

Development and Validation of Strategic Intervention Materials (SIMs) in Projectile Motion for Science 9

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Abstract. While Strategic Intervention Materials (SIMs) are widely used, empirical research on their impact on learners' understanding of projectile motion in Science 9 is limited. Existing studies typically focus on general science concepts, leaving a gap in evaluating the effectiveness of SIMs tailored to specific topics, such as motion in two dimensions. Many learners struggle with misconceptions about projectile motion, particularly viewing horizontal and vertical motion as interdependent rather than independent. Current SIMs often fail to address these misconceptions, contributing to underperformance. The study aimed to develop and validate instructional materials—specifically SIMs—to reteach topics deemed “least mastered” by learners in projectile motion. The developed SIMs were validated by experts through experimental and descriptive evaluative methods and were found to be highly valid and acceptable in both content and technical aspects. To evaluate their effectiveness, 136 heterogeneous Grade 9 learners from public (68) and private schools (68) were divided into control and experimental groups, with 34 learners in each group. The experimental group was taught using the developed SIMs, while the control group followed conventional teaching methods. Pre- and post-tests were administered, and data were analyzed using means and t-tests. The findings revealed a significant difference in academic achievement between the groups, with the experimental group demonstrating better results. This indicates that the SIMs effectively supported the learning process in projectile motion and helped learners master the least-mastered competencies. The study recommends continuous revision and expert validation of the SIMs to enhance their effectiveness. Feedback from learners' post-usage is essential for ongoing improvement, and further research should explore additional least mastered competencies in Science 9. Additionally, professional development for Science teachers through seminars and training should be provided to support effective SIM implementation.

Keywords: Strategic Intervention Materials (SIMs); Projectile Motion; Science 9; Curriculum development; Instructional materials.

1.0 Introduction

Various challenges have emerged as the Philippine Education System undergoes significant changes due to the implementation of the K-12 Basic Education Curriculum since 2015 (Reyes, 2024; Gurobat & Lumbu-an, 2022). Teachers must meet the objectives and competencies outlined in this curriculum and ensure that learners achieve them. However, in the early years of implementation, one significant issue faced by the education sector—particularly by teachers at the forefront of the teaching-learning process—was the inadequacy of learning materials (Dela Cruz, n.d.; Reyes, 2024). In addition to the department's limited resources for continuous

improvement, some teachers lack sufficient knowledge in developing instructional materials, particularly for interventions (Sanguenza & Gamao, 2021).

Teachers are sometimes responsible for providing resources that the department should supply to facilitate an effective teaching-learning process. However, due to a lack of instructional materials and differentiated methodologies (Weselby, 2014), learners often struggle to meet specific competencies, particularly in Science. Although Science is frequently recognized as significant due to its connection to technology—a government priority for economic development (Elkington, 2015)—learners still perceive it as a difficult subject, regardless of its importance. Research and student feedback consistently indicate that Science subjects, particularly Physics, Chemistry, Biology, and Earth Science, are seen as challenging. Many learners report difficulties with abstract concepts, complex problem-solving, and the high demand for critical thinking required in these subjects, compounding the difficulty. For example, Physics is frequently cited as one of the most challenging subjects due to its reliance on mathematics and a conceptual understanding of the physical world. Learners often feel overwhelmed by the volume of content they need to master, contributing to negative attitudes toward these subjects (CollegeVine, 2024; Debon, n.d.).

As a result, Science education has never been an enjoyable avenue for learners to grasp important concepts relevant to societal situations, leading to relatively low academic achievement in this field (Dacumos, 2016; Bernardo et al., 2023; Galvez & Reyes, 2023). Recent research highlights that Filipino learners' academic achievement in Science has remained low. This is evident in international assessments, such as the 2022 Programme for International Student Assessment (PISA), where Filipino learners scored significantly below the global average in Science. With an average score of 356 (compared to 357 in 2018) against the OECD average of 489, the Philippines ranked third from the bottom in scientific literacy among participating nations (Bernardo et al., 2023; SLA-PH, 2024). This raises questions about whether the evolving curriculum affects learners' performance levels despite numerous efforts by the education sector. This highlights the importance of utilizing Strategic Intervention Materials (SIMs), especially for assessing learners' mastery of specific competencies.

Asuncion (2013) and Luzano (2020) describe Strategic Intervention Materials (SIMs) as learning kits that promote critical thinking, independent and self-directed learning, and creativity among learners by providing ready information in various formats, detailed instructions, content summaries, and diverse learning situations that facilitate maximum attainment of scientific knowledge through engaging activities. Dela Cruz (2012) and Limbago-Bastida and Bastida (2022) emphasize that using SIMs in teaching Science contributes to high-performance levels among learners. For this reason, the researcher developed instructional materials, specifically a re-teaching tool, to help learners better understand abstract concepts in Science and Technology, particularly in physics. Since Science is a nature-based discipline, instructional challenges can be addressed by constructing and utilizing instructional materials to enhance learner performance. The Department of Education (DepEd) Schools Division Office of Marinduque strongly encourages its members to incorporate and adopt SIMs across all subjects to improve learners' performance levels, particularly in Science.

Recognizing her dual role as researcher and teacher and as a stakeholder in this research, she developed and adopted a specific Strategic Intervention Material (SIM) in Science 9: Projectile Motion to test and validate its effectiveness and impact on learners' performance. She believes that the SIM will significantly assist low-performing learners in understanding and improving their performance in various concepts related to projectile motion. Additionally, given that their comprehension of English texts often remains at a literal level due to limited vocabulary and exposure to higher-level language structures (de Guzman, 2009; Fajardo, 2018; Sarmiento, 2021; Gatchalian & Nacario, 2019; Aduna, 2020), the developed intervention materials are tailored to their reading abilities to facilitate concept assimilation and skill acquisition, particularly regarding the challenging topic of projectile motion. The materials are specifically designed for Grade 9 learners at two (2) selected secondary schools. The researcher aims to accomplish the following: identify the least mastered concepts in Science 9: Projectile Motion during the fourth quarter; describe the learners' pretest scores; evaluate their posttest scores; determine if there is a significant difference between the scores of the experimental and control groups in the pretest and posttest; and explain the process of developing the SIM, which was evaluated and validated by Junior and Senior High School Master/Key Science Teachers in the province of Marinduque in terms of content, technical validity, and acceptability.

2.0 Methodology

2.1 Research Design

The experimental and descriptive evaluative methods were employed in this study to develop and validate refined instructional materials in Strategic Intervention Materials (SIMs) to enhance learner performance in the least mastered competencies in Science 9, specifically in topics such as Projectile Motion. Experimental methods are essential for determining the validity and effectiveness of educational interventions like SIMs. By utilizing control and experimental groups, researchers can isolate the impact of the intervention on learner outcomes (Creswell & Clark, 2018) and statistically analyze quantitative data to determine significant differences in learner performance before and after the intervention (Campbell & Stanley, 1963), thereby establishing causality.

Conversely, descriptive, evaluative methods focus on understanding the context and processes of implementing SIMs. These methods help researchers capture the nuances of educational practices, including teacher attitudes, student engagement, and barriers to implementation (Yin, 2014). Additionally, they facilitate the collection of feedback from participants, which informs revisions to the SIMs, ensuring they meet the needs of diverse learners (Stake, 2010). The development and validation of the Strategic Intervention Material (SIM) adapted and utilized an existing instructional design model, specifically the ADDIE Model (Center for Educational Technology at Florida State University, 1975), to create structured, effective, and learner-centered resources. This model includes the following stages: analysis (preparation), design, development, implementation, and evaluation (validation).

2.2 Research Locale

The study was conducted at two (2) secondary schools in the Schools Division of Marinduque. One is a public high school in the Buenavista District, while the other is a private high school in Mogpog District.

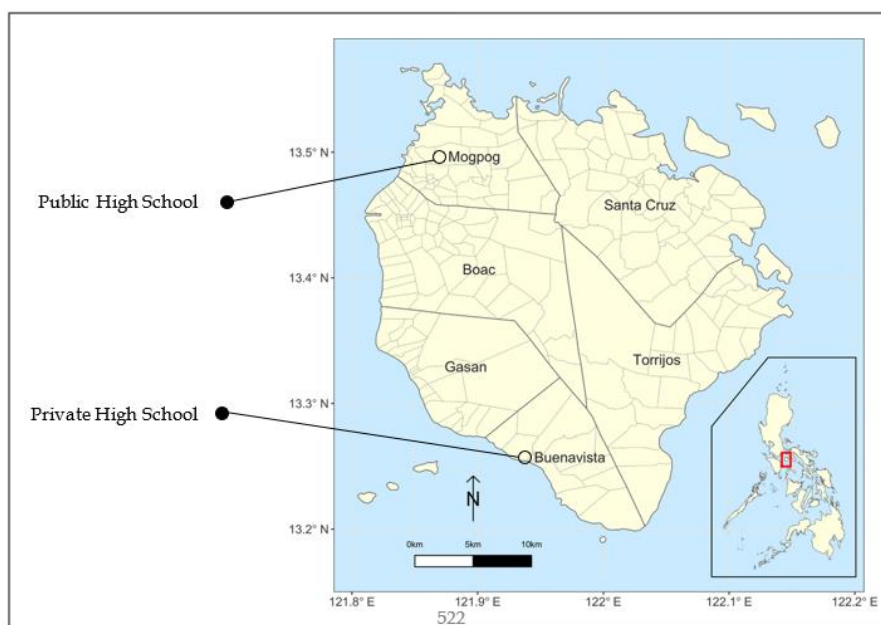


Figure 1. Location Map of the Selected Secondary Schools
(Image Source: Salvacion, 2022)

2.3 Research Participants

The participants of the study were Grade 9 learners officially enrolled during the school year in which the study was conducted at two (2) identified secondary schools within the Schools Division of Marinduque. These learners were studying lessons related to Motion in Two Dimensions, particularly projectile motion. Using Slovin's formula to determine the sample size, 68 out of 82 Grade 9 learners were selected from the public high school, and 68 out of 82 learners were chosen from the private high school. The learners were randomly selected using the fishbowl method to ensure a representative, unbiased, and ethically sound sample selection process, contributing

to the overall reliability and credibility of the study (Creswell & Creswell, 2018; Levy & Lemeshow, 2013; Babbie, 2015). These 136 participants were then given a diagnostic test to identify the least mastered competencies in Motion in Two Dimensions, particularly projectile motion. The participants were divided into two (2) groups: the experimental group (SIM group) and the control group (non-SIM group). The SIM group utilized the researcher-made SIMs, while the non-SIM group did not use the researcher-made SIMs and instead followed the conventional teaching methods for the same topic. Following the development and validation of the SIMs based on these competencies, the learners were given a pretest and posttest to measure the effectiveness of the intervention and to assess improvements in their mastery of the competencies after the intervention (Creswell & Clark, 2018).

To evaluate the content and validity of the developed Strategic Intervention Materials (SIMs) for Science 9 on projectile motion, the researcher used purposive sampling to intentionally select expert validators with specialized knowledge or expertise, thereby increasing the validity and reliability of the findings (Robinson, 2014). The inclusion criteria for the expert validators required them to be graduates of Education, major in Science – mainly Physics or Physical Sciences – and to be either Master Teachers from the Department of Education (DepEd) or Assistant/Associate Professors/Professors from higher education institutions (HEIs).

2.4 Research Instrument

Questionnaire

The study utilized a questionnaire checklist to validate the developed Strategic Intervention Materials (SIMs). The expert validators were given questionnaires using a five-point scale to evaluate the validation of the SIMs based on a similar study conducted by Dy (2007). The content and technical validity of the developed SIMs were assessed using the scale below, with five (5) degrees of intensity, where 5 represents the highest rating and 1 represents the lowest. The scale of the statistical values adopted to assess the aspects is as follows:

Table 1. Likert scale for evaluating the validity and acceptability of the strategic intervention materials (SIMs)

Weighted Mean	Arbitrary Value	Descriptive Rating	Verbal Interpretation	
			Content and Technical Validity	Acceptability
4.50 – 5.00	5	Very Evident (VE)	Very Much Valid	Very Much Acceptable
3.50 – 4.49	4	Evident (E)	Much Valid	Much Acceptable
2.50 – 3.49	3	Moderately Evident (ME)	Moderately Valid	Moderately Acceptable
1.50 – 2.49	2	Less Evident (LE)	Least Valid	Least Acceptable
1.00 – 1.49	1	Least Evident (LtE)	Not Valid	Not Acceptable

Diagnostic Test

The researcher utilized a researcher-made diagnostic test with content aligned to the Curriculum Guide for Science 9. To ensure that all learning competencies were met and fully represented, a Table of Specifications (TOS) was prepared. This included specific learning objectives, levels of learning, number of hours, corresponding item numbers, and equivalent percentages. The test was also validated by at least eight (8) expert validators. The 50-item test followed a multiple-choice format, with four (4) choices per item and one (1) correct answer, and was administered in a paper-pencil format within 60 minutes. The results of this diagnostic test were used to identify the least mastered in the content related to Motion in Two Dimensions, which would then be the focus of the development of specific Strategic Intervention Materials (SIMs).

Pretest/Posttest

The pretest and posttest, both researcher-made, consisted of 50 items and were almost identical in difficulty to the diagnostic test. The pretest/posttest underwent the same validity process as the diagnostic test. Each item was considered valid if all expert validators deemed it essential and appropriate for inclusion in the pretest/posttest. The test followed a multiple-choice format, with four (4) choices per item and one (1) correct answer. After necessary validation corrections were made, the revised and finalized pretest/posttest was subjected to pilot testing with learners who were not part of the study but were also Grade 9 learners from the two (2) selected secondary schools. The pilot testing, with the same number of participants as in the research sample, confirmed the instrument's reliability, with a Cronbach's alpha of 0.8916. Based on Cronbach's alpha's general rule of thumb, a value above 0.70 is good, above 0.80 is better, and above 0.90 is best (Statistics Solutions, n.d.).

The test was administered in a paper-pencil format within 60 minutes, and its content was aligned with the competencies specified in the curriculum guide. The results of these tests were subjected to an item analysis comparing the upper 27% group and the lower 27% group. After the result was analyzed, five (5) items were discarded, and the remaining test items were used for the experiment's pretesting and post-testing. The results of these tests were reused to evaluate the effects of using the Strategic Intervention Materials (SIMs) on learners' performance throughout the session.

2.5 Data Gathering Procedure

Based on the ADDIE Model, The study began by developing Strategic Intervention Materials (SIMs) in Science 9. The procedures for gathering materials and information and organizing the SIMs are as follows:

Phase I: Analysis, Design, and Development Phase

In preparation for developing the Strategic Intervention Materials (SIMs), the researcher identified the topics that were least mastered within the specific learning competencies related to Motion in Two Dimensions during the fourth grading period. The selection of topics was based solely on the results of a diagnostic test on projectile motion administered to the selected respondents of this study. Out of the two (2) learning competencies related to projectile motion, both were identified as the basis for the final preparation of the SIMs developed by the researcher. The second part of the development phase involved organizing each identified topic. Corresponding SIMs were created for each topic. Each SIM consists of a guide card, activity card, assessment card, enrichment card, and reference card.

Phase II: Validation Phase

The experts validated the SIMs, specifically selected Junior and Senior High School Master/Key Teachers in Science from the Schools Division of Marinduque, using a five-point scale rating. The materials were evaluated in terms of content and technical aspects. The experts were given questionnaire checklists and asked to use the five-point scale rating to validate the SIMs. The components used for validation included the Guide Card, Activity Card, Assessment Card, Enrichment Card, and Reference Card.

Phase III: Implementation and Evaluation Phase

To determine the effectiveness of the validated SIMs, they were implemented with selected Grade 9 learners from two (2) secondary schools in the Schools Division of Marinduque. Two (2) sections from these schools were used as subjects for the study, with one section as the experimental group and the other as the control group. The study did not reassign learners to the experimental or control groups, as all sections were heterogeneous. A pretest was administered to assess the learners' prior knowledge of projectile motion. The researcher personally administered most of the research instruments, including the SIMs, to the respondents. Although the teacher-researcher did not teach Science 9 at the identified secondary schools, she implemented the SIMs during the teaching-learning process for projectile motion. Pretest and posttest scores were collected from the learners after the materials were used.

The researcher personally administered the questionnaire checklist to the Science teachers, specifically the selected Junior and Senior High School Master/Key Teachers in Science from the Schools Division of Marinduque. Before distributing the instrument, she discussed the significance of the study with the respondents. The respondents were given ample time to complete the questionnaire-checklist to avoid rushed responses and ensure they had time to evaluate every part and detail of the developed SIMs. The results were tallied and tabulated after the developed SIMs were used and the questionnaire checklists were completed. These data were then subjected to analysis and interpretation.

2.6 Ethical Considerations

To protect respondents' rights, the researcher obtained informed consent from all participants, including learners, teachers, and administrators, ensuring they fully understood the purpose and procedures of the study. The research prioritized confidentiality and anonymity, safeguarding participants' personal information and responses. It also ensured that the Strategic Intervention Materials (SIMs) were inclusive, culturally sensitive, and equitable, providing equal learning opportunities for all learners, regardless of their background or abilities. Additionally, the study was designed to avoid causing any psychological or academic stress to the learners,

ensuring that the materials were educationally beneficial without creating unnecessary pressure. Finally, the researcher upheld transparency in reporting results, avoided plagiarism, and acknowledged all contributors throughout the study.

3.0 Results and Discussion

3.1. Topics Learners Find Difficulty in Learning and Understanding Projectile Motion Based from the Selected Fourth Quarter Learning Competencies in Science 9

The learners' learning skills encompass the areas they find most difficult. The data were obtained from the Diagnostic Test on Motion in Two Dimensions (Projectile Motion). As shown in the table, the least mastered competencies were based on the K to 12 Basic Education Curriculum Learning Competencies.

Table 2. Fourth quarter learning competencies in science 9: projectile motion

Rank	K to 12 Basic Education Curriculum Learning Competencies	Item Nos.	No. of Items	Type of School	MPS	Verbal Descriptive
1	Describe the horizontal and vertical motions of a projectile. (LS: S9FE-IVa-34)	1 - 25	25	Public	29.58	Low Mastery
				Private	30.91	Low Mastery
2	Investigate the relationship between the projection angle and the height and range of the projectile. (LS: S9FE-IVa-35)	26 - 50	25	Public	27.30	Low Mastery
				Private	31.82	Low Mastery

Table 2 reveals that, among the topics covered in the 4th Quarter Learning Competencies in Science 9: Projectile Motion, the following competencies were identified as the least mastered: 1) *Describe the horizontal and vertical motions of a projectile* and 2) *Investigate the relationship between the projection angle and the height and range of the projectile*. Both competencies were rated as having “low mastery.” These results align with Burk’s (2010) findings, which suggest that more than any other topic, projectile motion is often regarded as particularly challenging in the Sciences. Given these results, this topic requires additional focus and attention to enhance learners’ understanding and mastery of these competencies.

3.2 Strategic Intervention Materials (SIMs) Developed Based on the Fourth Quarter Least Mastered Competencies in Science 9: Projectile Motion

Among the least mastered competencies identified in the learners’ 4th Quarter Diagnostic Test on Motion in Two Dimension (Projectile Motion), two (2) were used as the basis for developing the Strategic Intervention Materials (SIMs). These competencies are: 1) *Describe the horizontal and vertical motions of a projectile*; and 2) *Investigate the relationship between the projection angle and the height and range of the projectile*.

Summary of the Grand Means of the Content and Technical Validity of the Developed Strategic Intervention Materials (SIMs)

Validating the content of any research materials (e.g., questionnaires, modules) is essential for evaluating whether they accurately measure what they designed to assess. In the case of the Strategic Intervention Materials (SIMs), experts validated them based on their key components: Guide Card, Activity Card, Assessment Card, Enrichment Card, and Reference Card.

Table 3. Content and technical validity of the developed strategic intervention materials (SIMs)

Indicators	Mean	Descriptive Rating	Verbal Interpretation	
			Content and Technical Validity	Acceptability
A. Content Aspect Indicator	4.33	Evident	Much Valid	Much Acceptable
1. Guide Card	4.44	Evident	Much Valid	Much Acceptable
2. Activity Card	4.37	Evident	Much Valid	Much Acceptable
3. Assessment Card	4.42	Evident	Much Valid	Much Acceptable
4. Enrichment Card	4.21	Evident	Much Valid	Much Acceptable
5. Reference Card	4.23	Evident	Much Valid	Much Acceptable
B. Technical Aspect Indicator	4.59	Very Evident	Very Much Valid	Very Much Acceptable
Grand Mean	4.46	Evident	Much Valid	Much Acceptable

As shown in Table 3, the overall validity and acceptability of the developed Strategic Intervention Materials (SIMs) are revealed. In general, the SIMs registered a grand mean validity score of 4.46, indicating they are *much valid* and *much acceptable*. Therefore, these materials can be effective as remediation tools. Specifically, the content validity of the SIMs in terms of their Guide Card, Activity Card, Assessment Card, Enrichment Card, and

Reference Card scored 4.44, 4.37, 4.42, 4.21, and 4.23, respectively, with an average mean of 4.33. Similarly, the technical validity of the SIMs received an average score of 4.59, confirming that they are *much valid* and *much acceptable*.

3.3 Effectiveness of the Strategic Intervention Materials (SIMs) in Science 9: Projectile Motion

To determine the effectiveness of using SIMs for re-teaching the concepts and skills related to the least mastered competences in Science 9: Projectile Motion, the researcher developed two (2) SIMs based on the following topics: 1) *Describe the horizontal and vertical motions of a projectile*; and 2) *Investigate the relationship between the projection angle and the height and range of the projectile*. The experimental groups in selected public and private schools in Marinduque used these materials as instructional tools for nearly one week.

Summary of t-Test Statistics for the Comparison between the Pretest, Posttest and Gained Scores of the Experimental and Control Groups from both Public and Private Schools in Science 9: Projectile Motion

Table 4. Summary of t-test statistics for the comparison between the pretest, posttest and gained scores of the experimental and control groups from public school in science 9: projectile motion

	Treatment	Mean
*	Pretest Results of the Experimental Group	13.7
	Pretest Results of the Control Group	13.3
**	Posttest Results of the Experimental Group	22.9
	Posttest Results of the Control Group	18.6
***	Pretest vs. Posttest Results of the Experimental Group	9.24
****	Pretest vs. Posttest Results of the Control Group	5.29
*****	Gained Scores of the Experimental Group	9.24
	Gained Scores of the Control Group	4.23

* $t = 0.102$ at $df = 33$ is Not Significant at $\alpha = 0.05$

** $t = 0.000$ at $df = 33$ is Significant at $\alpha = 0.05$

*** $t = 0.000$ at $df = 33$ is Significant at $\alpha = 0.05$

**** $t = 0.000$ at $df = 33$ is Significant at $\alpha = 0.05$

***** $t = 0.000$ at $df = 33$ is Significant at $\alpha = 0.05$

Based on the data presented, most of the computed p-values indicate a significant difference between the pretest and posttest means for the two (2) groups from the public school, except for the pretest results between the experimental and control groups. These results highlight the effectiveness of the developed SIMs over the conventional method in teaching Science 9: Projectile Motion. However, they do not directly suggest that the conventional method is ineffective as a re-teaching tool for improving learners' performances, as evidenced by the pretest and posttest means of the control group. At a 95% confidence interval, the t-test significantly differentiated the two (2) types of tests administered to the control group. This suggests that while the conventional method remains effective, it is insufficient to replace using SIMs as both a re-teaching tool and a remediation aid in enhancing learners' proficiency, particularly in Science subjects.

In consonance, similar studies have also highlighted the positive impact of SIMs on academic performance. The findings suggest that learners who engaged with SIMs demonstrated improved understanding and retention of key concepts compared to those who did not use these materials (Limbago-Bastida & Bastida, 2022; Martinez, 2019).

Table 5. Summary of t-test statistics for the comparison between the pretest, posttest and gained scores of the experimental and control groups from private school in science 9: projectile motion

	Treatment	Mean
*	Pretest Results of the Experimental Group	15.6
	Pretest Results of the Control Group	13.7
**	Posttest Results of the Experimental Group	25.9
	Posttest Results of the Control Group	26.3
***	Pretest vs. Posttest Results of the Experimental Group	10.2
****	Pretest vs. Posttest Results of the Control Group	12.6
*****	Gained Scores of the Experimental Group	10.2
	Gained Scores of the Control Group	12.6

* $t = 0.102$ at $df = 33$ is Not Significant at $\alpha = 0.05$

** $t = 0.000$ at $df = 33$ is Significant at $\alpha = 0.05$

*** $t = 0.000$ at $df = 33$ is Significant at $\alpha = 0.05$

**** $t = 0.000$ at $df = 33$ is Significant at $\alpha = 0.05$

***** $t = 0.000$ at $df = 33$ is Significant at $\alpha = 0.05$

As shown in Table 5, most of the results (in terms of the p values) and the interpretations are almost identical to the list of findings enumerated in Table 7. Employing the t-test of difference between the means of independent samples, results significantly differentiated the experimental and control groups from the private school except for the posttest results of the two groups with t equal to 0.710 at 33 degrees of freedom (df), which considered not significant at $\alpha = 0.5$ indicating that after the use of the developed Strategic Intervention Materials (SIMs) and the conventional method in re-teaching the lessons in Science 9: Projectile Motion, the learners' knowledge after the conduct of the experiment was still the same level.

However, given such results, the effectiveness of the developed Strategic Intervention Materials (SIMs) over the conventional method in teaching Science 9: Projectile Motion is apparent, considering it both a productive and functional re-teaching tool and a remediation aid in increasing learners' proficiency, especially in terms of Science subjects. Unlike the means obtained from the experimental and control groups in the public school, as shown in Table 5, the means acquired by the two groups in the private school are higher. This further implies that the level of knowledge and performance of the learners in this school is positively different from those in the public school. Aranda et al. (2019), however, stated in their study's findings, similar to this case, that the significant difference and increase in the posttest scores of the control group could be attributed to the fact that the subject taught using the conventional method is merely a repetition of what had been covered in the previous grading period. Despite this observation, the findings indicate that the science performance of the control group remained low.

Overall, the effectiveness of the developed Strategic Intervention Materials (SIMs) as the study employed the experimental design is seen throughout the experiment. Its aim is to assist teachers in providing their learners the needed reinforcement given the pretest and posttest results of both groups to create a progression in their respective subjects is attained as well. Furthermore, according to Dacumos (2016), different studies have also singularly pointed out the effectiveness of utilizing Strategic Intervention Materials (SIMs) in their respective Science lessons.

4.0 Conclusion

The findings from this study underscore the need for targeted educational interventions, such as Strategic Intervention Materials (SIMs), to help learners master difficult concepts in projectile motion. Developing and validating SIMs presents a promising approach to enhancing learning outcomes. By recognizing learners' unique challenges and leveraging innovative instructional strategies, educators can foster a deeper understanding of scientific principles, ultimately improving learner performance and engagement in Science Education. The study suggests that the developed SIMs should undergo continuous revision and expert validation to enhance their effectiveness in improving learners' performance in Science. Collecting feedback from learners after using the materials is crucial for ongoing improvement, and further studies should explore additional least mastered competencies in Science 9. Additionally, professional development opportunities, such as seminars and training for science teachers, should be provided to support the effective implementation of SIMs.

5.0 Contributions of Authors

The author initiated, conducted, and completed this study.

6.0 Funding

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7.0 Conflict of Interests

The author declares no conflict of interest.

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