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Development and Validation of Strategic Intervention Material in Science-8

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ABSTRACT

This study focused on the development and validation of a Strategic Intervention Material (SIM) in Science 8 designed to enhance classroom instruction by improving learner engagement, comprehension, and motivation in scientific learning. Conducted at Pio Dalim Memorial School of Arts and Trades in Eva, Calanasan, Apayao during the school year 2024–2025, the research employed a developmental-evaluative design. The SIM was localized, curriculum-aligned, and pedagogically structured based on the competencies of the K to 12 Science curriculum. Its quality was assessed by teacher-experts in terms of content relevance, face validity, presentation and organization, and accuracy and currency of information. Findings revealed that the teacher-evaluators rated the SIM as very impactful across all dimensions, affirming its appropriateness, clarity, and alignment with learning standards. Minor recommendations were noted regarding typographical accuracy and print formatting. Learner feedback indicated a highly favorable attitude toward the SIM, citing increased interest, improved comprehension of difficult science concepts, greater motivation, and appreciation for its visual elements and clarity of content. However, some students identified challenges such as unfamiliar vocabulary and the need for clearer instructions.

Feedback on usability emphasized the need for further enhancements, including the provision of a teacher's guide, inclusion of performance-based tasks, and additional vocabulary support. Despite these technical and instructional recommendations, both teachers and students acknowledged the SIM's effectiveness as a supplementary resource in science instruction. The study concluded that, with minor refinements, the developed SIM held strong potential for broader application in junior high school science education.

Keywords: Strategic Intervention Material, Science Education, Instructional Design, Learner Engagement, Curriculum Development

1. INTRODUCTION

Science education had become a global priority as nations recognized its crucial role in driving innovation, technological progress, and sustainable development. Across the world, education systems shifted their focus toward strengthening Science curricula to equip learners with the knowledge and skills required to address modern challenges. In this context, the teaching of Science evolved from merely imparting theoretical knowledge to emphasizing critical thinking, problem-solving, and real-world applications. This shift reflected the growing realization that a scientifically literate population was essential for economic growth and social progress.

In the Philippines, the introduction of the K to 12 curriculum marked a significant milestone in Science education. Designed to align the country's education system with global standards, the curriculum aimed

to streamline Science courses through programs such as the STEM strand, highlighting the importance of Science, Technology, Engineering, and Mathematics. Despite these efforts, the country continued to face challenges in improving Science education outcomes. National and international assessments revealed persistent gaps in students' understanding and application of scientific concepts, emphasizing the need for innovative teaching approaches to complement government initiatives [1].

The challenges were starkly highlighted by the Philippines' performance in the Programme for International Student Assessment (PISA). In the 2018 PISA, the Philippines ranked 78th out of 79 countries in both Mathematics and Science, underscoring the urgent need to strengthen the teaching and learning of these subjects [2]. In PISA 2022, the situation did not improve significantly, with the country's average Science score dropping slightly from 356 to 355 [3]. These results illustrated the difficulties Filipino learners faced in mastering scientific competencies, despite curriculum reforms and government interventions. Addressing these gaps required not only systemic changes but also grassroots efforts by educators to implement classroom-based innovations.

Educators played a crucial role in bridging these learning gaps by employing tools and strategies that catered to the needs of individual learners. One such innovation was the development of Strategic Intervention Materials (SIMs), educational tools specifically designed to address least-mastered competencies and enhance students' engagement and understanding of complex topics. SIMs provided learners with supplementary resources that broke down challenging concepts into manageable and relatable parts, helping them grasp the material more effectively.

The development and use of Strategic Intervention Materials (SIMs) have been shown to significantly enhance student learning, as evidenced by various studies. Cabildo [4] highlighted the strong consistency in expert feedback regarding the content, pedagogy, and technical aspects of SIMs, demonstrating their suitability for student use. High agreement levels between teachers and students on the SIMs' effectiveness in terms of content, clarity, presentation, and relevance further underscored their positive impact on learning. Additionally, the Flesch reading score confirmed the materials' readability, ensuring accessibility for their intended grade level. Limbago [5] emphasized the importance of integrating SIMs into lesson plans and curriculum materials to maximize their impact, suggesting that they served as effective supplementary resources. Casinillo [6] further reinforced the role of teacher training in ensuring the successful implementation of SIMs, recommending continuous monitoring of student progress and adjustments to instructional strategies to address specific learning gaps.

At the local level, a needs assessment conducted by the researcher during the previous school year revealed that Grade 8 students at Pio Dalim Memorial School of Arts and Trades struggled with two key competencies: explaining how typhoons develop and how they are affected by landmasses and bodies of water (Quarter 2) and explaining physical changes in terms of the arrangement and motion of atoms and molecules (Quarter 3). These least-mastered competencies reflected broader challenges in Science education and served as the basis for the development of a Strategic Intervention Material tailored to address these specific topics.

Motivated by the desire to improve learners' academic performance and contribute to the broader goals of Science education in the Philippines, the researcher embarked on this study. The development and validation of the SIM aimed not only to address the learning gaps identified in the local context but also to serve as a small yet meaningful step in addressing the national challenges in Science education. While individual efforts like this may have seemed minor, their cumulative impact over time had the potential to transform the educational landscape, fostering a generation of scientifically literate and empowered

individuals.

The present study focused on the development and validation of a Strategic Intervention Material (SIM) specifically designed for Grade 8 Science learners at Pio Dalim Memorial School of Arts and Trades during the school year 2024–2025. Grounded in the results of a needs assessment conducted by the researcher, the study targeted two least-mastered competencies: explaining how typhoons develop and how they are affected by landmasses and bodies of water, and explaining physical changes in terms of the arrangement and motion of atoms and molecules.

The study aimed to address these learning gaps by creating a resource that enhanced student engagement, comprehension, and performance. The SIM was evaluated by teacher-evaluators for content, face validity, presentation and organization, and the accuracy and up-to-datedness of information. Furthermore, the attitudes of Grade 8 learners toward the developed SIM were examined to determine its usability and effectiveness in facilitating meaningful learning experiences.

Statement of the Problem

This study aimed to develop and validate a Strategic Intervention Material (SIM) for Science-8 to enhance the teaching and learning process. The study was conducted at Pio Dalim Memorial School of Arts and Trades, located in Eva, Calanasan, Apayao, Upper Calanasan District, during the school year 2024–2025. Specifically, it sought to address the following questions:

1. How do the teacher-evaluators assess the developed SIM in Science 8 in terms of the following criteria?
- Content Face validity
- Presentation and organization
- Accuracy and up-to-dateness of information
2. What is the attitude of the Grade 8 learners towards the developed SIM in terms of:
- Interest and engagement
- Perceived usefulness
- Clarity and comprehensibility
- Motivation to learn
3. What are the teachers' and students' feedback on the usability of the Strategic Intervention Material (SIM) in teaching Science 8 topics?

Theoretical and Conceptual Framework

This study was anchored on Lev Vygotsky’s theory of scaffolding, which emphasized the role of support systems in the learning process. According to Vygotsky, learners depended on assistance from teachers, peers, or instructional tools to accomplish tasks that were beyond their independent capabilities. Scaffolding involved providing appropriate guidance and resources to help students bridge the gap between their current level of understanding and their learning goals [7].

Scaffolding encompassed various forms of support, including verbal instructions, visual aids, and interactive activities, which simplified complex concepts and enhanced learners' comprehension. These supports were gradually reduced as learners gained confidence and mastery over the material. In the context of Strategic Intervention Materials (SIMs), scaffolding was operationalized through carefully designed resources that combined text, images, and interactive elements to facilitate student understanding.

The theory of scaffolding was highly applicable to Science education because it addressed the challenges students faced when learning abstract and complex concepts. Science often involved understanding processes, principles, and phenomena that were not directly observable, such as the development of typhoons or the molecular changes in matter. Scaffolding provided structured support to help learners navigate these difficulties, breaking down complex topics into simpler, more digestible components.

In the present study, scaffolding was embedded in the development of the Strategic Intervention Material (SIM) for Grade 8 Science. The SIM integrated visual aids, step-by-step explanations, and interactive elements that aligned with Vygotsky's idea of providing comprehensible input to learners. This approach ensured that students were guided as they progressed toward mastering competencies that would otherwise be difficult to achieve independently. Scaffolding within the SIM also facilitated engagement and active participation, enabling students to build confidence and eventually work on these concepts autonomously. The use of scaffolding in the present study highlighted its relevance in addressing the specific learning gaps identified in the needs assessment, making it an effective theoretical foundation for the development of instructional materials in Science education.

Figure 1. Research Paradigm

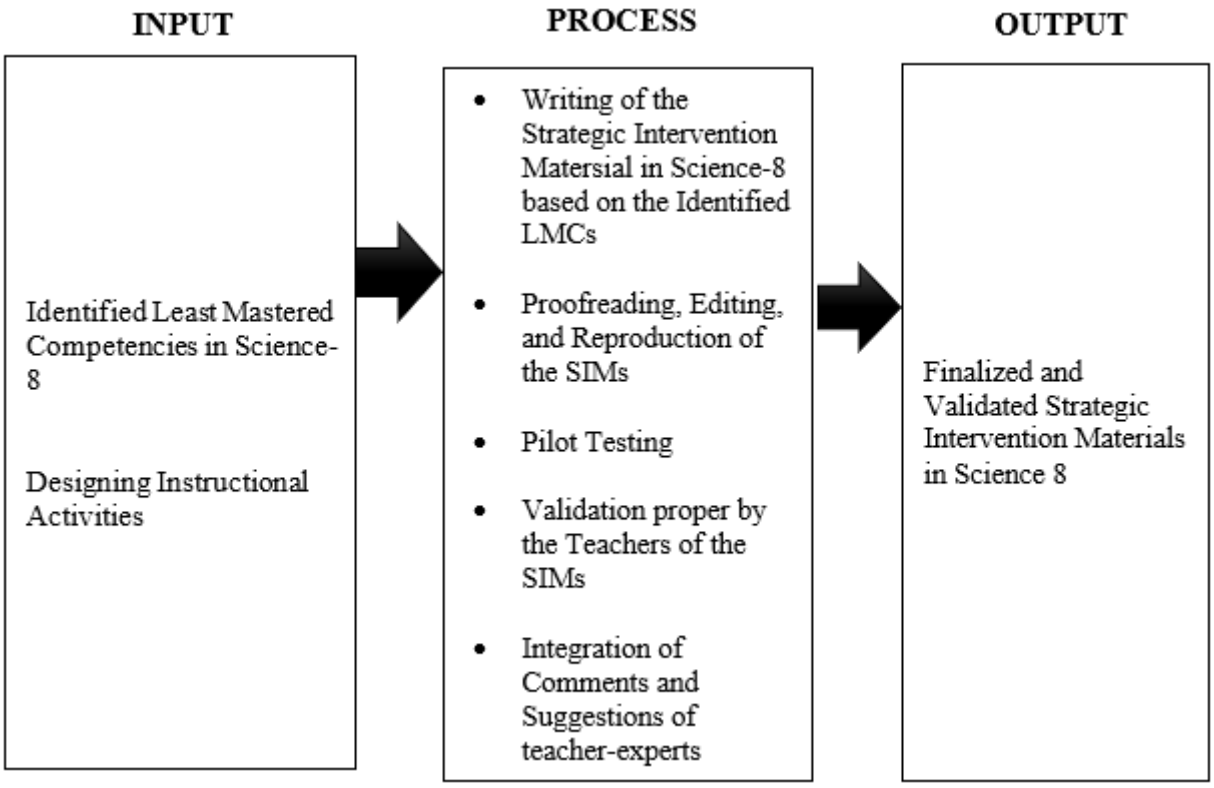

Figure 1 illustrated the conceptual framework of the study, structured using the Input-Process-Output (IPO) model. The input consisted of the identified least-mastered competencies (LMCs) in Science 8, which served as the foundation for developing focused instructional materials. These competencies were determined through a needs assessment conducted by the researcher, highlighting specific areas where learners required additional support to enhance their understanding and performance.

The process encompassed a series of systematic steps to create, refine, and validate the Strategic Intervention Materials (SIMs). Initially, instructional activities were designed based on the identified LMCs to ensure that the content aligned with curriculum standards and addressed learners' specific needs.

This was followed by the writing of the SIMs, incorporating scaffolding strategies to provide structured and comprehensive support for students. After drafting, the materials underwent proofreading and editing to ensure clarity, accuracy, and quality before being reproduced for evaluation.

Pilot testing involved assessing the usability and effectiveness of the SIMs in real classroom settings. Feedback from teacher-experts and student participants was collected, offering constructive observations regarding the materials' strengths and areas for improvement. Revisions were made to incorporate comments and suggestions, further enhancing the overall quality of the SIMs. The materials then underwent a formal validation process, ensuring their effectiveness and alignment with educational standards.

The output of this comprehensive process was a finalized and validated set of Strategic Intervention Materials for Science 8. These materials aimed to address the identified LMCs, support student learning, and contribute to the overall improvement of Science education outcomes. This framework demonstrated a clear and methodical approach to developing instructional tools tailored to the needs of teachers and learners.

4. METHODOLOGY

This presented the research methods and procedures utilized in the study. It included the research design, locale of the study, respondents of the study, research instrument, data gathering procedure, and statistical treatment of data.

Research Design

This study employed a descriptive-evaluative research design, as described by Cliff [8], which involved a systematic approach to the design, development, and evaluation of instructional programs. The focus of this design was on creating materials that were both reliable and valid, ensuring their suitability for addressing specific educational needs. In this research, the descriptive-evaluative framework was applied to the development and validation of Strategic Intervention Materials (SIMs) for Science 8. These SIMs were designed to address the least-mastered competencies (LMCs) identified through a needs assessment. The study was divided into three key stages: preparation, development, and validation. The **preparation stage** involved identifying the specific competencies in Science 8 that learners struggled to master. Through a comprehensive needs assessment conducted in the previous school year, the researcher pinpointed two areas of difficulty: explaining how typhoons develop and how they are affected by landmasses and bodies of water, and understanding physical changes in terms of the arrangement and motion of atoms and molecules. This stage also included gathering relevant resources, designing instructional activities, and planning the structure of the SIMs to address these competencies effectively.

The **development stage** focused on creating the SIMs based on the identified needs. This process involved writing the instructional materials, ensuring that they incorporated scaffolding principles to guide learners through challenging concepts. The materials included visual aids, interactive elements, and structured explanations to make the content comprehensible and engaging for students. Once the initial drafts were completed, the SIMs underwent proofreading and editing to ensure clarity, accuracy, and alignment with curriculum standards. The materials were then reproduced and prepared for pilot testing.

The **validation stage** involved the evaluation and refinement of the SIMs. The materials were tested in real classroom settings to assess their usability and effectiveness in addressing the targeted competencies. Feedback was gathered from teacher-experts and learners, providing critical observations on content accuracy, clarity, presentation, and relevance. This feedback was analyzed and used to refine the SIMs,

integrating constructive suggestions to improve their quality. Finally, the revised SIMs were subjected to a formal validation process by teacher-evaluators, who assessed them against criteria for reliability and validity.

Through this descriptive-evaluative research design, the study ensured a systematic and comprehensive approach to developing and validating instructional materials. The design allowed for the creation of high-quality SIMs tailored to the specific needs of learners, contributing to the enhancement of Science education

outcomes.

Locale of the Study

The locale of this study was Pio Dalim Memorial School of Arts and Trades, located in Eva, Calanasan, Apayao, within the Upper Calanasan District. This educational institution played a vital role in the region, catering to learners from diverse backgrounds and providing both academic and technical training. It served as a significant center for fostering the development of students' cognitive and practical skills, preparing them for various future endeavors.

Grade 8 learners, the focus of this study, were at a critical stage in their educational journey, where they began to tackle more complex scientific concepts. This made the school an ideal setting for the development and validation of Strategic Intervention Materials (SIMs) designed to address least-mastered competencies in Science. The learners represented a diverse mix of socioeconomic backgrounds, reflecting the broader community dynamics, which offered a meaningful context for examining the effectiveness of instructional interventions.

Being situated in a rural area, the school faced unique challenges, such as limited access to advanced educational resources, alongside opportunities to ground learning in real-world, community-relevant issues. The socio-economic profile of the community, predominantly centered around agriculture, underscored the importance of enhancing scientific literacy among students, particularly in areas like environmental science and sustainability. These skills were critical for equipping learners to engage with and address pressing local issues, such as disaster preparedness and resource management.

Preliminary observations by teachers and the researcher revealed varying levels of scientific understanding among the learners. While some students demonstrated an eagerness to engage with scientific topics and local issues, others struggled due to gaps in foundational knowledge. This variability highlighted the need for targeted instructional materials like SIMs to bridge these gaps and enhance learning outcomes.

The findings of this study were expected to benefit the school community by informing teaching practices and improving the academic performance of Grade 8 students in Science. The research also aimed to contribute to the broader educational goals of fostering critical thinking, scientific literacy, and practical problem-solving skills among learners, ensuring they were well-prepared to contribute meaningfully to their community and society.

Respondents of the Study

The respondents of this study included two distinct groups: the teacher-evaluators and Grade 8 learners of Pio Dalim Memorial School of Arts and Trades. There were 1 Master teacher and 4 teachers; the teacher-evaluators played a critical role in the validation process of the developed Strategic Intervention Materials (SIMs). They assessed the SIMs based on specific criteria, including content, face validity, presentation and organization, and the accuracy and up-to-datedness of information. Their expertise and feedback ensured the instructional materials met the required standards of quality and effectiveness.

Additionally, fifty Grade 8 learners participated in assessing their attitudes toward the developed and

validated SIM. This group represented a significant portion of the target audience for the instructional materials, providing valuable insights into the usability, relevance, and overall appeal of the SIM. The perspectives of these learners helped determine the practicality of the materials in a real classroom setting and their potential impact on learning outcomes. Together, these two respondent groups provided comprehensive evaluations that guided the refinement and finalization of the SIM for Science 8.

Research Instruments

The instruments used in this research were designed to effectively gather data on the impact of the Strategic
Intervention Materials (SIM) in Science 8 and assess their effectiveness in enhancing student engagement, understanding, and motivation. Two main instruments were employed: the **Department of Education (DepEd) Evaluation Rating Sheet for Print Resources** (Appendix B) and the **Instrument on the Attitudes of Grade 8 Learners towards the SIM** (Appendix C). These instruments were aligned with the study's objective of evaluating the developed SIMs for their content, clarity, relevance, and overall effectiveness in improving students' scientific literacy.

DepEd Evaluation Rating Sheet for Print Resources (Appendix B):

This evaluation sheet was specifically designed to assess the quality of print resources, in this case, the SIMs. It included multiple criteria covering several essential aspects:

- **Content**: This section focused on evaluating whether the SIM aligned with the educational goals of the Science 8 curriculum, enhanced higher-order thinking skills, and addressed critical values such as scientific reasoning and problem-solving.
- **Face Validity**: This dimension evaluated the presentation quality of the SIM, including print quality, layout, and design features such as font legibility and the relevance of illustrations.
- **Presentation and Organization**: The instrument assessed how well the SIM was organized, whether the information flowed logically, and if the language and vocabulary were accessible to the target learners.
- **Accuracy and Up-to-Datedness of Information**: It evaluated whether the SIM was free from factual, grammatical, or conceptual errors and ensured that the information was current and accurate.

These evaluation criteria helped ensure that the SIMs were effective, accessible, and aligned with the educational needs and cognitive levels of Grade 8 students.

2. Instrument on the Attitudes of Grade 8 Learners towards the SIM (Appendix C):

The second instrument was survey designed to capture the learners' attitudes and experiences with the SIM. The instrument assessed four key dimensions of student engagement and learning:

- **Interest and Engagement**: This section evaluated whether the SIM made Science 8 more engaging and if students found the activities in the SIM interactive and motivating.
- **Perceived Usefulness**: It measured the extent to which students found the SIM useful in understanding complex concepts, improving their learning, and helping them with difficult topics.
- **Clarity and Comprehensibility**: This dimension checked whether the students could easily understand the instructions and explanations in the SIM and whether the text and visuals effectively aided comprehension.
- **Motivation to Learn**: This section assessed if the SIM motivated students to study Science 8 more actively, encouraged them to tackle challenging topics, and inspired further learning beyond the

classroom.

Each statement was rated on a Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree), allowing the researcher to capture nuanced responses that reflected students' attitudes toward the SIM in a comprehensive manner.

These two instruments were vital for obtaining both qualitative and quantitative data that provided a comprehensive assessment of the SIMs' effectiveness in improving students' learning experiences and scientific literacy. The results from these instruments helped refine the SIMs, ensuring they were both pedagogically sound and student-centered.

Data Gathering Procedure

After the research proposal, the researcher obtained permissions from the Schools Division Superintendent of Apayao through the appropriate channels, ensuring adherence to institutional protocols for conducting research within the schools. Upon receiving approval, coordination with the administration of Pio Dalim Memorial School of Arts and Trades was established to schedule a suitable time for data collection. The data gathering process began with informing Grade 8 students about the study and its objectives, emphasizing the importance of their participation. Parents or guardians were also notified and asked to provide consent for their children's involvement in the research.

Preparation of the SIMs through Designing Instructional Activities

The preparation of the Strategic Intervention Materials (SIMs) began with a thorough analysis of the **Least Mastered Competencies (LMCs)** in Science 8. These were the topics or areas where students had shown the most difficulty or lack of mastery in previous assessments or feedback. The researcher, in consultation with Science teachers, identified these LMCs by reviewing the results of prior tests, student performance data, and teacher observations. The aim was to ensure that the SIMs focused on the competencies that required additional attention, providing the students with the targeted support they needed to improve their understanding and performance.

Once the LMCs were identified, the researcher proceeded to the **designing of instructional activities** specifically tailored to address these areas of difficulty. This phase involved:

- **Creating engaging and interactive activities** that aligned with the Science 8 curriculum and targeted the identified LMCs.
- **Selecting appropriate teaching strategies** that promoted active learning, problem-solving, and critical thinking.
- **Incorporating multimedia elements** such as images, diagrams, and short explanations to enhanced the clarity of the material, making it easier for students to grasp complex scientific concepts.
- Ensuring that the activities were **interactive and varied**, encouraging students to engaged with the material in different ways, whether through group discussions, hands-on experiments, or self-paced tasks.

This process ensured that the SIMs were designed with the specific learning needs of the students in mind, offering a focused and structured approach to mastering the most challenging competencies.

Writing of the Strategic Intervention Material (SIM) in Science-8 based on the Identified LMCs

After designing the instructional activities, the researcher began the **writing of the SIMs.** This step involved drafting the content based on the LMCs and the designed activities. The SIMs were written in a

clear, concise, and student-friendly manner, ensuring that the language used was appropriate for Grade 8 learners. The written materials included:

responses from both the teachers and students were analyzed using appropriate statistical methods. The teacher evaluations were analyzed quantitatively by calculating mean ratings for each criterion, providing an overview of the quality and relevance of the SIMs. The student surveys were similarly analyzed, focusing on the mean scores for each dimension (interest and engagement, perceived usefulness, clarity and comprehensibility, and motivation to learn). These analyses allowed the researcher to assess the overall effectiveness of the SIMs and identify areas for improvement.

Ethical Considerations

This study adhered to strict ethical standards, emphasizing informed consent, confidentiality, and the well-being of all participants. Since the research involved minors, both Grade 8 learners and their parents or guardians provided informed consent prior to participation. This consent process included a comprehensive explanation of the study's purpose, procedures, potential risks, and expected benefits, ensuring that participants and their guardians fully understood that involvement in the study was entirely voluntary. Participants and guardians were also informed of their right to withdraw from the study at any time without facing any consequences.

Confidentiality and anonymity were critical components of this research. Data collected on learners' attitudes toward the Strategic Intervention Materials (SIMs) were anonymized to protect their identities. Identifiable information was accessible only to the researcher and securely stored to prevent unauthorized access. Upon the study's conclusion, all identifiable data was securely disposed of, adhering to established data protection standards.

Furthermore, the study prioritized the psychological well-being of participants by ensuring that the research process was conducted in a sensitive and respectful manner. The study was designed to pose minimal risk, but any procedures or questions that might cause discomfort were managed with care. The researcher monitored participants' responses closely and provided support or made adjustments as necessary to foster a safe and comfortable environment throughout the study. This commitment to ethical practices underscored the study's dedication to respecting and protecting its participants.

Statistical Treatment of Data

This study utilized descriptive statistics to analyze the data collected from teacher-experts and Grade 8 learners regarding the developed Strategic Intervention Materials (SIMs) in Science 8. Descriptive statistics, including weighted mean and frequency distribution, were employed to summarize the evaluations and feedback provided by the respondents.

The weighted mean was specifically used to compute the average ratings of teacher-experts on the validity and effectiveness of the SIMs, as well as the attitudes of the learners toward the instructional material.

To interpret the results, a five-point Likert scale was used for both the teacher-experts' assessments and the learners' attitudes. For the teacher-experts' evaluation of the SIMs, the following scale was applied:

Scale	Statistical Limits	Descriptive Value
5	4.20 – 5.00	Very Satisfactory
4	3.40 – 4.19	Satisfactory
3	2.60 – 3.39	Moderately Satisfactory

2	1.80 – 2.59	Poor
1	1.00 -1.79	Not Satisfactory

For the learners' attitudes toward the SIMs, the following Likert scale was employed:

Scale	Statistical Limits	Descriptive Value
5	4.20 – 5.00	Strongly Agree
4	3.40 – 4.19	Agree
3	2.60 – 3.34	Undecided
2	1.80 – 2.59	Disagree
1	1.00 – 1.79	Strongly Disagree

These Likert scales allowed the researcher to interpret the levels of satisfaction of the teacher-experts and the extent of agreement of the learners with regard to the features, clarity, usefulness, and motivational value of the SIMs.

5. RESULTS AND INTERPRETATION OF DATA

Teachers' Assessment of the Developed SIM in Science 8

Table 1. Mean and Descriptive Value of Teachers' Assessment of the developed Strategic Intervention Material in Science 8

criteria	Mean	Descriptive Value
Content	4.54	Very Satisfactory
Face validity	4.60	Very Satisfactory
Presentation and Organization	5.0	Very Satisfactory
Accuracy and Up-to-datedness of Information	4.73	Very Satisfactory
Over All Mean	**4.71**	**Very Satisfactory**

Table 1 presented the results of the teachers' assessment of the developed Strategic Intervention Material (SIM) in Science 8, evaluated across four key quality indicators: content, face validity, presentation and organization, and accuracy and up-to-dateness of information. Each component received a "Very Satisfactory" descriptive value, with an overall weighted mean of 4.71, signifying a high level of approval among the teacher-evaluators.

The content of the SIM obtained a mean score of 4.54, indicating that the instructional material was highly relevant, appropriate to the learners' developmental stage, and aligned with the learning competencies of the K to 12 Science curriculum. This finding was supported by Almeida, Costa, and Ferreira (2019), who emphasized that well-designed instructional materials reflecting curriculum standards significantly

improved student understanding and engagement in STEM education. Their study highlighted that content relevance and curricular alignment were essential for instructional efficacy in science classrooms.

For face validity, a mean score of 4.60 was recorded, suggesting that the SIM was perceived as visually appealing, well-structured, and accessible to learners. This finding aligned with the work of Mahr, Schmid, and Müller (2020), who found that instructional materials with high visual quality and user-friendly design elements contributed to increased learner engagement and satisfaction. Their meta-analysis concluded that the aesthetic and structural components of materials directly influenced students' motivation to engage with academic content, particularly in the sciences.

The presentation and organization of the SIM received a perfect mean score of 5.00, the highest among the four criteria. This result underscored the effectiveness of the SIM's logical flow, sequencing of information, and instructional clarity. According to O'Leary, Sandoval, and Papageorgiou (2020), clearly structured and well-organized instructional materials enabled better information retention and supported differentiated instruction, especially when designed to scaffold complex scientific concepts.

The accuracy and up-to-datedness of the information received a mean rating of 4.73, confirming that the content of the SIM was factually correct and aligned with current scientific knowledge. This aspect is particularly crucial in science education, where the precision of instructional content directly affects learners' conceptual understanding. The OECD (2019) emphasized that the use of outdated or inaccurate materials can undermine scientific literacy and erode students' trust in educational resources. Therefore, this high rating affirms that the SIM met contemporary standards for credibility and accuracy in instructional design.

The overall mean rating of 4.71, interpreted as "Very Satisfactory," confirms that the developed SIM is of high instructional quality and meets the pedagogical standards expected by science educators. This rating demonstrates that the material is not only aligned with the curriculum but is also pedagogically sound, visually engaging, and scientifically accurate making it a viable supplementary resource for enhancing classroom instruction in Science 8.

Attitude of the Grade 8 Learners towards the developed SIM

Table 2. Mean and Descriptive Value of the Attitude of the Grade 8 Learners towards the developed SIM

criteria	**Mean**	**Descriptive Value**
Interest and Engagement	4.77	Strongly Agree
Perceived Usefulness	4.86	Strongly Agree
Clarity and Comprehensibility	4.79	Strongly Agree
Motivation to Learn	4.84	Strongly Agree
Over All Mean	**4.81**	Strongly Agree

Table 2 presented the assessment of Grade 8 learners regarding their attitudes toward the developed Strategic Intervention Material (SIM) in Science 8, evaluated across four key dimensions: interest and

engagement, perceived usefulness, clarity and comprehensibility, and motivation to learn. The results revealed consistently high scores across all criteria, with descriptive values interpreted as "Strongly Agree," and an overall weighted mean of 4.81, indicating a highly positive reception of the material among learners.

The criterion "Interest and Engagement" obtained a mean score of 4.77, suggesting that the SIM successfully captured the learners' attention and stimulated their curiosity in science topics. This supported the findings of **O'Leary, Sandoval, and Papageorgiou (2020),** who emphasized that interactive and student-centered instructional materials significantly enhanced learner engagement and participation, particularly in science and mathematics subjects. Their study found that students were more likely to persist in learning when the materials used were relatable, visually rich, and cognitively stimulating.

The highest rating was given to "Perceived Usefulness," with a mean of 4.86, indicating that students found the SIM highly relevant and beneficial in improving their understanding of scientific concepts. This aligned with **Almeida, Costa, and Ferreira (2019),** who demonstrated that students who perceived instructional materials as useful were more likely to demonstrate improved academic performance and retention. Perceived usefulness was a key factor in determining instructional effectiveness, especially for learners who often struggled with abstract or content-heavy subjects like science.

"Clarity and Comprehensibility" received a mean of 4.79, affirming that the learners found the SIM's instructions, explanations, and structure easy to follow. According to **Mahr, Schmid, and Müller (2020),** materials that were clear and logically organized supported learners' independent study habits and reduced cognitive overload, making science content more accessible even for struggling learners. The presence of visual aids and structured learning tasks further contributed to the comprehensibility of educational resources.

The criterion "Motivation to Learn" was rated at 4.84, showing that the SIM was effective in encouraging learners to actively participate and sustain interest in exploring scientific concepts beyond classroom discussions. This finding was reinforced by **Poth (2024),** who highlighted that modern student were more motivated to learn when instructional materials incorporated elements of interactivity, visual design, and real-world application. Motivation, as a core aspect of affective learning, was influenced by how students emotionally connected with the content and delivery of learning materials.

The overall mean of 4.81, interpreted as "Strongly Agree," confirmed that the developed SIM fostered a positive attitude among Grade 8 learners. This suggested that the SIM not only achieved its instructional goals but also met affective objectives by nurturing students' confidence, interest, and engagement in learning science.

Feedback of Teachers and Learners on the Usability of the SIM in Teaching Science 8 Topics

Teachers' Feedback on the Usability of the SIM in Teaching Science 8 Topics

Table 3.a. Teachers' Feedback on the Usability of the SIM in Teaching Science 8 Topics

Feedback of Teachers on the Usability of the SIM in Teaching Science 8 Topics	Frequency	Rank
Suggestion to include a teacher's guide or answer key	4	1
Lack of performance-based tasks or experiments	3	2
Printing quality needs improvement (clarity, alignment, ink consistency)	2	3.5

Typographical and other minor errors (e.g., unclear visuals, missing labels, wrong captions)	2	3.5

Table 3.a outlined the feedback from teacher-evaluators regarding the usability of the developed Strategic Intervention Material in Science 8. The most frequently cited concern, mentioned by three out of four teachers, was the suggestion to include a teacher's guide or answer key. This reflected the need for instructional support tools that could assist in facilitating classroom implementation, ensure accurate checking of student work, and streamline teacher preparation. **Bautista and Rocero (2018)** noted that instructional efficiency was improved when materials were accompanied by clear teacher references, as these enhanced planning, consistency in delivery, and learner assessment [25].

Two teachers identified the absence of performance-based tasks or experiments as a limitation. This feedback suggested that while the SIM was effective in presenting conceptual content, it would have benefited from additional hands-on or inquiry-based components. **Garcia and Mendoza (2019)** emphasized the role of experiential learning in science, noting that students developed deeper understanding and stronger analytical skills when materials were complemented by practical applications and investigative tasks [26].

Another concern, also mentioned by two teachers, was the quality of printing, particularly in terms of letter clarity, uniformity of ink, and alignment. While these were technical aspects, they had a direct impact on the readability and overall professional appearance of the material. As **Dalton and Proctor (2008)** argued, visual precision in instructional materials was critical, especially when learners depended on diagrams, labels, and structured layouts for content comprehension [28].

Finally, two teachers highlighted the presence of typographical and other minor errors, which included unclear illustrations, missing labels, and incorrect captions. Although these issues did not detract significantly from the content's academic value, they might have created confusion or disrupted learners' focus. **Delos Reyes (2019)** observed that such minor oversights, when accumulated, could affect learners' perception of the material's credibility and might hinder seamless knowledge acquisition [21].

Overall, the teachers' feedback offered a valuable lens for improving the SIM. Their suggestions emphasized the importance of instructional support, content application, visual clarity, and editorial accuracy. Addressing these areas enhanced the material's usability and ensured its alignment with best practices in science instruction.

Learners' Feedback on the Usability of the SIM in Teaching Science 8 Topics

Table 3.b. Learners' Feedback on the Usability of the SIM in Teaching Science 8 Topics

Feedback of Teachers on the Usability of the SIM in Teaching Science 8 Topics	Frequency	Rank
Some instructions were hard to understand without teacher assistance	17	1
Some science terms were difficult to understand	14	2
Font size and layout were a bit crowded in certain parts	10	3

Table 3.b ranked the most common usability issues encountered by the twenty-five learners. The most frequently mentioned concern, identified by seventeen learners, was that some instructions were hard to understand without teacher assistance. This suggested that while the SIM encouraged learner

independence, the complexity of certain directions may have required simplification. In line with this, the study of **Clark and Mayer (2016)** emphasized the importance of instructional clarity in educational materials, noting that simplified instructions with clear step-by-step guidance helped reduce cognitive overload and allowed students to concentrate on learning rather than decoding directions [28].

The second concern, reported by fourteen learners, was that some science terms were difficult to understand. This highlighted the cognitive challenge of mastering subject-specific vocabulary. The research of **Fang (2006)** supported this, explaining that science texts often contained dense terminology that could hinder comprehension if not accompanied by definitions, visuals, or contextual examples. The integration of glossaries or embedded word supports would have helped bridge this gap and reinforced conceptual understanding [29].

The third most mentioned issue, shared by ten learners, was that the font size and layout were crowded in some parts of the SIM. This feedback drew attention to the importance of visual ergonomics in instructional design. According to the study by **Dalton and Proctor (2008),** the physical layout of learning materials directly impacted readability and learner focus. Poor spacing and small fonts could have led to visual fatigue and decreased the time learners could comfortably engage with content, especially in reading-intensive subjects like science [28].

In summary, both teacher and learner feedback suggested that the developed SIM in Science 8 was largely effective but would have benefited from enhancements in instructional differentiation, vocabulary support, and design presentation. These findings were aligned with established literature, reinforcing the idea that effective instructional materials are those that balance academic rigor with accessibility, usability, and learner support mechanisms.

Teachers Evaluation Rating on the Developed Sim in Science 8 in terms of Content

A. Content

Table 4. Mean and Descriptive Value of Teachers Evaluation Rating on the Developed Sim in Science 8 in terms of Content

Content	Mean	Descriptive Value
a. Content is suitable to student's level of development.	5.0	Very Satisfactory
d. Material contributes to the achievement of specific objectives of the subject area and grade/year level for which it is intended.	5.0	Very Satisfactory
c. Material provides for the development of higher cognitive skills such as critical thinking, creativity, learning by doing, inquiry, problem solving, etc.	5.0	Very Satisfactory
d. Material is free of ideological, cultural, religious, racial, and gender biases and prejudices.	5.0	Very Satisfactory
e. Material enhances the development of desirable values and traits such as:		Very Satisfactory
e.1 Pride in being a Filipino	5.0	Very Satisfactory
e.2 Scientific attitude and reasoning	5.0	Very Satisfactory

e.3 Desire for excellence	5.0	Very Satisfactory
e.4 Love for country	5.0	Very Satisfactory
e.5 Helpfulness/ teamwork/ cooperation	5.0	Very Satisfactory
e.6 Unity	5.0	Very Satisfactory
e.7 Desire to learn new things	5.0	Very Satisfactory
e.8 Honesty and trustworthiness	3.4	Satisfactory
e.9 Ability to know right from wrong	5.0	Very Satisfactory
e.10 Respect	5.0	Very Satisfactory
e.11 Critical and creative thinking	5.0	Very Satisfactory
e.12 Productive work	5.0	Very Satisfactory
f. Material arouses interest of target reader.	5.0	Very Satisfactory
g. Adequate warning/cautionary notes are provided in topics and activities where safety and health are concern.	3.4	Satisfactory
Overall Mean	**4.54**	**Very Satisfactory**

Table 4 presented the data on the evaluation of the developed Strategic Intervention Material (SIM) in Science 8, as assessed by teacher-respondents based on content-related criteria. The SIM received an overall weighted mean of 4.54, corresponding to a descriptive value of "Very Satisfactory." This reflected a high degree of perceived relevance, appropriateness, and pedagogical soundness of the material in addressing the instructional needs of Grade 8 learners.

Notably, the highest ratings (5.0) were recorded across key indicators, including: the suitability of content to students' developmental level, alignment with curriculum objectives, and the SIM's capacity to promote higher-order thinking skills such as critical thinking, inquiry, and problem-solving. These findings underscored the SIM's strong alignment with the **Department of Education's K to 12 Science Curriculum Guide**, which emphasized learner-centered, inquiry-based instruction to develop scientific literacy and 21st-century competencies.

This result affirmed the findings of **Reyes and Bautista (2020),** who emphasized that instructional materials designed with explicit cognitive and affective targets tended to be more effective in promoting both academic achievement and values formation. They concluded that localized and context-based instructional resources, when strategically aligned with curriculum standards, enhanced student engagement and moral development [8].

In addition, **Pascual, Napao, and Mendoza (2021)** supported the notion that high-quality SIMs not only fostered conceptual understanding but also cultivated scientific attitudes and positive values when values

were interwoven into learning experiences [9]. Their research on values-infused science modules revealed improved learner participation and the emergence of ethical behaviors in classroom discourse.

The SIM was likewise rated 5.0 in terms of freedom from ideological, cultural, religious, racial, and gender biases, reflecting its inclusiveness and sensitivity to diversity, as advocated in the study of **Dungo and Cabansag (2019),** who emphasized that culturally responsive materials empowered learners and contributed to a more equitable learning environment [10].

Another strength of the SIM lay in its support for values integration. Indicators such as "pride in being a Filipino, scientific reasoning, desire for excellence, love for country, and productivity" all received perfect scores (5.0), suggesting that the material effectively cultivated national identity and learner disposition toward lifelong learning. This confirmed the findings of **Garcia and Francisco (2022),** who asserted that values-based instruction in science deepened learner reflection and reinforced the social dimension of scientific inquiry [11].

However, two specific indicators received relatively lower scores, such as "honesty and trustworthiness" and "provision of adequate cautionary notes in topics involving safety and health," both rated at 3.4 ("Agree"). This result indicated that while these dimensions were present, they were less emphasized compared to others. Future versions of the SIM may have benefited from embedding more explicit scenarios and reflective tasks that reinforced ethical behavior and safety consciousness, as also recommended by **Lazo (2020)** in her study on integrating risk and safety education in science materials [12].

The findings confirmed that the developed SIM was academically sound, values-oriented, and inclusive, with minor areas identified for further refinement.

B. Face Validity

A. Prints

Table 5. Mean and Descriptive Value of Teachers Evaluation Rating on the Developed Sim in Science 8 in terms of Prints under Face Validity

Prints	**Mean**	**Descriptive Value**
a.1 Size of letters is appropriate to the intended user	5.0	Very Satisfactory
a.2 Spaces between letters and words facilitate reading	5.0	Very Satisfactory
a.3 Font is easy to read	5.0	Very Satisfactory
a.4 Printing is of good quality (i.e., no broken letters, even density, correct alignment, properly placed screen registration.	3.4	Satisfactory
Over All Mean	**4.60**	**Very Satisfactory**

Table 5 presented the results of the evaluation of the developed Strategic Intervention Material (SIM) in Science 8 in terms of its print features, as assessed by teacher-respondents. The SIM received an overall weighted mean of 4.60, which corresponded to the descriptive value "Very Satisfactory." This high rating indicated that the SIM's typographical design was perceived to be highly appropriate and accessible for the intended learners, particularly junior high school students.

Specifically, the indicators "Size of letters was appropriate to the intended user," "Spaces between letters and words facilitated reading," and "Font was easy to read" each received a perfect mean score of 5.0. These findings suggested that the visual and typographical elements of the SIM were effectively designed to promote readability, reduce cognitive load, and facilitate comprehension. Such outcomes aligned with the findings of **Domingo and Reyes (2018),** who emphasized that the visual quality of instructional materials played a critical role in enhancing learners' motivation and understanding. They concluded that appropriate font selection, sizing, and spacing could significantly contribute to a more engaging and less intimidating learning environment, especially in science instruction [13].

However, the criterion "Printing was of good quality" obtained a relatively lower mean score of 3.4, which corresponded to the descriptive value "Agree." Although still satisfactory, this score indicated that some respondents observed minor issues in the physical reproduction of the material, such as uneven print density, slight misalignment, or blurred text. These concerns pointed to the need for improvement in the quality assurance process during the printing or photocopying of the SIM. **Carreon and Ubaldo (2019)** supported this observation, noting that inconsistencies in print quality could distract learners and might affect their willingness to engage with supplementary materials. They recommended that institutions adopt minimum print quality standards for instructional materials, especially when these were intended for widespread classroom use [14].

The findings were further reinforced by the study of **Estrella and Mendoza (2020),** who argued that the face validity of instructional materials was not merely a matter of visual aesthetics but was integral to learner engagement and comprehension [15]. Their research showed that materials with clear, legible, and well-aligned print were more likely to sustain learners' interest and support effective content delivery. Based on the evaluation results and the literature reviewed, it was recommended that future iterations of the SIM ensure consistent, high-quality printing, particularly when scaled for broader implementation. This would help preserve the integrity of the content and optimize its usability in diverse classroom contexts.

B. Illustrations

Table 6. Mean and Descriptive Value of Teachers Evaluation Rating on the Developed Sim in Science 8 in terms of Illustrations under Face Validity

Illustrations	**Mean**	**Descriptive Value**
b.1 Simple and easily recognizable	5.0	Very Satisfactory
b.2 Clarify and supplement the text	5.0	Very Satisfactory
b.3 Properly labeled or captioned (if applicable)	5.0	Very Satisfactory
b.4 Realistic/ appropriate colors	5.0	Very Satisfactory
b.5 Attractive and appealing	5.0	Very Satisfactory
b.6 Culturally relevant	5.0	Very Satisfactory

Over All Mean	**5.0**	**Very Satisfactory**

Table 6 presented the teacher-evaluators' assessment of the illustrations used in the developed Strategic Intervention Material (SIM) in Science 8. The results showed a perfect overall mean of 5.0, corresponding to the descriptive value "Very Satisfactory" across all six indicators. This indicated that the illustrations were considered highly appropriate, effective, and supportive of the instructional content.

The illustrations were rated as simple and easily recognizable, which suggested that learners were likely to interpret them correctly without confusion. Respondents strongly agreed that the visuals were able to clarify and supplement the accompanying text, thereby supporting comprehension and retention of scientific concepts. They also affirmed that the illustrations were properly labeled or captioned where applicable, a feature that contributed to scientific accuracy and instructional clarity.

Furthermore, the use of realistic and appropriate colors enhanced the visual appeal of the SIM while maintaining content accuracy. The illustrations were also described as attractive, engaging, and culturally relevant, suggesting that they were accessible to the intended learners and reflected contexts familiar to them. These combined qualities emphasized that the illustrations were not only aesthetically pleasing but also functionally effective in promoting student understanding and engagement.

These findings were supported by the study of **Aguinaldo and Garcia (2020),** who emphasized that illustrations in science education should serve a dual role: to attract learners' attention and to deepen their understanding of abstract or unfamiliar content [16]. Their study found that materials incorporating clear, contextualized illustrations resulted in increased learner motivation and improved academic performance in science. The results of the present study affirmed that well-integrated illustrations contributed significantly to the overall face validity of the SIM and enhanced its usability in the classroom.

Given the perfect mean scores across all indicators, it was concluded that the illustrations in the developed SIM were a strong component of its instructional design. As such, their continued use and refinement were recommended in future editions to maintain visual clarity, instructional alignment, and cultural responsiveness.

C. Design and Layout

Table 7. Mean and Descriptive Value of Teachers Evaluation Rating on the Developed Sim in Science 8 in terms of Design and Layout under Face Validity

Design and Layout	**Mean**	**Descriptive Value**
c.1 Attractive and pleasing to look at	5.0	Very Satisfactory
c.2 Simple (i.e., does not distract the attention of the reader)	5.0	Very Satisfactory
c.3 Adequate illustration in relation to the text	5.0	Very Satisfactory
c.4 Harmonious blending elements (e.g., illustrations and texts)	5.0	Very Satisfactory
Over All Mean	**5.0**	**Very Satisfactory**

Table 7 presented the evaluation results of the developed Strategic Intervention Material (SIM) in Science 8 with regard to its design and layout, evaluated under the dimension of face validity. The data showed that the material received a perfect overall mean of 5.0, which corresponded to the descriptive value "Very Satisfactory." This result signified that the teacher-respondents expressed a high level of satisfaction with the visual organization and structural arrangement of the SIM.

All four indicators received a mean rating of 5.0, affirming that the SIM was attractive and visually pleasing, simple enough to prevent distraction, sufficiently illustrated in relation to the accompanying text, and effectively blended visual and textual elements in a harmonious manner. These findings suggested that the design of the material was not only engaging but also efficient in supporting learners' cognitive focus and comprehension. A layout that was both visually appealing and easy to navigate contributed to better retention and minimized cognitive overload, especially when dealing with complex science content. The clarity of arrangement and logical structure observed in the SIM indicated thoughtful planning during its development, ensuring that the material did not overwhelm the learner but rather facilitated meaningful interaction with the content.

These results confirmed the observations made by **De Vera and Ledesma in 2021**, who emphasized the significant role of design and layout in sustaining students' attention and improving cognitive processing [17]. Their study found that learners responded more positively to instructional materials that were cleanly laid out, visually structured, and effectively integrated illustrations with instructional text. The authors further argued that a well-designed layout was a critical factor in reducing learning fatigue, increasing motivation, and improving overall learning efficiency.

Based on the perfect scores received in all indicators related to design and layout, it could be concluded that this component of the SIM was successfully crafted. It effectively balanced aesthetic considerations with instructional functionality, thereby supporting both engagement and academic learning. Continued adherence to these design principles was recommended in the production of future intervention materials to ensure sustained effectiveness in diverse classroom settings.

D. Paper and Binding

Table 8. Mean and Descriptive Value of Teachers Evaluation Rating on the Developed Sim in Science 8 in terms of Paper and Binding under Face Validity

Paper and Binding	**Mean**	**Descriptive Value**
d.1 Paper used contributes to easy reading	5.0	Very Satisfactory
d.2 Durable binding to withstand frequent use	5.0	Very Satisfactory
Over All Mean	**5.0**	**Very Satisfactory**

Table 8 presents the teacher-evaluators' assessment of the developed Strategic Intervention Material (SIM) in Science 8 in terms of its physical quality, specifically focusing on paper and binding. The findings show that the material received a perfect overall mean of 5.0, corresponding to the descriptive value "Very Satisfactory." This reflects the evaluators' strong approval of the SIM's physical durability and readability, both of which are essential qualities for instructional materials intended for regular classroom use.

The indicator "Paper used contributes to easy reading" received a mean score of 5.0. This suggests that

the type and texture of the paper used in the SIM allowed for clear and legible printing, making the text comfortable and easy to read for its intended users. High readability is essential in educational resources, especially for junior high school students who rely on printed materials for concept reinforcement and independent learning.

Similarly, the indicator "Durable binding to withstand frequent use" also received a perfect score. This confirms that the SIM was evaluated as structurally sound and capable of withstanding repeated handling over extended periods. Such durability ensures that the material remains intact and usable throughout a school term, thereby maximizing its effectiveness and cost-efficiency.

These findings were supported by the study conducted by **Reyes and Fabros in 2020**, which emphasized that the quality of paper and binding plays a vital role in the longevity and usability of instructional resources [18]. Their research noted that even well-designed educational content could lose its value if printed on substandard materials, as wear and tear can quickly render them unusable. They recommended that printed instructional materials, especially those meant for multigrade or public-school settings, be produced using materials that ensure clarity of print and physical endurance.

Given these results, it can be concluded that the developed SIM in Science 8 met the standards for physical presentation and usability. The combination of clear printing and durable binding enhances its practical utility in classroom settings and supports its continued use as an effective supplemental learning material.

E. Size and Weight of Instructional Material

Table 9. Mean and Descriptive Value of Teachers Evaluation Rating on the Developed Sim in Science 8 in terms of Size and Weight of Instructional Material under Face Validity

Size and Weight of Instructional Material	**Mean**	**Descriptive Value**
e.1 Easy to handle	5.0	Very Satisfactory
e.2 Relatively light	5.0	Very Satisfactory
Overall Mean	**5.0**	**Very Satisfactory**

Table 9 presented the teacher-evaluators' assessment of the developed Strategic Intervention Material (SIM) in Science 8 based on its size and weight, evaluated under the component of face validity. The results showed a perfect overall mean of 5.0, with both indicators "Easy to handle" and "Relatively light" receiving a mean rating of 5.0 and a descriptive value of "Very Satisfactory."

These results indicated that the SIM was evaluated as highly suitable in terms of its physical form, particularly in relation to ease of handling and portability.

The favorable ratings reflected that the SIM was ergonomically designed, allowing it to be carried, held, and used comfortably by both teachers and students during instructional delivery. The ease of handling promoted convenience during classroom implementation, while the relatively light weight of the material reduced physical strain, particularly among younger learners who might carry multiple resources simultaneously. The positive evaluation in this area affirmed that the material was not only pedagogically sound but also practically usable in daily classroom contexts.

These findings aligned with the study conducted by **Mendoza and Cruz in 2018**, which emphasized the importance of ergonomics in the design of instructional materials [19]. Their research concluded that size,

weight, and physical manageability contributed significantly to learner comfort, reduced fatigue, and enhanced engagement, especially when the materials were frequently used. According to their findings, instructional resources that were bulky or heavy might discourage use and reduce their instructional value, regardless of content quality.

Based on the perfect scores across all indicators under this criterion, it can be concluded that the developed SIM in Science 8 was well-designed in terms of physical dimensions and weight. Its ergonomic features contributed to a more efficient and learner-friendly classroom experience, making it a practical and reliable resource for science instruction.

F. Presentation and Organization

Table 10. Mean and Descriptive Value of Teachers Evaluation Rating on the Developed Sim in Science 8 in terms of Presentation and Organization

Presentation and Organization	**Mean**	**Descriptive Value**
a. Presentation is engaging, interesting and understandable.	5.0	Very Satisfactory
b. There is logical and smooth flow of ideas.	5.0	Very Satisfactory
c. Vocabulary level is adapted to target reader's experience and understanding.	5.0	Very Satisfactory
d. Length of sentence is suited to the comprehension level of the target reader.	5.0	Very Satisfactory
e. Sentences and paragraph structures are varied and interesting to target reader.	5.0	Very Satisfactory
Overall Mean	**5.0**	**Very Satisfactory**

Table 10 presented the evaluation results of the developed Strategic Intervention Material (SIM) in Science 8 in terms of presentation and organization. The data showed a perfect overall mean of 5.0, with all individual indicators receiving a descriptive rating of "Very Satisfactory." This reflected the teacher-evaluators' high level of approval regarding how the SIM delivered its content and guided learners through the lessons.

The results indicated that the SIM's presentation was regarded as engaging, interesting, and understandable. Teacher-respondents agreed that the content was delivered in a manner that effectively captured learner attention and maintained it throughout the lesson. The logical and smooth flow of ideas was also noted as a strength of the material, suggesting that topics and subtopics were sequenced coherently and built upon each other progressively. This feature was essential in ensuring continuity of learning, especially in science, where concepts were often interrelated and cumulative in nature.

The evaluators also observed that the vocabulary used in the SIM was well-matched to the learners' level of experience and understanding. The appropriateness of the vocabulary enhanced accessibility, allowing students to focus on comprehension rather than decoding unfamiliar terms. Moreover, the sentence structures were reported as appropriately varied and of suitable length, contributing to the overall readability and appeal of the material. This variation in sentence and paragraph structure aided in maintaining student interest and supported differentiated learning styles.

These findings were consistent with the study of **Santos and Ramirez** conducted in **2020**, which emphasized that clear presentation and logical organization significantly contributed to learner engagement and academic comprehension [20]. Their research highlighted those instructional materials written with age-appropriate vocabulary and structured in a logically coherent manner were more effective in promoting active learning and sustained attention.

Based on the perfect evaluation ratings, it can be concluded that the developed SIM in Science 8 demonstrated exemplary quality in presentation and organization. The combination of engaging content, coherent structure, and accessible language contributed to a learning experience that was both effective and learner-centered.

G. Accuracy and Up- to Datedness of Information

Table 11. Mean and Descriptive Value of Teachers Evaluation Rating on the Developed Sim in Science 8 in terms of Accuracy and Up- to Datedness of Information

Accuracy and Up- to Datedness of Information	**Mean**	**Descriptive Value**
The module is free from…		
a. Conceptual errors	5.0	Very Satisfactory
b. Factual errors	5.0	Very Satisfactory
c. Grammatical errors	5.0	Very Satisfactory
d. Computational errors	5.0	Very Satisfactory
e. Obsolete information	5.0	Very Satisfactory
f. Typographical and other minor errors (e.g., inappropriate or unclear illustrations, missing labels, wrong captions, etc.)	3.4	Very Satisfactory
Overall Mean	**4.73**	**Very Satisfactory**

Table 11 presented the teacher-evaluators' assessment of the developed Strategic Intervention Material in Science 8 in terms of accuracy and up-to-datedness of information. The findings indicated an overall mean of 4.73, with a descriptive value of "Strongly Agree." This suggested that the SIM was perceived to be highly accurate, factually reliable, and aligned with current scientific knowledge and educational standards.

The indicators under this component included the absence of conceptual errors, factual inaccuracies, grammatical mistakes, and computational miscalculations. These items all received perfect mean scores of 5.0. The teachers also affirmed that the content was current and relevant, reflecting up-to-date information consistent with the Department of Education's prescribed competencies. These results indicated that the SIM effectively upheld the principles of academic rigor and instructional credibility.

However, the item related to typographical and other minor errors was rated lower, with a mean score of 3.4 and a descriptive value of "Agree." This finding revealed that while the material was substantively sound, there were minor technical issues observed in formatting, labeling, or captioning that slightly

affected the clarity of presentation. Although these were not content-related errors, they suggested the need for additional proofreading and layout refinement to further enhance the material's overall quality and visual precision.

This result was consistent with the findings of **Delos Reyes in 2019**, who emphasized that instructional materials should not only be pedagogically effective but should also be carefully edited and formatted to eliminate errors that might distract learners [21]. According to the study, even minor visual or textual inconsistencies could affect learners' engagement and comprehension, especially in subjects that required precision such as science.

In conclusion, the developed SIM in Science 8 has been positively evaluated for its accuracy and relevance. Despite some areas for minor technical improvement, it remained an academically reliable and instructionally effective resource suitable for use in junior high school classrooms.

II. Attitude of Learners Towards the Developed SIM in Science 8

A. Interest and Engagement

Table 12. Mean and Descriptive Value of Attitude of Learners Towards the Developed SIM in Science 8 in terms of their Interest and Engagement

Interest and Engagement	Mean	Descriptive Value
1. The SIM has made Science 8 lessons more interesting for me.	4.78	Strongly Agree
2. I find the activities in the SIM engaging and interactive.	4.70	Strongly Agree
3. I look forward to using the SIM in our Science 8 lessons.	4.70	Strongly Agree
4. The SIM has captured my attention and made me more interested in learning science.	**4.78**	**Strongly Agree**
5. I am excited to explore more topics through the SIM.	4.88	Strongly Agree
Over All Mean	4.77	Strongly Agree

Table 12 presented the attitudes of Grade 8 learners toward the developed Strategic Intervention Material in Science 8, specifically focusing on their interest and engagement. The results revealed a high overall mean of 4.77, which was interpreted as "Strongly Agree." This indicated a very positive reception from the learners and suggested that the material was successful in capturing their attention and stimulating their interest in science.

Among the indicators, the highest-rated item was "I am excited to explore more topics through the SIM," which received a mean score of 4.88. This result suggested that the material effectively fostered curiosity and a sense of anticipation among students, encouraging them to continue exploring scientific content. Two additional statements, "The SIM has made Science 8 lessons more interesting for me" and "The SIM has captured my attention and made me more interested in learning science," both received a strong rating

of 4.78. These ratings affirmed the material's capacity to make science more appealing and to sustain learners' focus during lessons.

Meanwhile, the statements "I find the activities in the SIM engaging and interactive" and "I look forward to using the SIM in our Science 8 lessons" were both rated at 4.70. Although slightly lower than the others, these scores still fell within the "Strongly Agree" range, indicating that students found the learning experiences provided by the SIM to be enjoyable and interactive. These ratings reinforced the idea that the SIM successfully balanced content delivery with meaningful, hands-on learning opportunities that encouraged participation and sustained interest.

These findings were supported by the study of **Liou** conducted in **2021,** which emphasized that instructional materials designed with inquiry-based and engaging elements had a substantial positive impact on learners' attitudes toward science [22]. According to the study, materials that encouraged exploration, questioning, and discovery helped foster intrinsic motivation, resulting in increased classroom engagement and a more positive perception of the subject.

Based on the strong agreement across all indicators, it can be concluded that the developed SIM in Science 8 effectively promoted learner interest and engagement. Its ability to make lessons more interesting, interactive, and exciting established it as a valuable tool in fostering enthusiasm for science among junior high school students.

B. Perceived Usefulness

Table 13. Mean and Descriptive Value of Attitude of Learners Towards the Developed SIM in Science 8 in terms of their Perceived Usefulness

Perceived Usefulness	Mean	Descriptive Value
1. The SIM has helped me understand complex Science 8 concepts better.	4.82	Strongly Agree
2. I believe the SIM is a useful tool for improving my learning in Science 8.	4.84	Strongly Agree
3. Using the SIM has helped me better understand the topics I find difficult in Science 8.	4.82	Strongly Agree
4. The SIM provides helpful explanations that make science topics easier to grasp.	4.92	Strongly Agree
5. I feel that the SIM has made my learning experience in Science 8 more effective.	4.88	Strongly Agree
Over All Mean	**4.86**	**Strongly Agree**

Table 13 presented the learners' perception of the usefulness of the developed Strategic Intervention Material in Science 8. The overall mean rating was 4.86, interpreted as "Strongly Agree." This rating

demonstrated that the students overwhelmingly recognized the SIM as a valuable tool in supporting their learning experience and academic achievement in science.

The highest-rated item was "The SIM provides helpful explanations that make science topics easier to grasp," which received a mean score of 4.92. This result highlighted the material's strength in presenting complex scientific concepts in a simplified and comprehensible manner. Closely following were the statements "I feel that the SIM has made my learning experience in Science 8 more effective" with a score of 4.88, and "I believe the SIM is a useful tool for improving my learning in Science 8," which garnered a score of 4.84. These ratings affirmed the perception that the SIM significantly contributed to learning efficiency and academic understanding.

Additionally, the statements "The SIM has helped me understand complex Science 8 concepts better" and "Using the SIM has helped me better understand the topics I find difficult in Science 8" both received mean scores of 4.82. These responses confirmed that learners found the material particularly beneficial in clarifying difficult content and reinforcing topics they previously struggled to comprehend. The high ratings across all indicators reflected the learners' strong agreement that the SIM enhanced their ability to process and retain scientific knowledge.

These findings were consistent with the study conducted by **Delos Santos in 2020,** which emphasized the critical role of well-crafted instructional materials in bridging learning gaps and promoting content mastery. The study concluded that instructional resources that provide structured explanations and targeted reinforcement strategies were instrumental in improving learner performance, particularly in science education where abstract and technical topics could challenge student comprehension [23].

In conclusion, the responses of the learners affirmed that the Strategic Intervention Material developed for Science 8 was perceived as highly useful. Its ability to deliver clear explanations, support conceptual understanding, and improve learning outcomes demonstrated its effectiveness as a teaching and learning resource in the junior high school science curriculum.

C. Clarity and Comprehensibility

Table 14. Mean and Descriptive Value of Attitude of Learners Towards the Developed SIM in Science 8 in terms of their Clarity and Comprehensibility

Clarity and Comprehensibility	Mean	Descriptive Value
1. The explanations in the SIM are easy to understand.	4.60	Strongly Agree
2. The instructions in the SIM are clear and simple to follow.	4.86	Strongly Agree
3. I can easily follow the step-by-step guidance provided in the SIM.	4.84	Strongly Agree
4. The SIM presents information in a way that is clear and easy to comprehend.	4.82	Strongly Agree
5. The visuals and text in the SIM work together to help me understand science concepts better.	4.82	Strongly Agree

Over All mean	**4.79**	**Strongly Agree**

Table 14 showed the learners' evaluation of the clarity and comprehensibility of the developed Strategic Intervention Material in Science 8. The results revealed an overall mean of 4.79, interpreted as "Strongly Agree." This indicated that the learners found the SIM highly accessible, logically structured, and easy to follow.

The highest-rated item was "The instructions in the SIM are clear and simple to follow," which received a mean score of 4.86. This suggested that the learners were able to understand and act on the directions provided without confusion, allowing for independent learning and seamless task execution. The statements "I can easily follow the step-by-step guidance provided in the SIM" and "The SIM presents information in a way that is clear and easy to comprehend" followed closely, with mean scores of 4.84 and 4.82, respectively.

These findings affirmed that the structure and flow of information were designed with learner comprehension in mind, ensuring that concepts were broken down into manageable and logically sequenced parts.

Furthermore, the indicator "The visuals and text in the SIM work together to help me understand science concepts better" also received a strong rating of 4.82. This reinforced the idea that the integration of visual elements with explanatory text significantly enhanced understanding, particularly in science education where learners must process abstract ideas. The only relatively lower rating, though still within the range of "Strongly Agree," was given to the item "The explanations in the SIM are easy to understand," which received a mean of 4.60. While this remained a positive result, it may have suggested opportunities to further simplify the language or provide more contextual examples in certain sections.

These findings were supported by the study of **Mayer conducted in 2019**, which emphasized the importance of multimedia learning principles in instructional design. According to Mayer, materials that integrate clear text with supportive visuals facilitate dual-channel cognitive processing, reduce cognitive load, and ultimately lead to improved comprehension and retention of content. The application of these principles in the SIM demonstrated the effectiveness of well-integrated visual and textual elements in supporting learning outcomes [24].

In conclusion, the learners' responses confirmed that the SIM in Science 8 was both clear and comprehensible. Its well-structured content, learner-friendly language, and thoughtful use of visuals contributed to its usability as an effective instructional tool that supported independent and meaningful learning.

D. Motivation to Learn

Table 15. Mean and Descriptive Value of Attitude of Learners Towards the Developed SIM in Science 8 in terms of their Motivation to Learn

Motivation to Learn	**Mean**	**Descriptive Value**
1. The SIM has motivated me to study Science 8 more actively.	4.86	Strongly Agree
2. I feel more motivated to learn science because of the SIM.	4.78	Strongly Agree

3. The SIM encourages me to keep going even when the topics are challenging.	4.84	Strongly Agree
4. Using the SIM has inspired me to learn more about science outside of class.	4.80	Strongly Agree
5. I am more excited to participate in Science 8 lessons since we started using the SIM.	4.92	Strongly Agree
Over All Mean	**4.84**	**Strongly Agree**

Table 15 highlighted the learners' evaluation of how the developed Strategic Intervention Material in Science 8 influenced their motivation to learn. The overall mean of 4.84, described as "Strongly Agree," indicated that the SIM had a significant and positive impact on students' desire to engage with the subject. The statement "I am more excited to participate in Science 8 lessons since we started using the SIM" received the highest rating of 4.92. This result revealed that the material substantially increased learners' enthusiasm and eagerness to participate during science classes. Similarly, the items "The SIM has motivated me to study Science 8 more actively," with a mean score of 4.86, and "I feel more motivated to learn science because of the SIM," rated at 4.78, further demonstrated that the SIM successfully sparked curiosity and a proactive approach to learning among the students.

The item "The SIM encourages me to keep going even when the topics are challenging" received a score of 4.84. This suggested that the material provided not only academic support but also emotional reinforcement, helping learners remain persistent and resilient when faced with difficult content. In addition, the statement "Using the SIM has inspired me to learn more about science outside of class" was rated 4.80, showing that the material also influenced learners beyond the formal classroom setting by encouraging independent exploration of scientific topics.

These findings aligned with the study conducted by **Liou in 2021**, which found that interactive and engaging instructional materials contribute to increased intrinsic motivation, especially in subjects where students typically struggle with conceptual understanding. According to **Liou**, the sustained motivation resulting from meaningful learning experiences leads to higher participation, improved academic performance, and long-term interest in the discipline [22].

In summary, the learners' responses confirmed that the developed SIM in Science 8 effectively nurtured motivation to learn. Through its interactive format, clear content delivery, and relevance to learners' experiences, the SIM served not only as a content resource but also as a motivational tool that supported student engagement and fostered continuous learning in science.

6. SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary

This study focused on the development and validation of a Strategic Intervention Material (SIM) in Science 8 aimed at enhancing classroom instruction and improving learner engagement, comprehension, and motivation. Conducted at Pio Dalim Memorial School of Arts and Trades in Eva, Calanasan, Apayao

during the school year 2024–2025, the study sought to create a localized, pedagogically sound, and urriculum-aligned material that would address gaps in science learning among junior high school students. The study specifically aimed to determine the evaluation of teacher-respondents on the quality of the developed SIM in terms of content, face validity, presentation and organization, and accuracy and up-to-dateness of information. It also examined the attitudes of learners toward the SIM in the areas of interest and engagement, perceived usefulness, clarity and comprehensibility, and motivation to learn. Additionally, it explored the feedback of both teachers and learners on the usability of the SIM in actual classroom contexts.

The findings revealed that the teacher-evaluators viewed the SIM as very impactful across all dimensions. The content was assessed as appropriate, relevant, and aligned with the learning competencies of the Science 8 curriculum. The material was also recognized for promoting higher-order thinking skills and reinforcing desirable values. In terms of face validity, the SIM was found to be visually appealing, structurally sound, and user-friendly. The printing and minor typographical aspects, however, were noted as areas requiring technical refinement. The overall presentation of the SIM was described as logical, engaging, and easy to follow. Teachers affirmed that the material was free from major factual, conceptual, or grammatical errors, although minor formatting and visual issues were observed.

The learners expressed a highly favorable attitude toward the SIM. They found it interesting, enjoyable, and effective in making science lessons more meaningful. The material helped them better understand difficult concepts, encouraged them to participate more actively in lessons, and enhanced their desire to continue exploring science topics beyond the classroom. They also appreciated the clarity of instructions and the integration of visuals, although some noted that certain directions required teacher clarification and that scientific vocabulary could be further simplified or explained.

Feedback on the usability of the SIM highlighted several points for improvement. Teachers suggested the inclusion of a teacher’s guide or answer key to assist in instruction. They also recommended the integration of performance-based activities to enrich learning through application and inquiry. Concerns about print quality and minor typographical inconsistencies were likewise raised. From the learners' perspective, the most common challenges included the need for clearer instructions, difficulty with unfamiliar science terms, and slight discomfort with the layout in some parts of the material.

Conclusions

Based on the findings of the study, it was concluded that the developed Strategic Intervention Material in Science 8 was effective as a supplementary instructional resource. The material met the standards of quality in terms of content relevance, visual presentation, organization, and scientific accuracy. It successfully aligned with the competencies of the K to 12 Science curriculum and was perceived by teacher-evaluators as pedagogically sound and appropriate for junior high school learners.

Learners responded positively to the SIM, indicating that it enhanced their interest in science, improved their comprehension of difficult concepts, and increased their motivation to participate actively in class. The material was also found to support independent learning and promote engagement through clear structure and relevant visual-text integration.

Despite its overall effectiveness, the SIM required improvement in a few areas, particularly in technical aspects such as printing consistency, minor typographical details, and clarity of instructions. Feedback

from both teachers and learners also indicated the need for additional support features such as a teacher's guide, vocabulary aids, and performance-based tasks to further strengthen its instructional value.

Recommendations

In light of the findings and conclusions drawn from the study, the following recommendations were proposed to further improve the development, implementation, and utilization of the Strategic Intervention Material (SIM) in Science 8:

1. **Incorporate a teacher's guide and answer key** in future versions of the SIM, it could assist educators in facilitating lessons and validating learner outputs. This might have included a suggested pacing guide, key discussion points, and rubrics for assessing learner performance.
2. **Revise and proofread the SIM thoroughly** before reproduction, typographical errors were corrected, formatting was improved, and accuracy in illustrations, labels, captions, and screen registration was ensured. A technical review committee was formed for this purpose prior to final printing.
3. **Enhance the clarity of instructions and tasks** by rewriting complex prompts into simpler, step-by-step directions, this was piloted through a learner feedback session to ensure that the material was understandable even without constant teacher support.
4. **Embed a glossary of scientific terms** at the end of each unit or activity, this was done to support vocabulary development and assist learners in understanding technical concepts without needing external references.
5. **Integrate at least one performance-based or inquiry-based activity per module** that involves hands-on or real-life application of the concepts taught. This included experiments, investigations, or problem-solving tasks aligned with the Most Essential Learning Competencies (MELCs).
6. **Improve print quality and formatting** by ensuring standard font sizes, consistent spacing, and a clear layout for ease of reading, schools coordinated with printing providers to conduct quality checks before mass production.
7. **Conduct classroom-based validation** of the revised SIM in at least three additional schools across varied contexts to assess its adaptability and effectiveness in different teaching-learning environments. A standard feedback tool was used to collect data from teachers and students.
8. **Provide orientation or capacity-building sessions for teachers** on how to effectively use the SIM. This was done through a half-day division or district-led training focused on SIM-based pedagogy, assessment, and integration into daily lesson plans.

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