students should be encouraged to actively engage in demonstrations, experiments, collaborative problem-solving, and capstone activities to develop scientific inquiry skills, critical thinking, confidence, and positive attitudes toward Science. Finally, future researchers are encouraged to replicate this study using larger and more diverse samples across different grade levels and school settings, as well as employ quasi-experimental or mixed-methods designs to examine the long-term effects of Project DESC on students' academic achievement, scientific literacy, higher-order thinking skills, and other learning outcomes.

Conflict of Interests

The author declares that they have no conflicts of interest

References

[1] Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.

[2] Darling-Hammond, L., & Adamson, F. (Eds.). (2014). *Beyond the bubble test: How performance assessments support 21st century learning*. Jossey-Bass.

[3] Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. *Applied Developmental Science, 24*(2), 97–140. https://doi.org/10.1080/10888691.2018.1537791

[4] Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

[5] Glynn, S. M., Brickman, P., Armstrong, N., & Taasoobshirazi, 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

[6] Hattie, J. (2023). *Visible learning: The sequel*. Routledge.

[7] Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice-Hall.

[8] Lazonder, A. W., & Harmsen, R. (2016). Meta-analysis of inquiry-based learning: Effects of guidance. *Review of Educational Research, 86*(3), 681–718. https://doi.org/10.3102/0034654315627366

[9] National Research Council. (2012). *A framework for K–12 science education: Practices, crosscutting concepts, and core ideas*. National Academies Press. https://doi.org/10.17226/13165

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

[11] Osborne, J., Simon, S., & Collins, S. (2003). Attitudes towards science: A review of the literature and its implications. *International Journal of Science Education, 25*(9), 1049–1079. https://doi.org/10.1080/0950069032000032199

[12] Potvin, P., & Hasni, A. (2014). Interest, motivation and attitude towards science and technology at K–12 levels: A systematic review of 12 years of educational research. *Studies in Science Education, 50*(1), 85–129. https://doi.org/10.1080/03057267.2014.881626

[13] Toma, R. B., & Greca, I. M. (2018). The effect of integrative STEM instruction on elementary students' attitudes toward science and STEM careers. *Journal of Science Education and Technology, 27*(4), 354–366. https://doi.org/10.1007/s10956-018-9722-1

[14] Wiggins, G. (1998). *Educative assessment: Designing assessments to inform and improve student performance*. Jossey-Bass.