

# Strategic Intervention Materials in General Physics 1

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Date Submitted:  
**April 12, 2026**

Date Accepted:  
**May 28, 2026**

Date Published:  
**June 23, 2026**

DOI:  
**10.5281/zenodo.20806571**

## ABSTRACT

This action research developed and evaluated Strategic Intervention Materials (SIMs) in General Physics 1 to address the non-mastered competencies of STEM students at Tanay Senior High School during School Year 2024–2025. The study used a descriptive-developmental research design and involved 15 science teacher-experts from different schools in Tanay, Rizal. The SIMs were developed based on the Most Essential Learning Competencies, Learning Outcome Assessment results, and Least Mastered Skills identified for First Quarter Week 8. An adapted LRMSD Evaluation Rating Sheet for Print Resources was used to assess the materials in terms of content, format, presentation and organization, and accuracy and up-to-datedness of information. Findings showed that the developed SIMs received very satisfactory ratings in content, format, and presentation and organization,

while accuracy and up-to-datedness showed no errors. Overall, the materials obtained a composite mean of 3.89, interpreted as very satisfactory. The study concludes that the developed SIMs can serve as useful supplementary instructional materials to support Physics teaching and learning.

**Keywords:** *Strategic Intervention Materials, General Physics 1, instructional materials, descriptive-developmental research, science education, STEM learners*

## RATIONALE

In today's rapidly evolving educational system, characterized by shifting modalities set up in every school due to extreme weather conditions such as heat, typhoons, wind monsoons, and other environmental challenges like earthquakes, volcanic eruption, and the like, the importance of instructional and intervention materials, particularly in science education, is needed.

Science education holds a pivotal role in the educational system. Recognizing the importance of STEM (Science, Technology, Engineering, and Mathematics) subjects, especially the specialized subjects in the K to 12 curricula places a strong emphasis on developing instructional materials that help students in different areas of learning. As the curriculum mandates the use of daily learning materials (LM) tailored to the K-12 Science Curriculum Guide (DepEd.gov, 2019), teachers found them challenging in terms of required teaching competencies and the time needed to finish those competencies. Thus, the development of IMs can be a great help for teachers and students for effective teaching and learning.

According to DepEd Order No. 35, s. 2016 The Learning Action Cell as a K to 12 Basic Education Program School-Based Continuing Professional Development Strategy for the Improvement of Teaching and Learning in part 3 of its rationale is to select and implement the most effective instructional strategies and materials to teach the identified content objectives. Thus, for effective teaching and learning to happen, one of the main purposes is to develop instructional material such as intervention materials.

Locally, the teaching-learning process was done religiously with the aid of instructional materials. The aim of developing different Instructional Materials is to deliver quality education to students. To ensure that students have

acquired the necessary skills required at their respective levels, Least Mastered Skills (LMS) and Learning Outcome Assessment (LOA) are being used to collect data on where the students need to give intervention.

However, the result of the LOA and LMS for 3 consecutive years in General Physics 1 at Tanay Senior High School in week 8 First Quarter given the Most Essential Learning Competencies has been posting disappointing. The researcher identified most of the non-mastered skills in this area. It may be concluded that one of the factors why MELC in Week 8 got the non-mastered skills results is because of because of the time frame and too many MELCs given in this specialized subject. The other reason is that, since there is a limited time for classroom discussion, the students just watch most of the topics on youtube and study on their own the given materials (PPT) from the teacher.

To address this issue, the researcher being a science teacher developed an instructional material called Strategic Intervention Materials in General Physics I to help solve the problem of low level of mastery (non-mastered skills) in First Quarter Week 8 of the given Most Essential Learning Competencies since the lessons were not properly taught in the classroom due to many given competencies and limited time frame. It is also one of the reasons why the researcher was encouraged and motivated to develop SIMs thus it will help students to learn the topics even by themselves, even at their own house, and at the same time help the teacher monitor the student's learning progress. Thus, teaching and learning process can be positively observed.

## INTERVENTION/INNOVATION

Instructional material is one of the ways how the students learn a specific lesson or topic. It is an important instrument in student success and how teachers access the teaching and learning process. An effective instructional material encourages active learning and develops proper application. In designing instructional material, it is necessary to consider each component such as content, format, organization and presentation, and accuracy and up-to-date information thus it will enhance learning outcomes.

In this regard, the Regional Learning Resource Management Development Section (LRMDS) under the Curriculum and Learning Management Division (CLMD) conducted workshops and created shops on the development, production, and evaluation of contextualized storybooks produced by teachers for regionwide adoptions (Agamata, 2018). This was stated on the legal basis in the Republic Act no. 10533 Rule II, Section 10.3 of Republic Act No. 10533:

“The production and development of locally produced teaching and learning materials shall be encouraged. The approval of these materials shall be devolved to the regional and division education unit in accordance with national policies and standards.”

From this, the researcher made a Strategic Intervention Materials (SIM) in General Physics 1 that may solve problems of non-mastery skills in the given Most Essential Learning Competencies (MELC) of First Quarter Week 8 topics. The researcher determined the lessons to be included in the SIM based on the results of the Learning Outcome Assessment (LOA) and Least Mastered Skills (LMS) from 3 consecutive years starting from S.Y. 2022-2023, S.Y. 2023-2024 and up to this present school year 2024-2025. The developed SIMs have nine (9) parts with different features such as Title Card, Task Card, Guide Card, Activity Card, Assessment Card, Enrichment Card, Answer Card, Progress Card and Reference Card. Each card offered different strategies or approaches for the learners to understand the topic or lesson comprehensively. It also contained different hands-on activities or experiments to help students learn the actual set-up of the lesson.

The SIM in General Physics 1 helped facilitate the teaching and learning process of the teacher in STEM and can also be used by other schools with STEM strand for benchmarking because it may help the teacher teach the lesson not being discussed in the classroom due to limited time frame and too many given MELCs, it may also help the teaching and learning process enjoyable, useful and meaningful because of its creative design and presentation.

Therefore, the researcher being a Physics major and one who believed in the power of developing and introducing new instructional material to students helped learners to develop their analytical, scientific, and experimental techniques since 21<sup>st</sup>-century learners achieve learning success.

## RESEARCH QUESTIONS

This study aimed to develop and evaluate the developed Strategic Intervention Materials in General Physics 1 at Tanay Senior High School.

Specifically, it sought to answer the following questions:

1. How are the Strategic Intervention Materials in General Physics 1 developed?
2. How do the experts evaluate the developed Strategic Intervention Materials in General Physics 1 in terms of:
  - 2.1. Factor 1: Content;
  - 2.2. Factor 2: Format;
  - 2.3. Factor 3: Presentation and Organization; and
  - 2.4. Factor 4: Accuracy and Up-to-datedness of Information?
3. What are the comments and suggestions of the science teachers/experts in the field for the developed Strategic Intervention Materials in General Physics 1?

## PARTICIPANTS / SOURCE OF DATA OR INFORMATION

The respondents of the study were 15 science teachers from different Schools in Tanay, Rizal. They were from Junior or Senior High School and taught Physical Science Subjects (Chemistry and Physics) and General Physics 1. The purposive sampling technique was used in this study.

This study utilized the descriptive-developmental methods of research to evaluate the Strategic Intervention Materials in General Physics I. The descriptive aspect of the research focused on providing a detailed description of the developed SIM or strategic intervention materials as the final product and the developmental process that will include revisions and improvements made based on feedback and analysis from experts. The developmental aspect of the research involved creating the strategic intervention materials according to identified needs most essential learning competencies (MELC). This process included the continuous refinement and improvement of the material based on experts' evaluation. Additionally, it involved thorough documentation of the developmental process, including the rationale behind design decisions, challenges faced, and revisions made throughout the development stages.

After the development of the instructional material with the topic found to be the non-mastered competencies, the researcher crafted or made the contents included in the developed Strategic Intervention Materials in General Physics 1.

An adapted questionnaire checklist from LRMS Evaluation of Printed Materials was used in gathering the needed data to establish descriptive research. This method is essential to collect information necessary to know if the developed Strategic Intervention Materials in General Physics 1 is much suited and accepted based on the different aspects or factors. The developed SIM was also subjected to evaluation of the teacher-experts for its acceptability.

## DATA GATHERING METHODS

For the development of the Strategic Intervention Materials in General Physics 1, the researcher based the content of the SIMs on the given Most Essential Learning Competencies (MELC) in one of the specialized subjects of the STEM strand that covers the topics in the First Quarter Week 8 with the recorded non-mastered skills in Learning Outcome Assessment (LOA) and Least Mastered Skills (LMS).

The researcher adapted the Evaluation Rating Sheet for Print Resources from the DepEd LRMS Portal as a questionnaire checklist. The checklist consists of different aspects such as Content, Format, Presentation, Organization, Accuracy, and Up-to-datedness of Information. The Strategic Intervention Materials in General Physics 1 was validated by 15 science teachers from different schools in Tanay, Rizal.

For further understanding of the evaluation made by the science teachers in terms of content, format, presentation, and organization, the 4-point Likert scale given its range and verbal interpretation was used.

Scale	Range	Verbal Interpretation
4	3.26 - 4.00	Very Satisfactory
3	2.51 - 3.25	Satisfactory
2	1.76 - 2.50	Poor
1	1.00 - 1.75	Not Satisfactory

In addition, for the evaluation made by the science teacher in Accuracy and Up-to-datedness of information, a 4-point Likert Scale given its range and verbal interpretation was used.

Scale	Range	Verbal Interpretation
4	3.26 - 4.00	Not present
3	2.51 - 3.25	Present but very minor and must be fixed
2	1.76 - 2.50	Present and requires major redevelopment
1	1.00 - 1.75	Do not evaluate further

The adapted questionnaire checklists from the respondents were retrieved. The data gathered and obtained from the questionnaires were summarized, tabulated, presented, analyzed, and interpreted. Possible trends were established for conclusions and recommendations. The study ran from October to March 2025.

## DATA ANALYSIS

To answer the statement of the problem of the research, the following statistical treatments were used:

1. To determine how the Strategic Intervention Materials in General Physics 1 developed, a qualitative description was used.
2. To determine how the experts evaluate the developed Strategic Intervention Materials in General Physics 1 with respect to content, format, presentation and organization, and accuracy and up-to-datedness of information, the weighted mean was used.
3. To determine the comments and suggestions of experts in the developed Strategic Intervention materials in General Physics 1, the qualitative description was used.

## DISCUSSION OF RESULTS AND RECOMMENDATIONS

### A. Discussion of Results

**SOP 1:** How are the Strategic Intervention Materials in Physics 1 developed?

#### *Development of Strategic Intervention Materials in Physics 1*

For the development of the Strategic Intervention Materials in General Physics 1, the researcher based the content of the SIMs on the given Most Essential Learning Competencies (MELC) in one of the specialized subjects of the STEM strand that covers the topics in the First Quarter Week 8 with the recorded non-mastered skills in Learning Outcome Assessment (LOA) and Least Mastered Skills (LMS). The researcher determined the lessons to be included in the SIM based on the results of the Learning Outcome Assessment (LOA) and Least Mastered Skills

(LMS) from 3 consecutive years starting from S.Y. 2022-2023, S.Y. 2023-2024 and up to this present school year 2024-2025. The developed SIMs have nine (9) parts with different features such as Title Card, Task Card, Guide Card, Activity Card, Assessment Card, Enrichment Card, Answer Card, Progress Card, and Reference Card. Each card offered different strategies or approaches for the learners to understand the topic or lesson comprehensively. It also contained different hands-on activities or experiments to help students learn the actual set-up of the lesson.

**SOP 2:** How do the experts evaluate the developed Strategic Intervention Materials in General Physics 1 in terms of the content, format, presentation and organization and accuracy and up-to-datedness of information?

***Experts’ evaluation on the developed Strategic Intervention Materials in General Physics 1***

Table 1 presents the experts’ evaluation on the developed Strategic Intervention Materials in General Physics 1 terms of Content.

Table 1. *Experts’ Evaluation of the Developed Strategic Intervention Materials in General Physics 1 in terms of Content*

CONTENT	MEAN	VI
1. Content is suitable to the student's level of development	3.8	vs
2. Material contributes to the achievement of specific objectives of the subject area and grade/year level for it is intended.	3.9	VS
3 Material provides for the development of higher cognitive skills such as critical thinking, creativity, learning by doing, inquiry, problem solving, etc.	3.9	VS
4. Material is free of ideological, cultural, religious, racial, gender biases and prejudices.	3.9	VS
5. Material enhances the development of desirable value and traits such as: (Put a check (✓) mark only to the applicable values and traits)	3.9	VS
6. Material has the potential to arouse interest of target reader.	3.7	VS
7. Adequate warning/cautionary notes are provided in to and activities where safety and health are of concern.	3.7	VS
AVERAGE	3.83	VS

The table presents the experts’ evaluation results of the developed Strategic Intervention Materials in General Physics 1 focusing on content. Based on the results, all the aspects of the content got Very Satisfactory (VS) results, and the average got 3.83 Overall mean with Very Satisfactory (VS) verbal interpretation.

The results showed that the educational materials are good but need a bit of improvement for a more complete and inclusive approach.

These findings imply that educators should prioritize the design and delivery of course materials with a focus on relevance to students' lives. By incorporating active learning strategies and ensuring clear communication, educators can enhance student engagement and facilitate better understanding. Findings from the development and validation of these Strategic Intervention Materials align with the statement of Tutana (2020) in his thesis entitled “Localized Instructional Materials in Teaching Mathematics for Grade 8 learners”, emphasizing the importance of well-designed content, active learning, clear communication, feedback, and technology integration in fostering student engagement and comprehension.

Table 2 presents the experts' evaluation on the developed Strategic Intervention Materials in General Physics 1 terms of Format.

Table 2. *Experts' Evaluation of the Developed Strategic Intervention Materials in General Physics 1 in terms of Format*

FORMAT	MEAN	VI
<b>PRINT</b>		
1.1. Size of letters is appropriate to the intended user.	3.9	VS
1. 2 Spaces between letters and words facilitate reading.	3.7	VS
1.3 Font is easy to read.	3.7	VS
1.4 Printing is of good quality (i.e., no broken letters,	3.5	VS
<b>ILLUSTRATIONS</b>		
2.1 Simple and easily recognizable.	3.8	VS
2.2 Clarify and supplement the text.	3.6	VS
2.3 Properly labelled or captioned (if applicable)	3.7	VS
2.4 Realistic / appropriate colors.	3.1	S
2.5 Attractive and appealing.	3.6	VS
2.6 Culturally relevant.	3.8	VS
<b>DESIGN AND LAY OUT</b>		
3.1 Attractive and pleasing to look at.	3.9	VS
3.2 Simple (i.e., does not distract the attention of the reader).	3.9	VS
3.3 Adequate illustration in relation to text.	3.9	VS
3.4 Harmonious blending of elements (e.g., illustrations and text).	3.8	VS
<b>PAPER AND BINDING</b>		
4.1 Paper used contributes to easy reading.	3.9	VS
4.2 Durable binding to withstand frequent use.	4.0	S
<b>SIZE AND WEIGHT OF RESOURCE</b>		
5.1 Easy to handle.	3.9	VS
5.2 Relatively light.	4.0	VS
<b>AVERAGE</b>	3.76	VS

Table 2 on the previous page presents the evaluation results of the developed Strategic Intervention Materials in General Physics 1 focusing on the format. The highest mean score of 3.9 with verbal interpretation of "VS" in Print Aspect was obtained for item 1.1, "Size of letters is appropriate to the intended user."

Moving on to the Illustrations aspect, the highest mean score of 3.8 with the verbal interpretation of “VS” was obtained for items 2.1 and 2.6, “Simple and Easily Recognizable” and “Culturally Relevant” suggesting that the illustrations used in the materials are visually appealing and likely to capture the interest and attention of the students.

In the "Design and Layout" aspect, the highest mean score of 3.9 with the verbal interpretation of “VS” was obtained for items 3.1, 3.2, and 3.3, indicating that the design and layout of the materials are both visually appealing and has adequate illustrations about the text.

In the "Paper and Binding" category, the evaluation for item 4.2 indicates that the paper has durable binding to withstand frequent use and received a rating of "Very Satisfactory" with a score of 4.0 This implies that the paper quality is durable and lightweight.

For the "Size and Weight of Resources" aspect, item 4.2 has an average mean of 4.00. This means that the SIM is relatively light due to its manageable size and weight.

The overall average mean score is calculated to be 3.76. This score suggests that, on average, the experts perceived the developed Strategic Intervention Materials in General Physics 1 to be of high quality and highly satisfactory in terms of all aspects.

These findings emphasize the importance of well-designed and developed instructional materials such as SIM, especially in this time of post-pandemic. High-quality format, illustrations, design, and layout are crucial for engaging students and enhancing their learning experience. Materials that are visually appealing, durable, and easy to handle create a positive learning environment, leading to improved student outcomes in science education. Findings support the study of by Abdullah et al. (2023) that highlights the importance of format in learning materials. The study focuses on the creation and evaluation of the PADA module, providing specific instructions for its reuse in educational settings. Conducted during the COVID-19 pandemic, the research addresses challenges in virtual STEM education. The PADA module, designed for Science, Technology, Engineering, and Mathematics (STEM) subjects, utilizes a mixed-method approach, incorporating interviews with pedagogical science experts and assessing the module's effectiveness with 623 students through online assessments. The module is recognized for its significant benefits in supporting successful virtual learning during the pandemic and similar circumstances.

Table 3 presents the experts’ evaluation on the developed Strategic Intervention Materials in General Physics 1 terms of Presentation and Organization.

Table 3. *Experts’ Evaluation of the Developed Strategic Intervention Materials in General Physics 1 in terms of Presentation and Organization*

PRESENTATION AND ORGANIZATION	MEAN	VI
1. Presentation is engaging, interesting, and understandable.	3.8	VS
2. There is logical and smooth flow of ideas.	4.0	VS
3. Vocabulary level is adapted to target reader's likely experience and level of understanding.	4.0	VS
4. Length of sentences is suited to the comprehension level of the target reader.	4.0	VS
5. Sentences and paragraph structures are varied and interesting to the target reader.	4.0	VS
AVERAGE	3.96	VS

The table provides an evaluation of the developed Strategic Intervention Materials in General Physics 1 based on presentation and organization.

Experts evaluated the materials and assigned an overall rating of 3.96, indicating a high level of satisfaction with how the content is presented and organized.

This implies that the materials helped maintain student engagement and prevented monotony, found to have an engaging and understandable presentation, a logical flow of ideas, adapted vocabulary, suitable sentence lengths, and varied sentence and paragraph structures have positive attributes that contribute to an effective and enriching learning experience for the readers.

Findings support the study by Chen, Chiu, and Wu (2019) which emphasized the importance of clear and well-organized instructional materials in science education. When content is well-organized, information is logically sequenced, and explanations are concise, it helps students better understand complex scientific concepts and establish connections between various topics. In essence, clear and well-organized instructional materials are crucial for promoting deeper learning and comprehension in science education.

Table 4 presents the experts' evaluation on the developed Strategic Intervention Materials in General Physics 1 terms of Accuracy and Up-To-Datedness.

Table 4. Experts' Evaluation of the Developed Strategic Intervention Materials in General Physics 1 in terms of Accuracy and Up-To-Datedness

Accuracy And Up-To-Datedness	MEAN	VI
1. Conceptual errors.	4.0	NP
2. Factual errors.	4.0	NP
3. Grammatical errors.	4.0	NP
4. Computational errors.	4.0	NP
5. Obsolete information.	4.0	NP
6. Typographical and other minor errors (e.g., inappropriate or unclear illustrations, missing labels, wrong captions, etc.).	4.0	NP
AVERAGE	4.0	NP

Table 4 presents the evaluation of the developed Strategic Intervention Materials in Physics 1 by experts in terms of accuracy and up-to-datedness of information. The evaluation criteria include conceptual errors, factual errors, grammatical errors, computational errors, obsolete information, and typographical/minor errors.

The experts rated each criterion with 4.00, indicating high levels of accuracy and up-to-datedness of information throughout the developed SIM. The overall evaluation score was also 4.00, signifying a Very Satisfactory evaluation by the experts or errors are "Not Present"

This implies that the results of the evaluation of the accuracy and up-to datedness of information in the developed Strategic Intervention Materials in Physics 1 revealed a generally positive picture. Experts, giving an average rating of 4.0, are satisfied in the overall accuracy, reliability, and currency of the developed Strategic Intervention Materials in Physics 1.

The findings aligned with the research conducted by Miranda and Pacho (2022), which underscores the crucial importance of accuracy and up-to datedness in learning materials. The results of the current study highlight that the instructional material, under evaluation, demonstrated high validity in terms of accuracy and currency of information. This underscores the critical role of having precise and current information in maintaining the quality and efficacy of educational resources.

Table 5 presents the composite mean of the developed Strategic Intervention Materials in General Physics 1 in terms of the different variables.

Table 5. *Experts' Evaluation of the Developed Strategic Intervention Materials in General Physics 1 in terms of Different Variables*

Overall	MEAN	VI
1. Content	3.83	VS
2. Format	3.76	VS
3. Presentation and Organization	3.96	VS
4. Accuracy and Up-to-Datedness	4.0	NP
AVERAGE	3.89	VS

The composite mean rating, calculated as 3.89, indicates a “Very Satisfactory” performance across various aspects of the materials. In terms of content, format and presentation and organization, the developed Strategic Intervention materials in Physics 1 received highly positive ratings.

Experts praised the material for being suitable to students' developmental levels, contributing to subject objectives, promoting higher cognitive skills, and being free from biases.

The findings imply that the materials meet the expectations of the experts in all areas or criteria.

Findings support the study by Teti (2016) which underscores the critical need for effective supervision, teacher motivation, and the development and implementation of quality instructional materials to support positive student outcomes.

**SOP 3:** What are the comments and suggestions of the science teachers / experts in the field for the developed Strategic Intervention Materials in General Physics 1?

### **Comments and Suggestions of the Science teachers/experts in the developed Strategic Intervention Materials in Physics 1**

The experts gave their comments and suggestions regarding the developed Strategic Intervention Materials in Physics 1. The developed material is well- received and deemed informative for students, with recognition that it will contribute to the teaching-learning process for both students and teachers. One expert suggested that to enhance more the material, provide additional real-life examples, more activities, and including more diagrams and pictures to further enrich the learning experience. Overall, the output is appreciated and seen as additional material that will serve its purpose and lead to better learning in the future.

### **CONCLUSION**

Based on the findings of the study, it was concluded that the developed Strategic Intervention Materials in Physics 1 can be an additional teaching tool or instructional material that will help enhance teaching and learning condition conforms with the LRMDs criteria for print materials.

### **Recommendations**

Considering the conclusion drawn, the following are the recommendations:

1. The developed Strategic Intervention Materials in Physics 1 is open for modifications and should be updated regularly according to the experts' feedback.
2. The developed Strategic Intervention Materials in Physics 1 can be used by other teachers in Physics for benchmarking.
3. Conduct further study to test the effectiveness of the developed Strategic Intervention Materials in Physics 1.

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