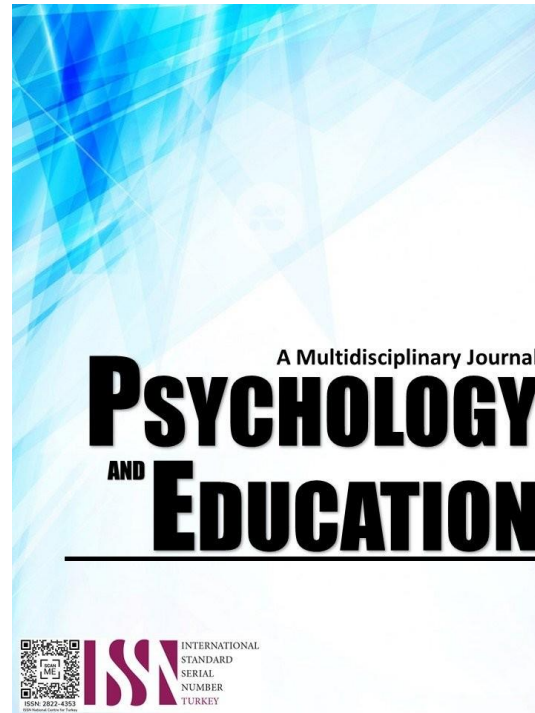


**FOLLOW THE ORDER: A STRATEGIC INTERVENTION MATERIAL
TO ENHANCE GRADE 8 STUDENTS' UNDERSTANDING
OF THE PERIODIC TABLE**



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Follow the Order: A Strategic Intervention Material to Enhance Grade 8 Students' Understanding of the Periodic Table

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Abstract

The periodic table is a fundamental tool in understanding chemical behavior, yet it remains one of the most challenging topics for many Grades 8 students. School-based assessments have consistently identified it as a least mastered competency due to difficulties in understanding its organization and predictive use. These challenges highlight the need for instructional materials that make deep chemistry concepts more accessible and engaging. This study aimed to develop and validate a Strategic Intervention Material (SIM) titled "Follow the Order" to assist Grade 8 learners in mastering the periodic table. Anchored on competencies outlined in the Philippine K to 12 curriculum, the SIM used student-friendly activities, visual aids, and guided exercises to support learning. It underwent a rigorous validation process by subject matter experts to evaluate its content, format, presentation, accuracy, and up-to-datedness. Results showed that the SIM was rated Very Satisfactory across all domains, with mean scores ranging from 3.46 to 3.94 and low standard deviations, indicating strong agreement among evaluators. The material was conceptually accurate, free of grammatical and factual errors, and appropriate for junior high school learners' cognitive levels. Illustrations and layout were found clear, relevant, and supportive of student engagement. Readability was assessed using the Flesch Reading Ease and Flesch-Kincaid Grade Level formulas, yielding scores of 60.2 and 5.6, confirming its suitability for students aged 13 to 15. Suggestions from validators were incorporated to improve the material's quality and usability. While this study focused on development and validation, findings suggest SIM's strong potential as a supplementary tool in Grade 8 Chemistry. Future research is recommended to evaluate its impact on student achievement, engagement, and retention in actual classroom settings.

Keywords: *grade eight chemistry, learning competencies, periodic table, readability, strategic intervention material*

Introduction

Assessment plays a crucial role in learning, serving as a key determinant of whether educational objectives are met. It influences various aspects of education, including student grades, placement, advancement, instructional needs, and curriculum development. According to Amua-Sekyi (2016), assessment encompasses all activities that teachers and learners engage in to gather knowledge that can inform modifications to teaching and learning. This knowledge can be derived from various sources, such as homework, tests, essays, reports, practical procedures, and classroom discussions.

The assessment process is cyclical, encompassing teaching, measuring, reflecting, planning, and improving. Teaching involves employing strategies to facilitate student learning while measuring student progress, which is the second phase. Reflecting on the effectiveness of these strategies leads to necessary adjustments to enhance learning outcomes. Finally, refining the action plan ensures that all learners achieve mastery of the required competencies.

This paper focuses on the fourth phase of the assessment cycle—revising instructional approaches to ensure mastery of learning outcomes. Support and intervention must be tailored to the diverse learning needs of students. As outlined in Department of Education Order No. 8, Series of 2015, the guidelines for classroom assessment in the K to 12 Basic Education Program underscore that assessment is integral to teaching-learning process. Teachers are tasked with providing appropriate assessments that accurately measure learners' current and developing abilities. They must ensure that instructional materials effectively support a constructive teaching and learning environment (Setiabudi et al., 2019). Furthermore, assessments must be valid and reliable, accurately measuring their intended assessment (Dela Mines & Cajucom, 2022).

Many Grade 8 students struggle to master essential science concepts, particularly in Chemistry, negatively impacting their overall academic performance. One of the most challenging topics for learners is the periodic table, which requires memorization and conceptual understanding. Despite existing interventions, there remains a lack of validated and learner-centered instructional materials that directly address these difficulties in a curriculum-aligned and developmentally appropriate way.

Furthermore, this paper focused on developing and validating Strategic Intervention Material (SIM) tailored to one of the most challenging topics in grade eight chemistry—the periodic table. Mastery of this topic is foundational for understanding more advanced chemistry concepts, yet students often struggle due to its abstract nature and the cognitive demand it requires. Given its significance and its challenges, constructing well-designed, research-based SIMs becomes imperative in improving learning outcomes.

Research Questions

This study was conducted to address the need for effective and engaging instructional tools by developing and validating a SIM for Grade 8 Science. Specifically, the study sought to answer the following objectives:

1. To what extent is the developed SIM acceptable in terms of:
 - 1.1 content validity;
 - 1.2 format; and
 - 1.3 presentation and organization d. accuracy and up-to-datedness of information?
2. How readable is the developed SIM for Grade 8 students?

Literature Review

Instructional Design and the Role of Strategic Intervention Materials in Science Education

A clear distinction between assessment and evaluation is crucial in educational discourse. Assessment serves a diagnostic function, aiming to identify learners' areas for improvement while providing meaningful feedback to enhance achievement (Yambi, 2024). It is a continuous and dynamic process involving reinforcement and revision. Effective assessment recognizes the diversity of learners, necessitating multiple measurement strategies aligned with their Zone of Proximal Development (Raslan, 2024).

In science education, pedagogical approaches have shifted toward fostering independent, critical thinkers equipped with 21st-century skills. However, the scarcity of appropriate instructional materials challenges this goal, requiring educators to be resourceful and innovative. The Department of Education's Order No. 031, s. 2020 underscores the need for learning continuity amidst disruptions, highlighting principles such as relevance, accessibility, and responsiveness to learners' needs.

Educational resources must, therefore, be well-designed—balancing content accuracy, layout, and visuals to support comprehension (Paras, 2024). Catering to a range of learning capabilities, instruction should be scaffolded and personalized. Effective materials should empower students, encouraging self-paced learning and fostering accountability (Setiabudi et al., 2019). Even advanced learners benefit from targeted materials that facilitate conceptual integration and mastery (Bonitez, 2021).

SIMs play a pivotal role in this context. These tools are designed to remediate least-mastered competencies through focused, interactive content. Studies have shown SIMs to significantly improve student performance, especially in critical subjects like science and economics (Sadsad, 2022; O'Donoghue et al., 2023). The effectiveness of SIMs lies in their alignment with curriculum goals, student needs, and clear evaluative criteria.

Moreover, model-based strategies (Carroll & Park, 2024) successfully deepen conceptual understanding. Collaborative, iterative development and validation ensure that SIMs are engaging, curriculum-aligned, and accessible to learners.

While previous studies affirm SIM efficacy, there remains a gap in specialized SIM development for complex topics like the periodic table. This study aimed to address by producing a rigorously validated SIM for Grade 8 science, offering a structured, learner-centered approach to improve conceptual mastery in grade 8 chemistry.

Methodology

Research Design

This study employed a descriptive research design to facilitate the validation and evaluation of a developed SIM for Grade 8 Chemistry. The research was conducted during the COVID-19 pandemic in public schools in Nueva Vizcaya, Philippines. It sought to assess only the validity of the instructional material through expert evaluation (Allonar et al, 2024).

Respondents

This study utilized purposive sampling to select five chemistry experts who evaluated the developed learning material. As a non-probability sampling technique, purposive sampling was deemed appropriate due to the evaluators' specialized expertise in the subject area, ensuring informed and relevant feedback on the content and design of the material (Etikan, Musa, & Alkassim, 2016). To ensure a credible evaluation, the study engaged three local chemistry experts with extensive teaching experience and two foreign specialists with notable academic and professional credentials. Subject Expert A has eight years of teaching experience in public schools, while Subject Expert B holds a Master of Arts in Teaching General Science with a focus on chemistry and has been teaching for ten years. Subject Expert C specializes in chemistry and brings 20 years of experience from the Department of Education. The foreign experts include Subject Expert D, a Slovenian teacher of chemistry, physics, and astronomy with six years of experience in academia. He holds master's degrees in both education and civil engineering. Subject Expert E is a Canadian educator who has taught physics and chemistry to Grades 10 to 12 in Canada and is currently teaching in Thailand. His expertise in the subject matter was highly regarded.

Instrument

Data was collected using an evaluation rating sheet designed for print resources, aligned with the Department of Education's Learning Resource Management and Development System (DepEd-LRMDS) checklist. The materials and checklists were distributed electronically via email to both local and international subject experts. A total of five emails were sent, ensuring responses from experts with significant experience in the field. The complete checklists were retrieved through the same electronic platform. The study involved subject experts from public schools in Nueva Vizcaya, Philippines namely Bintawan National High School, and Diadi

National High School. Additionally, international experts residing in Thailand contributed recommendations on content, layout, and readability. Their insights helped refine the instructional material to enhance its effectiveness.

Furthermore, to evaluate the content validity and overall quality of the SIM titled "Follow the Order," this study specifically utilized the Quality Assurance Tool for New Print-Developed Learning Resources, a standardized evaluation instrument developed by the Department of Education. This tool is designed to ensure that print-based instructional materials meet pedagogical, physical, and technical standards before they are implemented in the classroom.

The tool used in this study assessed five key aspects of the learning materials: content validity, format, presentation and organization, accuracy and up-to-datedness of information, and overall acceptability. In total, 28 indicators were evaluated.

For content validity, seven items were examined, focusing on how well the materials suited the learners' developmental stages, how closely they aligned with curriculum goals, how they encouraged cognitive skills like critical thinking and problem-solving, and whether they avoided biases—whether ideological, cultural, religious, racial, or gender-based.

The format category included four sub-areas. Illustrations were evaluated using six criteria such as clarity, simplicity, relevance, attractiveness, proper labeling, and cultural appropriateness. Design and layout were judged by four indicators that looked at visual appeal, simplicity, adequate illustration use, and cohesive design. Paper and binding were assessed based on readability and physical durability using two items, while size and weight were also rated with two indicators focusing on ease of handling and portability.

Presentation and organization were reviewed through five indicators, including the logical flow of ideas, language appropriateness, sentence structure, and how well the material engaged learners.

To check for accuracy and how up to date the materials were, six items were used. These looked for conceptual, factual, grammatical, and computational accuracy, as well as typographical errors and any outdated content.

Each of the 28 indicators was scored using a four-point Likert scale: 3.50–4.00 meant "Very Satisfactory," 2.50–3.49 was "Satisfactory," 1.50–2.49 indicated "Poor," and 1.00–1.49 was rated as "Not Satisfactory."

Evaluators rated each item according to these criteria. Domain means were computed to determine acceptability levels per category. The instrument allowed for both quantitative scoring and qualitative observations, offering a comprehensive appraisal of the SIM's content quality, instructional effectiveness, and physical usability.

This quality assurance tool is widely used in DepEd validation procedures, ensuring instructional materials are learner-centered, accessible, accurate, and aligned with curriculum standards.

Procedure

Validation Process

The development and validation of SIMs are critical processes in enhancing student learning outcomes, particularly in subjects like Chemistry. This study involved creating SIMs tailored for Grade Eight Chemistry students, followed by validation from subject matter experts.

To establish content validity, SIM was reviewed by a panel of five experts in the field of science education, curriculum development, and instructional materials. The validators used the above-mentioned DepEd tool to evaluate the SIM based on the established indicators.

The validation process was conducted entirely online due to pandemic-related restrictions. Data Interpretation with systematic analysis of responses from experts using statistical methods to ensure a comprehensive evaluation was performed. The mean scores per domain were computed and interpreted according to the rating scale to identify strengths and areas for improvement.

The methodology aligns with contemporary practices in educational material development and validation. For instance, Allonar et al. (2024) developed Contextualized Strategic Intervention Materials (CSIMs) for Grade 7 Ecosystem topics, which were evaluated by experts and received a "Very Satisfactory" rating, indicating high quality in content, format, and accuracy.

Similarly, Akram et al. (2017) developed and validated a Supplemental Learning Resource in Chemistry in Conversational Filipino, emphasizing the importance of expert validation to ensure content validity and instructional effectiveness. These studies underscored the significance of expert validation and structured data analysis in developing effective educational materials.

No modifications were made to the structure of the original validation tool; however, pilot validation was conducted with a draft version of the SIM prior to final evaluation. Minor adjustments to illustrations, text organization, and vocabulary were made based on initial feedback from a curriculum expert, ensuring developmental appropriateness for Grade 8 learners.

This study did not compute reliability measures (e.g., Cronbach's alpha or test-retest reliability), as it was focused solely on content validation and readability. However, the use of a standardized tool developed by the Department of Education adds to the instrument's inherent credibility and consistency.

Administration and Standardization

The instrument was administered in a structured expert review setting, wherein validators independently assessed the SIM without collaboration. The target population for the material is Grade 8 students enrolled in public secondary schools under the K to 12 Science Curriculum. The review process was guided by DepEd's standard validation procedures and required approximately 30 to 45 minutes per evaluator to complete.

Readability Assessment

To supplement content validation, the readability of SIM was measured using the Flesch Reading Ease and Flesch-Kincaid Grade Level formulas. These metrics evaluate the complexity of English texts based on sentence length and word syllable count. The SIM received a Flesch Reading Ease score of 60.2, indicating it is moderately easy to read, and a Flesch-Kincaid Grade Level of 5.6, suggesting it is accessible for learners in Grades 8–9. These results confirm that the material is appropriate for its intended audience and aligns with their reading comprehension levels.

Data Analysis

The gathered data was analyzed using appropriate statistical tools, including mean and general weighted mean. In assessing the overall validity and effectiveness of the material, a Likert – type scale was used as summarized Table 1.

Table 1. Equivalent ratings for the mean and general weighted mean of the indicators

Rating Scale	Description	Description
3.5 - 4.00	Very Satisfactory	Not present
2.5 - 3.49	Satisfactory	Present but with very minor and must be fixed
1.5 - 2.49	Poor	Present and requires major development
1.0 -1.49	Not Satisfactory	Poor, do not evaluate further

Ethical Considerations

All data collected in this study were treated with strict confidentiality. To ensure anonymity, validator's' names and other identifying details were replaced with numerical codes, and only the researchers had access to the raw data. The information was securely stored and used solely for academic purposes. This study adhered to institutional ethical guidelines and data privacy.

Results and Discussion

Developed Strategic Intervention Material

The developed strategic intervention material was composed of five essential parts. These are the guide, activity, assessment, enrichment, and answer cards. These are answered through a paper pen format. The developed strategic intervention material focused on the least mastered competency for the third quarter, a lesson in the periodic table. Mainly, its concern is on the essential learning competency that states, "Use the periodic table of elements to predict the chemical behavior of an element "MELC week 7-8 SMT- III –I – j -12). Figure 1 shows an excerpt of all the cards of the developed SIM.

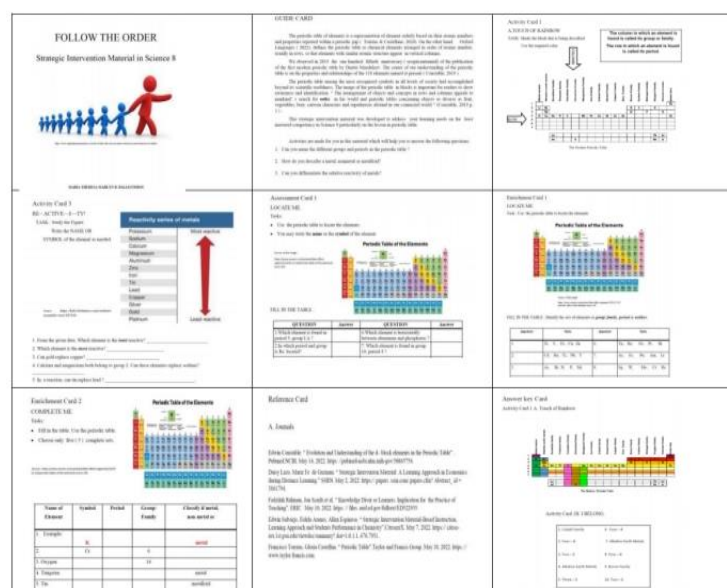


Figure 1. Follow the Order: Strategic Intervention Material in Chemistry 8

The developed SIM comprises five essential components: the Guide Card, Activity Card, Assessment Card, Enrichment Card, Reference Card, and Answer Key Card.

The *Guide Card* provides a brief but comprehensive introduction to the periodic table, drawing from multiple sources to establish foundational knowledge. It serves to engage the learner and direct them through the subsequent sections of the material.

The *Activity Cards* are designed to address three core tasks: (1) identifying the groups and periods of elements, (2) categorizing elements as metals, nonmetals, or metalloids, and (3) comparing the reactivity of metallic elements. Activity Card 1 is divided into Parts A and B. Part A encourages learners to color sections of the periodic table while recalling the concepts of groups and periods using guiding keywords such as “columns” and “rows.” Part B prompts learners to identify the family or period to which specific elements belong. Activity Card 2 focuses on grouping elements according to their classification into metals, metalloids, and nonmetals. This activity enhances learners' ability to distinguish between these categories. Activity Card 3 challenges learners to compare the reactivity series of metallic elements, fostering higher order thinking skills.

The *Assessment Cards*, numbered 1 through 3, are structured progressively to evaluate the learners' understanding. Assessment 1 and 2 require learners to complete tables for identifying families, periods, and element classification, while Assessment 3 presents a multiple-choice format to assess knowledge of reactivity trends and classification of elements.

The *Enrichment Card* allows students to further explore the periodic table by locating and grouping elements according to their family and period. This activity strengthens familiarity with the periodic table's structure and enhances the learner's ability to navigate it independently.

The *Reference Card* provides the source material that supports the content, ensuring accuracy and alignment with the curriculum.

Finally, the *Answer Key Card* provides the correct answers to the activities and assessments, enabling learners to verify their responses and promote self-directed learning.

To further illustrate the observed indicators of the learning material, the following tables are presented and interpreted.

Section 1: Content Validation of the SIM in Grade 8 Chemistry

Table 2 presents the evaluation results for the content validity of the SIM titled "Follow the Order."

Table 2. Acceptability of the Material in Terms of Content Validity

Indicators	Mean	Qualitative Description
1.Content is suitable to the student's level of development	3.83	Very Satisfactory
2. Material contributes to the achievement of the specific objectives of the subject area and grade/ year level for which it is intended	4.00	Very Satisfactory
3. Material provides for the development of higher cognitive skills such as critical thinking, creativity, learning by doing, inquiry, problem solving, etc.	3.67	Very Satisfactory
4. Material is a free of ideological, cultural, religious, racial and gender biases and prejudices	4.00	Very Satisfactory
5. Material has the potential to arouse interest of target reader.	3.00	Satisfactory
6 Adequate warning / cautionary notes are provided in topics and activities where safety and health are of concern	3.33	Satisfactory
Average Mean	3.46	Satisfactory
Standard Deviation	0.40	

Rating Scale: 3.5 -4.00 -Very Satisfactory, 2.5 - 3.49- Satisfactory, 1.5- 2.49- Poor, 1- 1.49- Not Satisfactory

The material received a Very Satisfactory rating for items 1 to 4 and a Satisfactory rating for items 6 and 7. The average mean score of 3.46 (SD = 0.40) indicates that the evaluators found the content highly acceptable, with minimal variation in their responses. This suggests that the SIM aligns well with key content-related criteria, including appropriateness for Grade 8 students, alignment with learning objectives, and promotion of higher-order thinking skills such as critical thinking and problem-solving. Furthermore, the content was free from ideological, religious, racial, and gender bias and included appropriate health and safety measures while capturing student interest.

These findings are supported by Setiabudi et al. (2019), who emphasized the importance of contextually relevant content and instructional strategies in enhancing constructive teaching. Similarly, Lazo and de Guzman (2021) found that materials rated highly for cognitive development significantly contributed to positive learning outcomes. Salviejo et al. (2021) also noted that quality instructional materials foster deep learning and meaningful educational experiences.

Acceptability of the Material in terms of Format

Table 3.1 shows the SIM's acceptability in terms of format, with an average mean of 3.87 and a low standard deviation of 0.08. This Very Satisfactory rating across indicators such as font size, spacing, typeface, and printing quality reflects strong agreement among evaluators and adherence to instructional design standards. The user-friendly format enhances readability and usability, making the

SIM suitable for reproduction and distribution. Lazo and de Guzman (2021) noted that learners respond well to materials with clear instructions and engaging tasks, qualities in this SIM.

Table 3.1. *Format: Prints*

<i>Indicators</i>	<i>Mean</i>	<i>Qualitative Description</i>
1.1 Size of letters is appropriate to the intended user	3.83	Very Satisfactory
1.2 Spaces between letters and words facilitate reading	4.00	Very Satisfactory
1.3 Font is easy to read	3.83	Very Satisfactory
1.4 Printing is of good quality (i.e., no broken letters, even density, correct alignment, properly placed screen registration)	3.83	Very Satisfactory
Average Mean	3.87	Very Satisfactory
Standard Deviation	0.08	

Rating Scale: 3.5 -4.00 -Very Satisfactory, 2.5 - 3.49- Satisfactory, 1.5- 2.49- Poor, 1- 1.49- Not Satisfactory

Table 3.2 presents the assessment of the SIM's illustrations, which received a Very Satisfactory mean rating of 3.61 (SD = 0.29). The illustrations were clear, simple, properly labeled, and realistic, supporting student comprehension. While rated Satisfactory in attractiveness and cultural relevance, the illustrations still met acceptable instructional design standards. Bonitez (2021) highlighted the importance of visuals in enhancing understanding and engagement, especially in science instruction, where illustrations clarify abstract concepts and boost motivation.

Table 3.2. *Format: Illustrations*

<i>Indicators</i>	<i>Mean</i>	<i>Qualitative Description</i>
2.1 Simple and easily recognizable	3.83	Very Satisfactory
2.2 Clarity and supplement the text	3.83	Very Satisfactory
2.3 Properly labelled or captioned	3.67	Very Satisfactory
2.4 Realistic/ Appropriate	3.83	Very Satisfactory
2.5 Attractive and appealing	3.33	Satisfactory
2.6 Culturally relevant	3.17	Satisfactory
Average Mean	3.61	Very Satisfactory
Standard Deviation	0.29	

Rating Scale: 3.5 -4.00 -Very Satisfactory, 2.5 - 3.49- Satisfactory, 1.5- 2.49- Poor, 1- 1.49- Not Satisfactory

Table 3.3 evaluates the SIM's design and layout, which received a mean of 3.54 (SD = 0.16) and was rated Very Satisfactory. Elements such as text clarity, organization, and visual structure were positively received, though the adequacy of illustrations about the text received a slightly lower Satisfactory rating. This suggests the material is generally well-structured and engaging, with minor areas for improvement. Bonitez (2021) emphasized that strategic intervention materials should be informative, easy to understand, and visually appealing to sustain learner engagement.

Table 3.3. *Format: Design and layout*

<i>Indicators</i>	<i>Mean</i>	<i>Qualitative Description</i>
3.1 Attractive and pleasing to look at	3.50	Very Satisfactory
3.2 Simple	3.67	Very Satisfactory
3.3 Adequate illustration in relation to text	3.33	Satisfactory
3.4 Harmonious blending of elements	3.67	Very Satisfactory
Average Mean	3.54	Very Satisfactory
Standard Deviation	0.16	

Rating Scale: 3.5 -4.00 -Very Satisfactory, 2.5 - 3.49- Satisfactory, 1.5- 2.49- Poor, 1- 1.49- Not Satisfactory

The physical quality evaluation revealed high paper and binding durability ratings, with an average mean of 3.84 (SD = 0.23). The paper quality received a perfect score of 4.00, and the durability of the binding was rated 3.67. These findings suggest the material is built for frequent use, enhancing its longevity. Allonar et al. (2024) emphasized the significance of paper tensile strength and handling characteristics, which vary depending on grammar and moisture content—factors crucial in maintaining durability and usability in printed educational materials.

Table 3.4. *Format: Paper and Binding*

<i>Indicators</i>	<i>Mean</i>	<i>Qualitative Description</i>
4.1 Paper used contributes to easy reading	4.00	Very Satisfactory
4.2 Durable binding to withstand frequent use	3.67	Very Satisfactory
Average Mean	3.84	Very Satisfactory
Standard Deviation	0.23	

Rating Scale: 3.5 -4.00 -Very Satisfactory, 2.5 - 3.49- Satisfactory, 1.5- 2.49- Poor, 1- 1.49- Not Satisfactory

As shown in Table 3.4, the paper and binding of the material were rated as Very Satisfactory. Similarly, the size and weight of the resource received the same rating, as presented in Table 3.5.

Table 3.5. *Format: Format: Size and weight of resource*

Indicators	Mean	Qualitative Description
5.1 Easy to handle	4.00	Very Satisfactory
5.2 Relatively light	3.67	Very Satisfactory
Average Mean	3.84	Very Satisfactory
Standard Deviation	0.23	

Rating Scale: 3.5 -4.00 -Very Satisfactory, 2.5 - 3.49- Satisfactory, 1.5- 2.49- Poor, 1- 1.49- Not Satisfactory

While limited studies exist on the physical dimensions of instructional materials, insights from digital usability studies are applicable. Kortum and Sorber (2015) demonstrated that user-centered design whether in digital or physical formats enhances satisfaction and usability, reinforcing the value of thoughtful material construction in education.

Acceptability of the Material in terms of Presentation and Organization

Table 4. *Presentation and organization*

Indicators	Mean	Qualitative Description
1. Presentation is engaging, interesting, and understandable	3.67	Very Satisfactory
2. There is logical and smooth flow of ideas.	3.83	Very Satisfactory
3. Vocabulary level is adapted to target reader's likely experience and level of understanding	3.54	Very Satisfactory
4. Length of sentences is suited to the comprehension level of the target reader	4.00	Very Satisfactory
5. Sentences and paragraph structures are varied and interesting to the target reader	3.83	Satisfactory
Average Mean	3.77	Satisfactory
Standard Deviation	0.16	

Rating Scale: 3.5 -4.00 -Very Satisfactory, 2.5 - 3.49- Satisfactory, 1.5- 2.49- Poor, 1- 1.49- Not Satisfactory

Table 4 highlights the SIM's Very Satisfactory rating regarding presentation and organization, with a mean score of 3.77 (SD = 0.16). The language used in the material was appropriate for the learners' reading level, and the structure supported compelling learning experiences. Bonitez (2021) noted that SIMs should use language tailored to students needing remediation, while Lazo and de Guzman (2021) stressed the importance of instructional content that positively influences student learning outcomes.

Acceptability of the material in terms of accuracy and up -to – datedness of information

Table 5. *Accuracy and Up -to – Datedness of Information*

Indicators	Mean	Qualitative Description
1. Conceptual errors	3.83	Not Present
2. Factual errors	3.83	Not Present
3. Grammatical errors	3.67	Not Present
4. Computational errors	3.83	Not Present
5. Obsolete information	3.83	Not Present
6. Typographical and minor errors	3.83	Not Present
Average Mean	3.81	Not Present
Standard Deviation	0.06	

Rating Scale: 3.5 -4.00 -Not Present, 2.5 - 3.49-Present but very minor and must be fixed, 1.5- 2.49- Present and requires major development, 1.49 - 1 Poor, do not evaluate further

Table 5 presents the evaluation of the material's accuracy and currency. With a mean of 3.81 (SD = 0.06), the SIM showed no significant conceptual, factual, grammatical, or computational errors. It also contained no obsolete content or typographical issues. Salviejo et al. (2021) emphasized that combining traditional teaching methods with well-designed and up-to-date materials improves academic achievement, underscoring the significance of accurate and relevant content.

Table 6 summarizes the overall validation results.

Table 6. *Accuracy and Up -to – Datedness of Information*

Factor	General Weighted Mean	Qualitative Description
Content	3.64	Very Satisfactory
Format	3.94	Very Satisfactory
Presentation and Organization	3.77	Very Satisfactory
Accuracy and up to datedness	3.81	Not Present
Average Mean	3.79	Very Satisfactory
Standard Deviation	0.11	

Legend: 90-100: Very Easy, 80-89: Easy, 70-79: Fairly Easy, 60-69: Standard, 50-59: Fairly Difficult, 30-49: Difficult, 0-29

The SIM met the content validity requirement, scoring 21.83 points above the minimum threshold, with an average mean of 3.64. Format validity was also achieved, scoring 71 points with a mean of 3.94. The material likewise satisfied the criteria for presentation and organization, earning 18.83 points above the benchmark. However, while the material received a high mean rating of 3.81 for

accuracy and up-to-datedness, it did not meet the perfect score required for full validity in this area.

These findings are consistent with previous research (O'Donoghue et al., 2023; Sadsad, 2022; Lazo & de Guzman, 2021), supporting the overall quality of the material.

Section 2: Readability of the SIM in Grade 8 Chemistry

Table 7. Readability of the the SIM in Grade 8 Chemistry in terms of Reading Ease

SIM	Flesch Reading Ease Formula	Description	Flesh-Kincaid Grade Level	Reading Level (Plain English)
SIM in Grade 8 Chemistry	60.2	Standard	5, 6	8, 9

Description: Flesch Reading Ease Formula

Finally, the readability analysis yielded a Flesch Reading Ease Score 60.2 and a Flesch-Kincaid Grade Level 5.6. These results suggest that the material is written in accessible English appropriate for Grades 8–9, aligning with the target user group. Nunoo et al. (2021) and Counihan (2022) confirmed that readability formulas like Flesch-Kincaid remain valuable tools for ensuring comprehensible and effective instructional content, especially when addressing least mastered competencies.

This study sought to evaluate the instructional quality of the Strategic Intervention Material (SIM) titled "Follow the Order", and the findings indicate that the material is both instructionally sound and pedagogically appropriate for Grade 8 learners. Overall, the SIM received Very Satisfactory ratings across most key dimensions, including content, format, illustrations, layout, physical quality, presentation, and accuracy. These results reflect a strong alignment with effective instructional design principles and confirm the material’s potential as a valuable classroom resource.

The high content validity, as shown by a mean score of 3.46, suggests that the SIM effectively supports learning objectives and encourages higher-order thinking. This is particularly important for topics like periodicity and elemental behavior, which can be abstract and challenging for students. These findings echo the work of Setiabudi et al. (2019), who emphasized the importance of contextually relevant and well-structured materials in promoting constructive learning environments. Similarly, Lazo and de Guzman (2021) have shown that content which fosters cognitive development significantly contributes to better learning outcomes.

The SIM’s formatting and layout were also positively evaluated. With a mean score of 3.87 and minimal variability in responses, the format was deemed clear, organized, and easy to follow. This aligns with previous findings that learners engage more effectively with materials that are both visually appealing and user-friendly (Lazo & de Guzman, 2021). The illustrations, rated Very Satisfactory overall, were recognized for their clarity and accuracy, though attractiveness and cultural relevance received slightly lower ratings. This suggests a minor area for enhancement, possibly by integrating more localized or culturally familiar visual elements (Bonitez, 2021).

In terms of physical quality, the SIM was rated highly, particularly for paper and binding durability. These results suggest that the material is suitable for repeated classroom use. The importance of physical durability in printed materials is supported by Allonar et al. (2024), who noted that factors such as paper strength and moisture resistance are essential for maintaining usability over time.

The presentation and organization of the material also contributed to its effectiveness. With a mean score of 3.77, the language used was appropriate for the intended reading level, and the structure supported meaningful learning experiences. This aligns with Bonitez’s (2021) recommendation that SIMs should use language tailored to the needs of learners requiring remediation. Moreover, the material’s readability—measured by a Flesch Reading Ease score of 60.2 and a Flesch-Kincaid Grade Level of 5.6—confirms its accessibility for students in Grades 8 to 9 (Counihan, 2022; Nunoo et al., 2021).

The evaluation of the SIM’s accuracy and up-to-datedness yielded a high mean of 3.81, with no identified errors in content or language. Although it did not achieve a perfect score, the findings still support the material’s instructional soundness. This is consistent with the observations of Salviejo et al. (2021), who argued that accurate and current resources enhance learning outcomes when integrated into traditional classroom instruction.

Lastly, the SIM exceeded validity thresholds in most areas, further confirming its overall quality and readiness for implementation. These results are in line with prior studies (e.g., O'Donoghue et al., 2023; Sadsad, 2022), which affirm that well-validated materials contribute to more effective and engaging teaching practices.

While the SIM shows strong potential, continuous refinement particularly in enhancing cultural relevance of illustrations and maintaining content accuracy will ensure its sustained relevance and impact. Future studies may also explore student perceptions and learning outcomes after actual classroom implementation, providing deeper insights into its effectiveness in practice.

Conclusions

This study addressed the need for effective and engaging instructional tools in Grade 8 Science by developing and validating a Strategic Intervention Material (SIM). Specifically, it sought to determine the acceptability of the SIM in terms of content validity, format, presentation, and organization, as well as the accuracy and up-to-datedness of information. Additionally, the study assessed the

material's readability to ensure its appropriateness for Grade 8 learners.

Based on evaluations conducted by subject matter experts, the developed SIM was highly satisfactory across all assessed domains. It demonstrated accuracy, coherence in organization and structure, and clarity in visual and textual presentation. The material was also free from conceptual, factual, grammatical, and computational errors. Validator recommendations were carefully incorporated to refine the SIM further and enhance its overall quality and usability. The readability analysis confirmed that the SIM suits students aged 13 to 15, aligning well with their cognitive development and reading comprehension levels.

It is important to note that the scope of this study was limited to the construction and validation of the instructional material. The actual classroom effectiveness of the SIM, particularly in terms of its impact on student learning outcomes, was beyond the parameters of this research. Thus, while the material shows strong potential for pedagogical use, its instructional efficacy remains to be empirically tested. Nevertheless, the validated SIM presents considerable promise as a supplementary learning resource in science education. Its structured, student-centered design is valuable for addressing learning gaps and enhancing conceptual understanding among junior high school learners. It also supports differentiated instruction by accommodating diverse learner needs and preferences.

Future research is encouraged to build on the current findings by implementing SIM in varied educational contexts and evaluating its effect on students' academic performance and engagement. Studies may also investigate the adaptability of SIM across different science topics, subject areas, and learner profiles. Longitudinal research focusing on sustained learning gains and knowledge retention would offer further insights into the long-term impact of strategic intervention materials in science education.

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