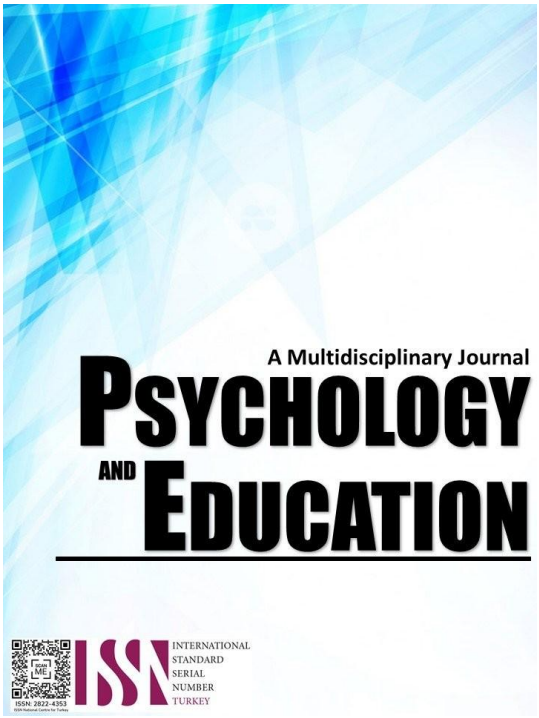
EFFECTIVENESS OF STRATEGIC INTERVENTION MATERIAL (SIM) IN TEACHING GRADE 11 SCIENCE: A QUASI-EXPERIMENTAL STUDY



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Research Article

Effectiveness of Strategic Intervention Material (SIM) in Teaching Grade 11 Science: A Quasi-Experimental Study

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Abstract

This study examined whether Strategic Intervention Materials (SIMs) could improve science performance among Grade 11 students at a Philippine public high school. The research was prompted by the Philippines' low scores in international assessments, such as PISA, highlighting the need for targeted learning interventions. Using a one-group pretest-posttest quasi-experimental design alongside a descriptive-correlational design, 63 students from three strands (CSS, Food Processing, and HUMSS) were assessed via pre- and post-tests, along with a perception survey on SIM usability. Results showed significant academic improvement, with the mean post-test score (40.56) far surpassing the pre-test (24.03). The percentage of students at the "Beginning" level dropped from 87.3% to 31.7%, while those reaching "Advanced" proficiency rose from 0% to 20.6%. Students rated SIMs highly for clarity, engagement, and real-world relevance; however, some found the guide questions challenging. Statistical analysis confirmed the substantial impact of SIMs, although student perceptions did not correlate strongly with performance. The study concludes that SIMs are a cost-effective, scalable intervention for improving science literacy, particularly in resource-limited settings. These findings support the Department of Education's (DepEd) push for localized competency-based learning aids to address educational gaps.

Keywords: *strategic intervention materials (SIMs), science performance, grade 11 students, Philippine public high school*

Introduction

The Philippines is one of the countries where students have been observed to have low levels of science literacy for many years now (Martin et al., 2004; Talisayon et al., 2006). As reported by Inquirer.net, when the country participated in the Program for International Student Assessment (PISA) for the first time in 2018, it scored the lowest in reading and the second lowest in math and science among 79 participating nations. The results of the 2022 assessment showed that among the 81 participating countries, the Philippines was ranked 76th in both mathematics and reading, and 79th in science. These results indicate that Filipino schoolchildren are among those who struggle with Mathematics, Science, and Reading.

Studies have been conducted to understand the country's low science achievement, with a focus on curriculum and instruction. The research conducted by the Philippine Normal University, Manila, regarding the PISA 2018 in relation to the K to 12 Science curriculum mentioned that one possible attribution of the science result is the low expenditure allocated per student, which is the weakest among the participating countries, and the students' lack of readiness to answer computer-based tests. Findings from the PNU's research revealed that the Scientific Literacy Assessment Framework of PISA 2018 and the K-12 Science Curriculum are similar in terms of content domain, learning competencies, and levels of cognitive demand.

However, the lessons and competencies were not distributed with consideration of the skills expected of learners across grade levels. As Sumardani (2021) notes, another factor contributing to students' low science achievement is the language of instruction. In science classes, English is used as the medium of instruction; however, in most classes, a combination of English and local dialects is employed for classroom instruction and conversation. Due to these factors, improving science performance in the Philippines has been challenging.

Strategic Intervention Material, a remediation tool designed to enhance the least-learned competencies, is a solution to improve students' academic achievement in science and technology (Suarez, 2020). The agency released DepEd Memo No. 117, which provided training on preparing SIMs as intervention materials and tools to address students' poor performance in secondary school.

At the public high school where the study was conducted, strategic intervention materials were developed and used in remedial mathematics classes. Readily available, downloadable SIMs accessible through the Department of Education's Learning Resources portal are being used for Grade 10 Science remediation. It was observed that these materials are effective in improving the performance of junior high school students. However, the exit test outcomes for Grade 12 students in science were low, especially after the pandemic. When asked about concepts they could remember from their lower-level science classes, the students said they did not learn much from the modules.

With these reasons and the hope of improving students' academic achievement, the researchers sought to investigate the effects of Strategic Intervention Materials on Grade 11 students. The researchers also aimed to develop intervention materials for the least mastered physical science competencies, anchored in the Department of Education's K to 12 curricula.

Research Questions

This study assessed the efficacy of strategic intervention materials in teaching Grade 11 science competencies. Specifically, this study sought to find the answers to these research questions:

1. What is the students' level of perception of the teacher-made strategic intervention materials?
2. What is the students' level of academic performance in terms of their:
   2.1. pre-test score; and
   2.2. post-test score?
3. Is there a significant difference between the students' level of academic performance before and after the use of teacher-made strategic intervention materials?
4. Is there a significant relationship between the students' level of perception and level of academic performance?

Literature Review

Grade 11 Science Competencies

Recent empirical findings indicate that the primary challenge in senior high school science education lies not in mere "coverage" of competencies but in learners' capacity to apply scientific concepts and methodologies to solve practical problems (Bernardo et al., 2023). Evaluations of the Philippine PISA science results reveal that many low-proficiency students are concentrated in contexts characterized by inadequate learning supports and suboptimal school conditions, which helps explain the frequent discrepancies between competency targets and actual mastery observed in conventional classroom settings (Bernardo et al., 2023). In essence, the educational framework's objective to foster scientific literacy through progressively developed competencies may be compromised when foundational skills and supportive conditions are insufficient, leading to superficial competency completion without profound comprehension. This disparity aligns with broader trends observed in East Asian contexts, in which socioeconomic inequality persistently correlates with academic achievement over time, suggesting that the attainment of competencies is influenced by structural inequities rather than solely by student diligence (Lam & Zhou, 2021).

In the context of Philippine senior high schools, investigations into science process skills provide an informative perspective on competency mastery, as numerous Grade 11 competencies require inquiry-related skills such as systematic observation, interpretation of evidence, and logical reasoning. A study conducted in a Philippine senior high school context demonstrated a significant correlation between fundamental science process skills and performance in Earth Science. In contrast, integrated process skills showed no such correlation. This suggests that students may still be reinforcing "entry-level" scientific reasoning at the Grade 11 level (Jardinico III, 2023). This observation suggests that competency-based educational expectations should be complemented by targeted remediation for specific subskills students may lack, rather than presuming that mere exposure to content will automatically lead to mastery.

Science Strategic Intervention Materials

Strategic Intervention Materials (SIMs) have increasingly been conceptualized as a practical approach to address the ongoing challenge posed by the "least mastered competency" phenomenon in Philippine science education. The appeal of SIMs lies in their targeted remediation: these materials are meticulously crafted to focus on specific competencies or sub-competencies, often incorporating guided activities, structured practice, and integrated assessment mechanisms to gauge comprehension (Gabucan & Sanchez, 2021). Recent results from a thorough meta-analysis in the Philippines show that using SIMs has a significant positive effect on education in both science and math. However, results vary by format (paper versus digital) and academic level, underscoring the importance of design integrity and contextual appropriateness rather than treating SIMs as a universal remedy (Borabo & Dio, 2025).

More rigorous evidence derived from individual studies further corroborates the efficacy of SIMs when these educational materials are intentionally designed and executed. For instance, SIM-oriented instruction, formulated through a systematic instructional design framework (ADDIE), exhibited notable learning gains, and its acceptability and perceived advantages were assessed among Filipino students, thereby reinforcing the perspective that SIMs are most effective as instructional design interventions rather than mere supplementary worksheets (Mutya, 2025).

Digital SIMs, or electronic SIMs (e-SIMs), provide an additional dimension of pedagogical support through features such as interactivity, instantaneous feedback, and enhanced pacing control, which are particularly pertinent in scientific subjects, where misconceptions can proliferate rapidly. A study in the Philippines, which examined an electronic SIM focused on the Ideal Gas Laws, found that students' understanding of the concepts improved significantly. Participants also reported a positive experience with the e-SIM, indicating that well-structured digital remediation can lead to both cognitive and emotional outcomes, such as engagement and self-efficacy (Navarette et al., 2023). A comparable study in the Philippines, involving an e-SIM in physics, focusing on Newton's Laws, reported improvements in academic performance and learning motivation, thereby highlighting the critical importance of interventions that foster achievement without compromising student motivation (Manlapig et al., 2024).

Levels of Perception on Strategic Intervention Material

Perception is an essential determinant in implementing Student-Centered Instructional Materials (SIM), as these educational resources

require active student engagement that transcends conventional classroom methodologies. In recent empirical investigations of Philippine SIM, students' positive perceptions have consistently converged on factors such as clarity and incremental scaffolding, engaging modalities (notably in electronic SIMs), and their efficacy in rectifying misconceptions through iterative practice and constructive feedback (Navarette et al., 2023; Manlapig et al., 2024). The study on the Kimika e-SIM titled "Gas Rules!" demonstrates that learner perceptions are firmly rooted in tangible educational experiences, including ease of navigation, clarity of instructional content, and perceived utility of assignments, rather than solely in general appreciation (Navarette et al., 2023).

In a parallel study, a study focused on SIM-based instruction in the Philippines, published in Frontiers in Education, explicitly incorporated metrics of perception and acceptability alongside achievement outcomes, positioning perception as a significant educational variable rather than a mere indicator of satisfaction (Mutya, 2025). These results imply that perception warrants analytical examination by elucidating which features of SIM facilitate or impede mastery, particularly in Philippine classrooms, where students' learning environments exhibit considerable variability in resources, temporal availability, and language proficiency.

Students' Academic Performance

The scientific performance of the Philippines remains a matter of national significance, and contemporary research elucidates the reasons behind the persistence of achievement disparities. PISA-based profiling reveals that low-proficiency science learners do not constitute a homogeneous cohort; instead, they comprise distinct clusters influenced by resource limitations, educational supports, and institutional factors at the school level, suggesting that underperformance is as much a systemic phenomenon as an individual challenge (Bernardo et al., 2023). This finding carries substantial implications for intervention studies, as the learning advancements derived from Strategic Instructional Methods (SIMs) may be more pronounced when interventions concurrently address both cognitive deficiencies and the educational conditions that hinder sustained practice.

At the classroom level, evidence from the Philippines indicates a strong correlation between academic performance and specific foundational skills. The Grade 11 investigation into science process skills illustrates that enhancing fundamental process skills could be a pragmatic approach to improving science achievement, especially in contexts where integrated skills have yet to stabilize (Jardinico III, 2023). This bolsters the justification for competency-centric interventions, in which SIMs specifically target and remediate identified learning impediments rather than re-instruct entire units of content.

Relationship between Students' Perceptions and Academic Performance

In the context of SIM research, the relationship between perception and performance can be understood as a sequential mechanism in which perceptions affect engagement, engagement affects the availability of learning opportunities, and these learning opportunities ultimately affect academic outcomes. Recent studies on SIM in the Philippines have operationalized this relationship by examining academic improvements alongside perceived advantages and levels of acceptability. In the investigation published in Frontiers in Education, researchers evaluated changes in achievement from pretest to posttest. They concurrently analyzed learners' perceptions of SIM use, thereby reinforcing the assertion that perceptions are an integral component of the learning process rather than merely subjective reactions (Mutya, 2025).

Similarly, the Philippine Kimika e-SIM study illustrated that positive perceptions may coexist with measurable gains in conceptual understanding, indicating that when students regard SIMs as clear, beneficial, and engaging, they are more likely to persist in remediation tasks designed to rectify misconceptions (Navarette et al., 2023). Nevertheless, the extant literature cautions against presuming a direct causal relationship, as favorable perceptions may indicate robust instructional design, with the quality of that design the critical factor that ultimately influences achievement gains (Borabo & Dio, 2025).

In summary, the studies above examined the effect of Strategic Intervention Materials on students' science performance. These studies and articles demonstrate the importance of utilizing suitable instructional materials to enhance science education. Although learners' perceptions differ and challenges persist, the overall impact of SIM is positive.

Methodology

Research Design

This study employed a one-group pretest-posttest quasi-experimental design, complemented by descriptive-correlational components, to evaluate the effectiveness of Strategic Intervention Materials (SIM) for Grade 11 science. Since the study involved only a single group, the quasi-experimental approach measured changes in academic performance before (pre-test) and after (post-test) exposure to SIM, allowing for an evaluation of its impact (Creswell & Creswell, 2023). In this study, the limitation of the one-group design can be partly countered by using a pretest–posttest comparison with the same validated instrument, controlling the intervention period and instructional conditions, and applying appropriate statistical analyses (paired t-test) to establish significant change, while explicitly acknowledging that causality cannot be claimed without a control group.

Additionally, a descriptive-correlational design was employed to investigate students' perceptions of SIM and their relationship with academic performance. The descriptive component analyzed students' perceptions of SIM as an instructional aid for teaching the least learned competencies in senior high school science. In contrast, the correlational component assessed whether these perceptions were

associated with post-intervention performance (Panda, 2022).

Respondents

The Grade 11 students for the 2024-2025 school year were the respondents for this study. They were from the three (3) strands of the Senior High School. The students' ages range from 15 to 19 years old, among boys and girls. There are around forty (40) boys and twenty-three (23) girls with a total of sixty-three (63) students in the said grade level. The student-respondents were selected using a purposive quota sampling. The grade 11 students were chosen as respondents because they received direct instruction from the researchers.

Instrument

This study used summative tests, a survey questionnaire, and SIM as research instruments. The summative test was given as the pre- and post-tests. The pre-test score was taken at the start of the quarter, while the post-test result was determined before the quarter ended. The test included fifty (50) questions aligned to the seventeen (17) most essential learning competencies for the second quarter of Physical Science. This test was forwarded to the Master Teachers and the Science Department Head for review and validation to ensure the items align with the lesson objectives.

A survey questionnaire was used to gather data on students' perceptions of SIMs. The researchers decided to modify an existing instrument, the Perception Survey Questionnaire (PSQ), which has already been validated and is relevant to the study. This consists of twenty (20) closed-ended questions to analyze the level of perception of the teacher-made materials. To assess the questionnaire's reliability, the researchers conducted a pilot test. A pilot test is a rehearsal of a research study. Nineteen (19) students from the same grade level were selected as participants for the pilot test. Pilot testing of the questionnaire yielded a Cronbach's alpha of 0.86, indicating good internal consistency. The instruments were aligned with the research questions by using a validated pretest–posttest to measure changes in academic performance and a perception survey to directly capture students' views on the Strategic Intervention Materials, enabling each question to be addressed with corresponding data. Also, test scores were obtained by assigning 1 point to each correct answer on the 50-item test, with total scores converted to performance levels for analysis and interpretation.

The most essential instrument in this research is the Strategic Intervention Material. The researchers created five (5) materials, which included a variety of activities to help students master the learning competencies. Each of these materials covered one (1) to two (2) topics. To verify the material's validity, the researchers have checked it through the school's Learning Resource Management System (LRMDS) Team, the Science coordinator, and the master teacher.

Procedure

After securing approval from the School Principal, the study employed a single-group quasi-experimental design involving all Grade 11 students from the CSS, Food Processing, and HUMSS strands under the same teacher. A pretest identified the least mastered competencies, which guided the development of validated Strategic Intervention Materials (SIMs). The eight-week intervention was implemented during the second quarter, with four 50-minute sessions per week and weekly chapter tests to monitor mastery—a posttest measured academic gains at the end of the quarter. Students also completed a perception survey, with responses tallied, averaged, and analyzed to support data interpretation.

Data Analysis

This study employed various statistical tools to analyze the data. First, the mean was used to determine the respondents' pre-test and post-test scores. Second, the weighted mean and distribution tables were used to assess students' perceptions and academic achievement. Third, Pearson's correlation was used to examine the relationship between students' perception levels and their academic performance. Finally, a t-test was conducted to determine whether there was a significant difference in academic performance before and after using the Strategic Intervention Material (SIM).

The use of parametric tests such as the t-test assumes that the data are approximately normally distributed, measured at the interval level, and derived from independent observations with no extreme outliers.

Ethical Considerations

Ethical considerations were taken into account before conducting this study. A letter requesting permission was sent to the school principal's office, where the study was conducted. The respondents were also given an assent form and a parent consent form to be signed before the survey was conducted. For the sake of their anonymity, the researchers did not ask the respondents for their names. The parents provided their full consent for their children to participate in the study by signing the letter.

This study also encouraged respondents to participate voluntarily, ensuring their privacy was protected. All the information gathered was kept confidential. The collected data were kept in a secure location and accessible only to those involved in the study. Moreover, this study ensured that deception and exaggeration of the study's objectives were avoided. This study ensured honesty and transparency in the presented information and unbiased findings.

Results and Discussion

Table 1. *Students' level of perception of the teacher-made strategic intervention materials*

Statements	*Weighted Mean*	*Verbal Interpretation*
1. I easily understand the content of the strategic intervention materials.	3.56	Strongly Agree
2. My interest in science increased.	3.44	Strongly Agree
3. I am challenged in answering and doing the activities from the SIM.	3.43	Strongly Agree
4. I am enjoying the varied learning activities in the SIM.	3.43	Strongly Agree
5. I can learn more science concepts if strategic intervention materials are used.	3.40	Strongly Agree
6. I can apply my learning from the SIM into actual life situations.	3.38	Strongly Agree
7. I can develop positive attitudes and skills in science through the SIM.	3.37	Strongly Agree
8. I can easily access the materials.	3.35	Strongly Agree
9. I can clearly read the words used in the strategic intervention materials.	3.33	Strongly Agree
10. I am more motivated to learn science concepts.	3.33	Strongly Agree
11. I can follow the instructions of the activities independently.	3.32	Strongly Agree
12. I can use local materials in performing the activities included in the SIM.	3.30	Strongly Agree
13. I understand the key concepts of the lesson by using the SIM.	3.29	Strongly Agree
14. I can master the learning competencies for the quarter.	3.29	Strongly Agree
15. I find the strategic intervention materials easy.	3.27	Strongly Agree
16. I can finish the activities on time.	3.25	Agree
17. I can financially afford the materials to be used in the activities included in the SIM.	3.24	Agree
18. I find the activities in the SIM relevant to what I do outside the school.	3.21	Agree
19. I can maximize my science skills by using the SIM.	3.13	Agree
20. I find the guide questions difficult.	2.92	Agree
Average of Weighted Mean	3.31	Strongly Agree

Legend: *1-1.75 – Strongly Disagree; 1.76-2.5 – Disagree; 2.51-3.25 – Agree; 3.26-4.00 – Strongly Agree*

The study shows that students generally have a positive perception of teacher-made Strategic Intervention Materials (SIM), with a mean score of 3.31. They agree with the content's clarity, accessibility, enjoyment of learning activities, and increased interest in science. This aligns with Philippine studies (Dargo & Dimas, 2017), which highlight the effectiveness of SIMs in improving learning outcomes. Also, Alvarez et al. (2021) showed that SIMs enhance student performance in science by providing structured, engaging content tailored to learners' needs.

Despite the overall positive reception, there are areas for improvement, such as the perceived difficulty of the guide questions (M=2.92, "Agree"), suggesting a need for simplified instructions or additional scaffolding. This finding aligns with the work of Garcia and Gonzales (2021), who noted that overly complex guide questions in SIMs can hinder comprehension, particularly among students with lower proficiency levels. They recommended scaffolding techniques, such as breaking down questions into more straightforward, step-by-step prompts, to improve understanding.

Further supporting this, Reyes et al. (2022) found that Filipino students benefit from contextualized and leveled questions—starting with basic recall questions before progressing to higher-order thinking skills (HOTS). This approach aligns with Vygotsky's Zone of Proximal Development (1978), which has been effectively applied in Philippine classrooms through differentiated SIMs (Torres & Cruz, 2023).

Additionally, while students agreed they could use local materials (M = 3.302), their ability to afford materials scored lower (M = 3.238), highlighting potential financial barriers. A study on the impact of using low-cost materials in teaching chemistry emphasizes the importance of organizing workshops and training school teachers to use improvised educational materials (Ncutinamagara et al., 2023). Using low-cost materials in the activities included in the SIM will be very beneficial to the students and schools that lack resources. In science classes where experiments are typically conducted, it is essential to improvise, localize, and contextualize materials.

These findings collectively suggest that while the SIM is successful in fostering engagement and understanding, refinements such as simplifying the guide questions and minimizing cost-related activities could strengthen its efficacy in promoting science competencies and real-world application. This improvement is evident in students' academic performance, as illustrated in Table 2.

Table 2. *Level of Academic Performance of Students in terms of their Pre-test and Post-test*

Level	*Percentage*	*No. of Students*	
		Pre-test	*Post-test*
Advanced	90 and above	0	13
Proficient	85-89	1	5
Approaching Proficiency	80-84	4	12
Developing	75-79	3	13
Beginning	74 and below	55	20
Total		63	63

The table above shows that implementing Strategic Intervention Materials (SIM) significantly improved students' academic performance. In the pre-test, 87.3% of students fell in the "Beginning" level, but post-test results showed a significant change. Only 31.7% of students remained at the "Beginning" level, while 20.6% achieved the "Advanced" level. The number of students in higher proficiency levels increased significantly. The positive impact of SIM on student learning outcomes is attributed to its modular approach, personalized learning pacing, and activities aligned with varied learning styles, particularly in science education. The immediate feedback mechanisms also helped students identify and correct misconceptions in real time.

These advantages are further reinforced by positive student perceptions, as evidenced in related studies. When learners find materials engaging and accessible, as SIM's activity-based format typically provides, their intrinsic motivation increases, leading to better knowledge retention. Dacumos' (2016) study of junior high school students found that 78% of participants reported higher confidence in tackling science concepts after SIM implementation, suggesting that the materials' approach reduces cognitive overload.

The current findings, showing significant movement from beginning to Advanced proficiency levels, mirror the benefits of SIM. The 63% reduction in Beginning-level students indicates that SIM successfully addresses foundational gaps that often discourage learners. As science complexity increases, strategic scaffolding becomes even more critical for maintaining student engagement and competence. This suggests that, aside from junior high school teachers, senior high school teachers may also develop and use this type of material to address their students' difficulties in science (Acedillo et al., 2022).

Table 3. *Difference between the Pre-test and Post-test Score Means*

Variable	*Mean*	*SD*	*t-Stat*	*p-value*	*t-Crit*
Pre-test	24.03	7.98	-15.95	1.29E-23	2.0
Post-test	40.56	6.42			

**Significant level of 0.05 (two-tailed)*

The paired t-test results indicate a significant improvement in students' academic performance, with an average gain of 16.53 points from the pre-test to the post-test. The significant negative t-statistic and p-value, below the conventional alpha level of 0.05, indicate the statistical significance of this improvement. This finding supports the work of Cruz and Mendoza (2021), who found that properly designed SIMs in Philippine science classrooms yielded statistically significant improvements ($p < 0.001$) with effect sizes ranging from 1.2 to 1.8 standard deviations.

The reduced standard deviation in post-test scores (6.42 vs. 7.98) further suggests the SIM helped create more consistent performance levels across students. This observation confirms the findings of Dela Peña et al. (2022), who found that SIM in the Philippines consistently reduced performance variability by 23-35% compared to traditional instruction methods. This statistical evidence, combined with the earlier descriptive results showing movement across proficiency levels, provides empirical support for the effectiveness of the intervention materials in enhancing academic performance.

The substantial mean gain from pretest to posttest, coupled with a large t-value, indicates not only that the improvement was unlikely to be due to chance but also that the magnitude of the change was educationally meaningful. A large effect size suggests that SIMs produced substantial improvements in learning outcomes, particularly in addressing the least mastered competencies and reducing performance gaps among students. This implies that the intervention had robust instructional value in real classroom conditions, reinforcing the observation that the observed gains were not merely statistically detectable but also practically significant for Grade 11 science instruction.

Table 4. *Correlation between the students' level of perception and academic performance in using Strategic Intervention Materials*

		Perception Mean	*Pre-test Scores*	*Post Test Scores*
Pearson's r value	Perception	1		
	Pre-test	-0.047 (p =0.72)	1	
	Post Test	0.181 (p = 0.16)	0.364 (p = 0.003)	1

The correlation analysis reveals distinct relationships between students' perception of the Strategic Intervention Materials (SIM) and their academic performance in the Philippine educational context. There is a moderate positive correlation between pre-test and post-test scores ($r = 0.364$, $p = 0.003$), which aligns with DepEd-NERDC's (2022) national findings, indicating that students with stronger foundational knowledge benefited more significantly from the intervention. This also supports Vygotsky's (1978) social development theory, which emphasizes that building on a student's existing knowledge helps them learn best. The SIM provided students opportunities to build on their own expertise through scaffolding and support (Zabala, 2023). Activities that not only made them independent but also actively engaged them were included in their SIM. They were also able to collaborate with others through discussions and team activities.

On the other hand, the correlation between perception and academic performance shows more distinct patterns. The non-significant weak positive correlation between perception means and post-test scores ($r = 0.181$, $p = 0.16$) mirrors observations by Alcazar and Lim (2021) in Cebu classrooms, suggesting that while favorable perceptions may enhance engagement, their direct impact on learning outcomes remains limited in Philippine settings. Interestingly, the negative correlation between perception and pre-test scores (r = -

0.047, p = 0.72) implies no meaningful relationship between students' initial ability levels and their perception of the materials.

These results collectively indicate that, while the SIM effectively improved overall scores, individual differences in perception did not influence either baseline knowledge or post-intervention performance. The findings suggest that the intervention systematically enhanced learning, with its effectiveness largely independent of students' subjective evaluations of the materials.

Many studies have examined the relationship between students' perceptions of certain materials and academic performance; however, the correlation is small. Yuniar (2021) stated in his study that students' academic performance is influenced by several factors, including their previous educational background and level of motivation.

Conclusions

The findings confirm that the Strategic Intervention Materials (SIM) effectively enhanced student learning outcomes while maintaining high engagement and usability. The materials' well-structured design and practical relevance contributed to significant performance improvements, particularly for struggling learners, though refinements, such as simplifying guide questions, could further optimize their impact. Notably, while students rated the SIM favorably, their ratings did not correlate with learning gains, underscoring that effective teaching materials need not be universally "liked" to be successful. The SIM's efficacy stemmed from its clear, targeted support for foundational competencies, which bridged knowledge gaps across all ability levels. This study demonstrates that teacher-made SIMs, when carefully designed to address specific learning needs, can serve as a powerful tool in science education, driving both academic growth and motivation when implemented strategically.

Moreover, this research highlights the effectiveness of Strategic Intervention Materials (SIM) in improving the scientific performance of Grade 11 students at a public school in Lanao del Norte. It offers recommendations to strengthen science education in the Philippines. School administrators are encouraged to formalize SIM development through training, allocate resources for cost-effective materials, and expand SIM application across disciplines. Science educators may streamline their guiding inquiries, contextualize material with practical applications, and collaborate with colleagues to foster ongoing improvement. Students may utilize SIMs for autonomous learning and provide feedback to enhance materials. At the same time, prospective researchers are encouraged to investigate the long-term effects of SIMs, evaluate their efficacy across different settings, and examine the role of electronic SIMs in digital learning contexts.

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