Advanced Journal of STEM Education, Vol. 2 No. 1 (2024) https://doi.org/10.31098/ajosed.v2i1.2540

Research Paper

Effectiveness Of Feedback, Reframe, Assess, Model, And Enhance (FRAME) in the Enhancing of Learners' Performance of 9 Grader Students in Mathematics

Rudy D. Ebajan[1*], Victoria D. Tamban[1]

[1]Graduate School and Applied Research, Laguna State Polytechnic University, Philippines

Received : January 30, 2024	Revised : April 23, 2024	Accepted : May 24, 2024	Online : May 31, 2024

Abstract

Despite great efforts by the Department of Education, the Philippines during the 2022–2023 period exhibits one of the narrowest disparities in arithmetic performance between students in the highest and lowest quartiles of the economic, social, and cultural status index. This insight motivates the current study's goal of developing material that will help enhance the student's performance in mathematics. This study developed Strategic Intervention Material (SIM) to enhance the learners' performance in mathematics among 9th graders of Don Jose Integrated High School in the City of Santa Rosa, Laguna. The SIM was designed to help the selected 62 participants learn geometry competency. A quasi-experimental research method was employed in this study to determine whether intervention materials improved mathematics learners' performance. The analysis of pretest, formative test, and post-test performances in both the experimental and comparison groups provides a comprehensive look at the impact of educational interventions. Hence, there is a statistically significant difference between the pretest, formative, and post-test scores in enhancing learners' mathematics performance with the use of strategic intervention material. The use of Strategic Intervention Material promotes active learning and engagement among learners; thus, it can be used to help students with mathematics anxiety. Results showed that SIM effectively enhances learners' mathematics performance based on the mean, standard deviation, independent sample t-test, and Cohen's d. Moreover, the subjects demonstrated positive behavior toward the intervention. This entails cutting down on improper behavior, spending more time on instruction, and assisting instructors in teaching, modeling, and meeting students' needs.

Keywords: *feedback, reframe, assess, model, assess, enhance, performance, pretest, posttest, formative test*

INTRODUCTION

Nowadays, education has become vital in general. Sense is a type of learning in which knowledge and skills are combined. The abilities and habits of a certain group of people are transmitted from one generation to the next via teaching, training, and research. In the twenty-first century, time is of the essence. Teachers must be equipped with the latest tools and resources to meet the needs of modern and advanced learners (Kim et al., 2019).

However, a researcher found that during the 2022–2023 school year, students were underperforming, and significant learning gaps needed to be addressed. Learning engagement in class was not enough for slow learners to grasp the concepts being taught. This raised serious concerns about how to enhance students' learning outcomes. The researcher's primary focus was identifying the least-mastered mathematical competencies and developing an effective solution to address this issue. This research aimed to determine the effectiveness of SIM as a remediation tool for Grade 9 students to improve their performance in mathematics, which is one of the least mastered competencies in Grade 9 mathematics. Cutting-edge tools like SIM, it can ensure that students receive the support they should succeed in their academic pursuits.

Corresponding author's email: ebajandematerudy@gmail.com

According to DepEd Memorandum No. 39, series of 2012, policy directive in bridging educational gaps and putting reading and writing into practice, the DepEd secondary school program acknowledged that most secondary schools had already implemented a remedial program to deal with learning deficiencies. The "Enhanced Basic Education Act of 2013," commonly referred to as Republic Act No. 10533, reaffirmed the goal of developing a competent basic education system that would produce law-abiding, productive people. Additionally, it stated that " Production and Development Materials" is intended to encourage local production and development of materials. For the benefit of the students, the government (DepEd and other agencies) encouraged teachers to create self-instructional materials appropriate for students' knowledge levels.

According to Section 10.3 of Republic Act 10533, Article 3 of the Teachers' Processional Ethics Code, teachers play an important role in the mentoring and development of youth. Among these, providing sufficient, suitable, and easy materials for mastering the learning capabilities. In Don Jose Integrated High School (DJIHS), the issue confronting the researcher was students' low performance in mathematics, especially in geometry, because they lacked the basic mathematical skills needed in higher education courses. This study focused on the effectiveness of FRAME in enhancing the learner's performance in mathematics. The findings of the study were expected to be of great help to many sectors concerned, including students, teachers, and other researchers who are all involved in the new regular schooling setting. The researcher recognized an urgent need to address the subpar mathematics performance of learners.

Conducting this study helped enhance the learner's performance in Mathematics 9 using SIM, which was a significant initiative. According to Keller's PSI, which outlines the requirements for instructional materials. These include being personalized, self-paced, engaging in relevant and meaningful exercises, and providing value.

To that end, the researcher implemented a study that provided students with opportunities to develop essential abilities, skills, and values for life-long learning and employment. As a result, students could gain valuable experience as positive and reliable citizens, better positioning them for academic success and career advancement. To address this requirement and alleviate the pressure on instructions, the researcher intends to create instructional materials to improve learners' performance in mathematics (R.A. 10533). Another problem in creating this instruction material was the result of the PISA 2022 survey. According to PISA, 16% of pupils achieved at least Level 2 ability in mathematics, a much lower percentage than the average of 69%. If not explicitly taught, children can at least assess and demonstrate potential mathematical expressions for simple scenarios. Almost no children in the Philippines were outstanding math achievers, achieving levels five or six on the PISA Mathematics test with an average of 9% (9%). Students must be able to create mathematical models of complex situations. This allows them to limit, compare, and evaluate different potential solutions for handling these situations. By using this approach, students can analyze and assess various problem-solving strategies to select the most effective strategies for particular situations. This skill can be applied across various fields, ranging from science and engineering to economics and finance.

Instructional materials are important at all levels of education because they allow students to extend and deepen their understanding by providing a variety of firsthand, developmentally appropriate experiences and aiding students in gaining symbolic skills by providing various external aids. Knowing the importance of IMs in the classroom and the need to better understand the selection process, the researcher is currently conducting a study on curricular decision-making, with a focus on the development of IMs in mathematics, specifically in geometry. The researcher created his IMs for use in the classroom and studied their effectiveness in enhancing learner's performance in mathematics. Specifically, it sought answers to the following questions:

1. What is the mean pretest, formative test, and posttest scores in the experimental and comparison groups?
2. Is there a significant difference between the mean formative test scores of the experimental and comparison groups?
3. Is there a significant difference between the post-test mean scores of the experimental and comparison groups?
4. Is there a significant difference between the pretest and posttest mean scores of the experimental group?
5. Is there a significant difference between the pretest and posttest mean scores of the comparison group?

LITERATURE REVIEW

As educators, they know that Mathematics is one of the most difficult subjects to teach in the classroom. Some teachers use Strategic Intervention Material (SIM) to help fourth graders who struggle to understand these basic mathematical operations (Abucejo et al., 2022). Strategic intervention material, more commonly known as SIM, is used in the classroom as a teaching aid to increase student activity and enhance their understanding. It tends to re-teach unclear topics to students and assist them in mastering and enhancing the learner's performance. By providing opportunities for practical application, the SIM helps students develop a deeper understanding of the subject matter and prepares them to face real-life challenges. Intervention materials were helpful to teachers as support materials. Students gain mastery over their least-learned skills and improve their understanding of the subject matter (Toquero 2020).

This study, however, presented strategic intervention material that might help address the current problem. The research was grounded in Vygotsky's scaffolding theory, which posits that pupils are particularly dependent on the support of their classmates and professors. "Scaffolding" is the term used to describe providing students with the necessary help to finish tasks that would have been too difficult for them to do on their own. Words and images that represent both visible and audible makeup scaffolding, a type of support.

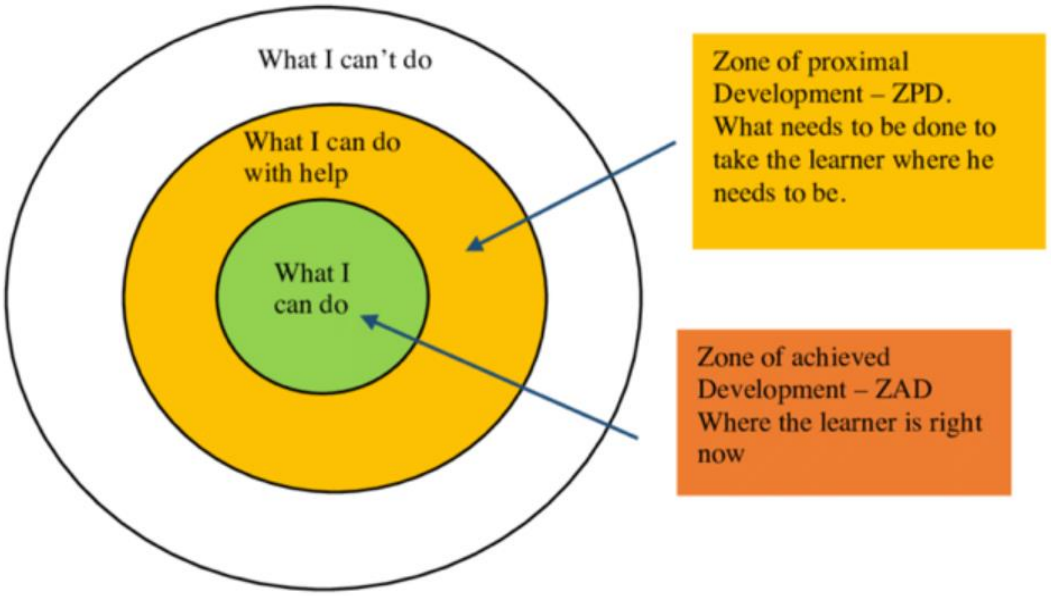

Figure 1: Vygotsky Scaffolfing Theory (image source: Vygotsky, 1978 in Kurt, 2020)

As per DepEd Memo No. 225, s. 2009 Enclosure No. 2, SIM-making for math teachers was added to the annual Mathematics Fair to encourage and promote teachers to use and develop

intervention materials. This contest occurs at the school, division, regional, and national levels. There are specific criteria and areas to be considered when creating Strategic Intervention Materials (SIM) for Mathematics, which include the title, guide, activity, enrichment, assessment and reference cards. SIMs ensure that activities align with the tasks and objectives, are kept short and simple for easy independent learning and provide a variety of activities to cater to diverse learners with different intelligence and learning styles. Additionally, sufficient activities are provided to allow learners to practice and develop skills, with a focus on improving the least mastered skills. SIM is designed to (a) correct learners, notably in the least learned competencies; (b) engage students with engaging activities; (c) stir learners' interest by making the material visually appealing; and (d) urge students to think, act, and discover more.

The mean percentage score on the National Achievement Test in Mathematics was below the expected grade level, indicating a need for improvement in the way mathematics is taught in the Philippines. However, it is worth noting that there is hope for improvement. Students who used Strategic Intervention Materials (SIM) performed better than those who received traditional education (Balazo, 2021). SIM is an approach to teaching that involves the use of instructional materials designed to target specific areas of difficulty for students. The effectiveness of SIM in improving mathematics performance suggests that innovative teaching methods and materials can play crucial roles in improving mathematics education in the Philippines.

At the beginning of the pandemic, students' mathematics skill levels have been alarming. This has been ascribed to a different factor, including poor teaching and learning facilities, students' lack of aptitude for mathematics, and students' inability to relate to and understand problems within the time frame allotted to complete the work (Van Geel et al., 2019). The findings of this study are essential for devising effective strategies and interventions to address the issue of poor math performance among students. The Curriculum and Instruction Division's commitment to using these findings to develop practical solutions is commendable. Organizing seminars and training sessions on the creation of strategic intervention materials is a crucial step toward achieving this goal. By providing educators with the necessary tools and resources, we can empower them to support their students better and improve their overall mathematics performance. The purpose of conducting this study was to test the effectiveness of FRAME in enhancing learners' performance in mathematics. According to a study, a student who is having trouble understanding mathematical concepts can receive help from the use of Strategic Intervention Materials (SIM), a type of 21st-century teaching and learning tool (Abuda et al. 2019).

Learning outcomes increased as a result of the use of intervention materials, indicating considerable improvements in learners' accomplishments. From the readings, strategic intervention materials serve as additional learning materials used to master the students' least-learned competencies. Students use these intervention materials to study and explore independently with the help of simple interactive discussions and activities. SIM improves students who experience difficulties in grasping a subject matter and helps them become proficient in their skill mastery (Bernido, 2023).

Another key part of this material is its engaging activities, which are designed to capture students' interest and attention. These activities are interactive and multimedia-based, providing students with an enjoyable and informative learning experience. They are carefully crafted to be both entertaining and educational, ensuring that students are still motivated and focused throughout the learning process.

In addition to engaging activities, the SIM employs visual aids and graphics to visually appeal to the visitor. One thing that might be said to assist students' strategic methods in improving their math performance is the use of intervention materials (Ramos, 2019). This approach is particularly effective in capturing the attention of visually impaired students who learn better. By incorporating

graphics and visual aids, the SIM helps students retain more information and enhances the learning process.

In Don Jose Integrated High School (DJIHS), the issue confronting the researcher was students' low performance in mathematics, especially in geometry, because they lacked the basic mathematical skills needed in higher education courses. Numerous studies have found that Filipino students struggle with mathematics and perform inadequately in this subject (Azucena et al., 2022; Capuno et al., 2019; Pentang et al., 2020). This study focused on the effectiveness of FRAME in enhancing the learner's performance in mathematics. The findings of the study were expected to be of great help to many sectors, including students, teachers and other researchers who are all involved in the new regular schooling setting. The researcher recognized an urgent need to address the subpar mathematics performance of learners. To that end, the researcher implemented a study that provided students with opportunities to develop essential abilities, skills, and values for life-long learning and employment. As a result, students could gain valuable experience as positive and reliable citizens, better positioning them for academic success and career advancement.

Research Hypothesis

The following hypotheses guided the researcher:

1. There was no significant difference between the mean formative test scores of the experimental and comparison groups.
2. There is no significant differences between the post-test mean scores of the experimental and comparison groups.
3. There is no significant differences between the pretest and posttest mean scores of the experimental group.
4. There is no significant differences between the pretest and posttest mean scores of the comparison group.

Research Framework

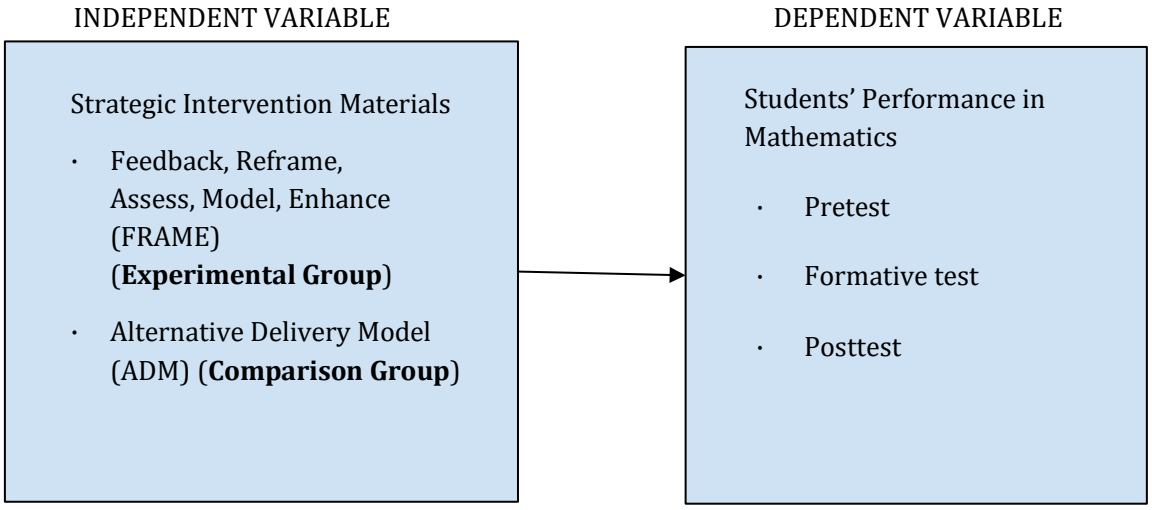

Figure 2. Research Paradigm

The independent variable included the strategic intervention material (SIM) with the acronym FRAME, which stands for feedback, reframe, assess, model, and enhance in enhancing learners' performance, which the Experimental group used. SIM was a teacher-made material. In contrast, the comparison group employed ADM. The dependent variables were pretest, formative, and posttest performance.

RESEARCH METHOD

This study used a quasi-experimental method using pretest and posttest. The match-pairing technique was used to determine which section was to be the experimental and comparison groups. The participants from the experimental group were paired with the participants from the comparison group based on the pretest results to avoid accidental bias.

The researcher created a 50-item test to evaluate the lesson's comprehension. Both the control and experimental groups took the same test before and after the lesson. The experimental group used the researcher's Strategic Intervention Material (SIM), while the comparison group used the traditional lecture format. A math master teacher and a math education program supervisor from the Division of Santa Rosa City confirmed the materials before use. After carefully reviewing the content, both experts offered insightful remarks on its correctness and suitability for teaching mathematical ideas. Their advice helped ensure the content was appropriate for the division's learners. Following the integration of their recommendations, the content was prepared for classroom use, and both specialists expressed assurance in its ability to improve students' mathematical comprehension. The education program administrator and master's teacher complimented the material producers on their creative and meticulous approach to teaching mathematics.

They also noted engaging activities and exercises that help students effectively grasp the concepts. Overall, the validation process confirmed that the material was a valuable resource for mathematics education in the Division of Santa Rosa City.

For this research, 62 students from two heterogeneous sections were employed. Participants were divided into experimental and comparison groups. Each group comprises 31 students. Students who were not selected as participants were included as blind participants. The comparison group received the DepEd Region Central Office ADM, and the experimental group received the FRAME learning material.

The following statistical tools were used to analyze the data gathered. Mean and standard deviation were used to determine mean scores for the formative and post-test means of the students in the comparison and experimental groups. The t-test for independent samples was used to determine if there was a significant difference between the pre-test, formative, and post-test mean scores of the experimental and control groups on the problem-solving test. The t-test for dependent samples was used to determine whether there was a significant difference between the pretest and post-test scores of the experimental and control groups in terms of test performance. Another statistical tool used was Cohen's D. A statistical tool called Cohen's d was used to express the magnitude of a difference between two groups or conditions in a study, where in this study, the experimental group and the comparison group. The standardized difference between the means of the two groups is represented by Cohen's d-value. A larger Cohen's d value denotes a larger effect size, which denotes a more significant difference between groups. Depending on the subject of study, Cohen's d can be interpreted in many ways; however, typically, a value of 0.2 is considered Very Small, a value of 0.4 is considered Small, a value of 0.8 is considered medium, a value of 1.2 is Large, a value of 2.0 is very large, and a value larger than 2.0 is considered large.

Properly organized and high-intensity interventions were implemented effectively and adapted to the students' achievement levels (Schnepel & Aunio 2022). The use of the new strategy, which includes the use of strategic intervention materials, can enhance students' mathematics learning performance in this new era.

FINDINGS AND DISCUSSION

According to Maruyama and Igei (2022), over 80% of elementary school students do not possess proficiency in fundamental math concepts. This highlights the urgent need for educators to

take immediate action. Teachers must possess expertise in both subject matter and pedagogy and must adapt to the demands of a technologically advanced society (Posamentier and Smith, 2021).

The analysis and interpretations were conducted based on the data. The effects of the strategic intervention materials (SIM) on the student's performance in mathematics were determined based on the independent sample t-test employed to test the statistical difference in post-test scores between the experimental and comparison groups. To test significant differences and Paired-Samples t-test for significant differences between the pretest and post-test scores of the experimental and control groups.

Table 1. The Pre-Test Mean Scores of the Experimental and Comparison Group

	Group (n=31)	Mean	SD
Pretest	Experimental	16.42	4.30
	Comparison	16.42	4.30

Legend: Provide Mean-Interpretation (x=50)

Table 1 displays the mean scores of the experimental and comparison groups students in their pretest and posttests. Despite the Education Department's success criteria, both the experimental and control groups failed to meet the expected standards. The pretest mean score for both groups was 16.42, with a standard deviation of 4.30, indicating a very low score. However, the mean score of the experimental group increased to 27.06, whereas that of the comparison group increased to 23.23, indicating improvement in both groups. The results revealed that the intervention material significantly improved the MPS of the students exposed to it, while those who did not use it exhibited a minor increase in their MPS. This indicates that students who used the intervention material had better scores than those who used the Alternative Delivery Model (ADM).

Table 2. Formative Test Mean Scores of the Two Groups

Formative Test	Group (n=31)	Mean	SD
1. Quadrilaterals and its Properties	Experimental	4.16	0.64
	Comparison	3.13	1.26
2. Determines the Condition that makes a Quadrilateral a Parallelogram.	Experimental	4.19	0.70
	Comparison	3.16	1.04
3. Rectangles, Rhombus, and Square	Experimental	4.03	0.71
	Comparison	3.42	0.85
4. Midline Theorem, Trapezoids and Kites	Experimental	4.35	0.75
	Comparison	2.94	1.03
Overall	Experimental	16.74	1.24
	Comparison	12.65	2.50

Legend: mean interpretation (x = 5, y = 20)

Table 2 reveals that the average test scores of the students who took Mathematics 9 were similar in both the experimental and comparison groups. However, the average scores of the experimental group in the formative test were higher than those of the comparison group, with mean scores of 16.74 and 12.65 and standard deviations of 1.24 and 2.50, respectively. This suggests that the experimental group performed better in the formative test than the comparison group.

Table 3. Test of Difference for Mean Score in Formative Test

Test	Group (n=31)	Mean	SD	T	Mean-Diff	Cohen's d	Effect Size
Formative	Experimental	16.74	1.24	8.18 **	4.10	2.07	Huge
	Comparison	12.65	2.50				

*** - Test is significant at p-value<0.01. df=60.*

Cohen's d <=0.19: Very Small, d <=0.49: Small, d <=0.79: Medium, d <= 1.19: Large, d<=1.99: Very Large; d>=2.0: Huge.

Table 3 presents the comparison between the formative test scores of the experimental and comparison groups using the independent sample t-test. As shown in Table 3, there was a significant difference in mean scores of the formative test between the experimental and comparison groups (t (30) = 8.18, mean difference = 4.10, p<0.01). Because the outcome of the independent-samples t-test was statistically significant, Cohen's d was calculated to measure the effect size on the formative test mean difference between the experimental and comparison groups.

The calculated Cohen's d was 2.07, which means that the difference in the formative test mean scores between the experimental and comparison groups was "Huge.". This indicates that the hypothesis that there is no significant difference was rejected.

Properly organized and high-intensity interventions were implemented effectively and adapted to the students' achievement levels (Schnepel & Aunio 2022). The new strategy, which includes the use of strategic intervention material, can enhance students' performance and attitude toward mathematics learning.

Table 4: Test of Significant difference in mean scores of the formative test

Test	Group (n=31)	Mean	SD	T	Mean-Diff	Cohen's d	Effect Size
Posttest	Experimental	27.06	4.95				
	Comparison	23.23	6.38	2.65 *	3.84	0.67	Medium

*** - Test is significant @ p-value<0.05. df=60.*

Cohen's d <=0.19: Very Small, d <=0.49: Small, d <=0.79: Medium, d <= 1.19: Large, d<=1.99: Very Large; d>=2.0: Huge.

Table 4 presents the analysis of the posttest mean scores between the experimental and comparison group conditions, revealing a statistically significant difference [t(30)=2.65, Mean-diff = 3.84, p-value<0.05]. As a result, the calculated Cohen's d was 0.67, interpreted as "Medium," which indicated a noticeable difference in the post-test mean scores between the groups. Consequently, we rejected the hypothesis, stating that there was no significant difference.

Table 5. Test of Difference between Pretest and Posttest of Experimental Group

Group (n=31)	Test	Mean	SD	t	Mean-Diff	Cohen's d	Effect Size
Experimental	Posttest	27.06	4.95	10.95 **	10.65	2.29	Huge
	Pretest	16.42	4.30				

** - Test is significant @ p-value<0.01. df=30.

Cohen's d <=0.19: Very Small, d <=0.49: Small, d <=0.79: Medium, d <= 1.19: Large, d<=1.99: Very Large; d>=2.0: Huge.

As shown in Table 5, there was a significant statistical difference between the mean scores of the pretest and posttest of the experimental group conditions [t(30)=10.95, Mean-Diff=10.65, p-value<0.01]. As the outcome of the Paired-Samples t-test was statistically significant, Cohen's d was calculated to measure the effect size between the pretest and post-test mean scores of the experimental group. The calculated Cohen's d was 2.29, which is considered to indicate "Huge." This implied that there was a "Huge" difference between the pretest and post-test mean scores of the experimental group. Therefore, the hypothesis that there is no significant difference was rejected.

Table 6. Test of Difference between Pretest and Posttest of Comparison Group

Group (n = 31)	Test	Mean	D	t	Mean-Diff	Cohen's d	Effect Size
Comparison	Posttest	23.23	638	6.93 **	6.81	1.25	Very Large
	Pretest	16.42	4.30				

*** The test is significant at p-value<0.01. * The test is significant at p-value<0.05. df=25.*

Cohen's d <=0.19: Very Small, d <=0.49: Small, d <=0.79: Medium, d <= 1.19: Large, d<=1.99: Very Large; d>=2.0: Huge.

Table 6 shows the analysis conducted comparing the pretest and posttest mean scores of the comparison group conditions. The statistical difference was found to be highly significant [t(30) = 4.23, mean-diff = 6.81, p-value<0.01]. As a result, Cohen's d was calculated to measure the effect size between the comparison group's pretest and posttest mean scores. The calculated Cohen's d was 1.25, which was interpreted as "numerous.". This suggested that there is a "numerous" difference between the pretest and posttest mean scores of the comparison group. Hence, the hypothesis that there is no significant difference was rejected.

These findings have significant implications for educators and researchers. The substantial t-value, along with the significant p-value, suggested a strong effect of the intervention or conditions applied to the comparison group, leading to a notable enhancement in their performance. This significant difference, confirmed at the 0.01 level, emphasized the effectiveness of the strategies or interventions employed by the comparison group, similar to the experimental group.

The analysis revealed an improvement in mean scores from the pretest to the posttest and

confirmed the impact of the educational or experimental strategies used. This significant change in performance highlights the potential benefits of such interventions in educational settings. The findings suggested that the approaches used with the comparison group were effective in enhancing learning outcomes.

CONCLUSIONS

Based on the study's findings, using teacher-created Strategic Intervention Materials significantly improved students' performances. The null hypothesis was rejected, indicating a high significant difference in student performance on the pretest, formative test, and post-test results, demonstrating the effectiveness of the intervention utilized in Grade 9 participants.

These findings have significant implications for educators and researchers. The analysis revealed an improvement in mean scores from the pretest to the posttest and confirmed the impact of the educational or experimental strategies used. This significant change in performance highlights the potential benefits of such interventions in educational settings. The findings suggested that the approaches used with the comparison group were effective in enhancing learning outcomes.

The school needs intervention materials to address these gaps. This study was conducted after the pandemic. Mathematical learning gaps were particularly evident, with most students requiring assistance to achieve low mathematics performance. This study demonstrated that there is a high significance in using FRAME as a strategic intervention material in enhancing the learner's performance in mathematics. Previous studies, especially during the pandemic, have shown contradictory results. In a study by Zheng and Zheng (2022), it was evident that the pandemic had various adverse effects, such as late submissions and worse learning performance. More seriously, the negative impacts may persist in the immediate aftermath of the pandemic.

LIMITATION AND FURTHER RESEARCH

This study is limited to the effect of instructional material (FRAME) on learners' mathematics performance and the significant differences in performance between formative and post-tests. In addition, the study will use a pretest and posttest design to enhance the learner's mathematics performance in Grade 9. The participants of the study were the two sections consisting of 60 learners from Don Jose Integrated High School. The scope of this study is limited to developing instructional materials called FRAME that cover five (5) topics in the third quarter. The lesson is all about quadrilaterals with the following topics: (1) Quadrilaterals and their properties, (2) conditions that make quadrilaterals a parallelogram, (3) use of property in finding the angles measure, sides, and other quantities of parallelogram, (4) rectangle, rhombus, and squares, (5) midline theorem, trapezoids, and kites. All topics comprise five parts: feedback, reframe, assess, model, and enhance.

The findings of this study led to the following recommendations:

1. School administrators may need to closely monitor and analyze the impact of educational interventions on student performance through regular, data-driven assessments. This approach may allow for the timely identification of successful strategies that can be expanded across the curriculum and the adjustment of less effective strategies to continuously improve teaching and learning outcomes.
2. Teachers may benefit from incorporating reflective practices into their instructional strategies by critically evaluating which aspects of the interventions have the most significant impact on student engagement and learning. This reflection can guide the adaptation and personalized delivery of teaching methods to meet the diverse needs of students.
3. Teachers can encourage students to actively participate in feedback mechanisms related to the

interventions, providing insights into what works best for their learning process. This engagement may help tailor interventions more closely to student needs and enhance educational strategies' overall effectiveness.

REFERENCES

Abucejo, C. M., Amodia, J. B., Calorin, R., Deo, N. F., Fuentes, M. J., Lamila, K. N., ... & Minyamin, A. (2022). Going Back to Elementary Years: The Parents Lived Experiences in Modular Distance Learning. *Psychology and Education: A Multidisciplinary Journal*, *2*(6), 477-489. https://doi.org/10.5281/zenodo.6791851 , ISSN 2822-4353

Abuda, B. F., Oraller-Balazo, G. F., Orque, J. C., Cabili, M. C. D., & Maestre, M. F. A. M. (2019). Struggling learners' mathematics achievement level using quick response embedded strategic intervention material. *International Journal in Information Technology in Governance, Education and Business*, *1*(1), 39-45. Available at SSRN: https://ssrn.com/abstract=4007648

Azucena, L. J. R., Gacayan, P. J. L., Tabat, M. A. S., Cuanan, K. H., & Pentang, J. (2022). GeoGebra Intervention: How have Students' Performance and Confidence in Algebra Advanced? *Studies in Technology and Education* 1 (1):51-61. https://philpapers.org/rec/AZUGIH

Balazo, G. F. O. (2021). Struggling Learners' Achievement Level Using Electronic Strategic Intervention Material In Mathematics (ESIMATH). *American Journal of Agricultural Science, Engineering, and Technology*, 5(2), 207–214. https://doi.org/10.54536/ajaset.v5i2.96

Bernido, R. (2023). Use of Strategic Intervention Materials (SIM) in Adding Integers: An Action Research. *Available at SSRN 4426854*. http://dx.doi.org/10.2139/ssrn.4426854

Capuno, R., Revalde, H., Etcuban, J. O., Aventuna, M., Medio, G., & Demeterio, R. A. (2019). Facilitating learning mathematics through the use of instructional media. *International Electronic Journal of Mathematics Education*, *14*(3), 677-688. https://doi.org/10.29333/iejme/5785

Kim, S., Raza, M., & Seidman, E. (2019). Improving 21st-Century Teaching Skills: The Key To Effective 21st-Century Learners. *Research in Comparative and International Education*, *14*(1), 99-117. https://doi.org/10.1177/1745499919829214

Kurt, S. (2020). Vygotsky's zone of proximal development and scaffolding. *Educational Technology*.

Maruyama, T., & Igei, K. (2022). Community-Wide Support for Primary Students to Improve Basic Reading and Math Learning: Empirical Evidence from Madagascar. *Available at SSRN 4076787*.

Pentang, J., Bautista, R. M., & Pizaña, A. (2020). Mathematical needs of Laura Vicuña learners. *Western Philippines University Graduate Journal*, *5*(1), 78-82. https://ssrn.com/abstract=3980365

Posamentier, A. S., & Smith, B. (2021). *Teaching secondary school mathematics: Techniques and enrichment*. Word Scientific. https://doi.org/10.1142/9789811211423_0001

Ramos, A. (2019). Strategic Intervention Materials (SIM) in Enhancing the MAthematics Performance of HUMSS Students in Anselmo A. Sandoval Memorial National High School. *Ascendens Asia Journal of Multidisciplinary Research Abstracts*, *3*(2H).

Schnepel, S., & Aunio, P. (2022). A Systematic Review of Mathematics Interventions for Primary School Students with Intellectual Disabilities. *European Journal of Special Needs Education*, *37*(4), 663-678. https://doi.org/10.1080/08856257.2021.1943268

Toquero, C. M. (2020). Challenges and opportunities for higher education amid the COVID-19 pandemic: The Philippine context. *Pedagogical Research*, *5*(4). https://eric.ed.gov/?id=EJ1263557

Van Geel, M., Keuning, T., Frèrejean, J., Dolmans, D., van Merriënboer, J., & Visscher, A. J. (2019). Capturing the complexity of differentiated instruction. *School effectiveness and school improvement*, *30*(1), 51-67. https://doi.org/10.1080/09243453.2018.1539013

Zheng, Y., & Zheng, S. (2022, September). A comparison of students' learning behaviors and performance among pre, during and post COVID-19 pandemic. In *Proceedings of the 23rd Annual Conference on Information Technology Education* (pp. 78-85). https://doi.org/10.1145/3537674.3554753