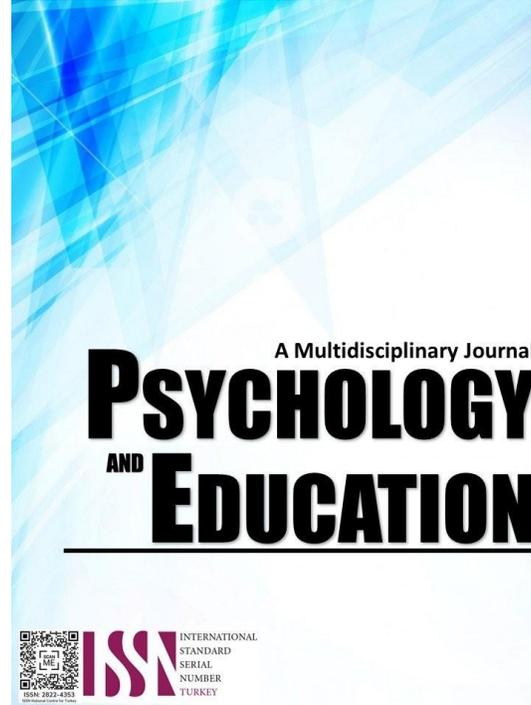


MATHRIX SENSE INTERVENTION ON THE LEARNING PERFORMANCE OF GRADE 7 LEARNERS IN MATHEMATICS



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Mathrix Sense Intervention on the Learning Performance of Grade 7 Learners in Mathematics

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Abstract

This quasi-experimental research investigated the effect of the Mathrix Sense Intervention on enhancing multiplication fact recall among Grade 7 learners at Dadiangas North High School during School Year 2019–2020. The intervention included four key instructional components: developing number sense, applying multiplication strategies, using flashcards, and integrating the Mathrix mobile learning application. Sixty learners were purposively selected and equally divided into experimental and control groups. The control group received traditional instruction, while the experimental group was taught using the Mathrix Sense Intervention. Both groups completed pretests and posttests aligned with the Most Essential Learning Competencies (MELCs) in Mathematics. Pretest results showed no significant difference between groups, indicating similar baseline knowledge. However, posttest scores revealed a significant improvement in the performance of the experimental group compared to the control group, with a large effect size based on Cohen's *d*. These findings demonstrate that the Mathrix Sense Intervention had a positive effect on learners' ability to recall multiplication facts. Therefore, this study recommends adopting the Mathrix Sense Intervention as a valuable approach for strengthening foundational skills in Mathematics, particularly in multiplication, among Grade 7 learners.

Keywords: *mathrix sense intervention, multiplication fact recall, grade 7 learners, multiplication strategies*

Introduction

Mastery in multiplication fact recall plays a fundamental role in developing mathematical proficiency among learners. It is a foundational skill supporting more advanced mathematical operations, such as division, fractions, algebra, and problem-solving. Learners who recall multiplication facts automatically are better equipped to engage in higher-order tasks accurately and confidently. Conversely, difficulties in recalling basic multiplication facts lead to increased cognitive load, reduced problem-solving efficiency, and lower academic performance. In the context of the 21st-century curriculum, which prioritizes analytical thinking and numerical literacy, strengthening learners' recall of multiplication facts is critical for their academic success.

Despite its foundational importance, the learners continue to struggle with multiplication fact recall. National assessments such as the Trends in International Mathematics and Science Study 2019 report persistent underperformance in foundational numeracy among Filipino learners (Mullis et al., 2020). This deficiency hinders learners' ability to approach more advanced mathematical topics, leading to frustration, diminished motivation, and continued underachievement. Traditional classroom practices, predominantly rote memorization and repetitive drills, frequently fail to address diverse cognitive needs and learning preferences (Wang & Hsu, 2021). Consequently, there is an urgent need for instructional strategies that both engage learners and effectively strengthen foundational skills.

In the context of Dadiangas North High School, classroom observations and formative assessments conducted by the researcher confirmed this national trend. A substantial number of Grade 7 learners struggled to recall multiplication facts with speed and accuracy. This limitation resulted in low levels of confidence, reduced classroom participation, and a general disengagement from mathematics lessons. Despite the use of traditional teaching approaches, learners continue to struggle with recalling multiplication, suggesting the need for a more effective and engaging instructional method.

To address these challenges, this study introduces the Mathrix Sense Intervention, a digital, gamified approach explicitly designed to enhance multiplication fact recall. Drawing on recent advances in educational technology, the intervention integrates adaptive feedback, interactive drills, and game-based learning activities that align with contemporary learners' preferences (Lee & Kim, 2023). By leveraging technology-enhanced instruction, it aims to foster automaticity in recall while maintaining high levels of learner motivation, thereby establishing a more robust foundation for subsequent mathematical learning (Park et al., 2022).

Moreover, the conduct of this is anchored in key educational policies. The Department of Education (DepEd) Order No. 21, s. 2019 encourages the use of innovative and inclusive instructional strategies to support varied learning styles and abilities. Likewise, Republic Act No. 10533, or the Enhanced Basic Education Act of 2013, emphasizes the development of 21st-century skills through learner-centered approaches. The Mathrix Sense Intervention aligns with these mandates by integrating technology to improve learning outcomes in mathematics.

Overall, this study aims to determine the effects of the Mathrix Sense Intervention in improving Grade 7 learners' multiplication fact recall by comparing the outcomes of those exposed to the intervention with those taught using traditional methods. It seeks to inform curriculum design and support the advancement of learner-centered, technology-integrated education.

Research Questions

This study aimed to determine the academic performance and investigate the effects of Mathrix Sense Intervention on the learning performance of Grade 7 learners in mathematics at Dadiangas North High School in the School Year 2019-2020. Specifically, this study sought to answer the following questions:

1. What is the academic performance of Grade 7 learners in mathematics in School Year 2019-2020?
2. What is the level of learning performance on the pretest of Grade 7 learners in Multiplication Fact Recall on the following groups:
 - 2.1 control; and,
 - 2.2 experimental?
3. Is there a significant difference in the level of learning performance on the pretest of Grade 7 learners in Multiplication Fact Recall between the control and experimental groups?
4. What is the level of learning performance on the posttest of Grade 7 learners in Multiplication Fact Recall on the following groups:
 - 4.1 control; and,
 - 4.2 experimental?
5. Is there a significant difference in the level of learning performance on the posttest of Grade 7 learners in Multiplication Fact Recall between the control and experimental groups?
6. Is there a significant difference between the level of learning performance on the pretest and posttest of the control group?
7. Is there a significant difference between the level of learning performance on the pretest and posttest of the experimental group?
8. Is there a significant difference in the mean gain scores between the control group and the experimental group?
9. What is the size effect of the Mathrix Sense Intervention?

Methodology

Research Design

This study utilized the quasi-experimental research design, particularly the pretest-posttest non-equivalent control group design. Grade 7 learners were classified into two groups - the control group and the experimental group. According to Mertens (2020), the quasi-experimental design is appropriate when a researcher aims to investigate the effects of an intervention on an existing group where participants are not randomly assigned. In this study, the treatment refers to the Mathrix Sense Intervention, while the pre-intervention scores are obtained from the pretest.

This study aimed to determine the effectiveness of the Mathrix Sense Intervention in enhancing learners' performance in mathematics, specifically focusing on multiplication fact recall. While the broader mathematics curriculum includes various topics, the study centered solely on evaluating the intervention's impact and effect size through a structured pretest-posttest design.

Respondents

The subjects of this study were Grade 7 learners officially enrolled at Dadiangas North High School during the School Year 2019–2020. Out of the total population of 232 learners across six Grade 7 sections, a subset of learners with an average grade below 80 in mathematics was identified as potential recipients of the intervention. Based on this criterion, 78 learners qualified for the study. From this group, a total of 60 learners were randomly selected through purposive sampling to serve as the study participants.

A total of 60 learners were equally distributed between the control and experimental groups, with 30 learners in each group. Group assignment was determined through random selection using a coin toss to ensure impartiality. The control group received instruction through the traditional teaching approach. In contrast, the experimental group was provided with the Mathrix Sense Intervention, a gamified learning strategy specifically designed to enhance multiplication fact recall.

Instrument

This study employed various instruments, including a grading sheet, pretest and posttest assessments consisting of thirty questions each, a Table of Specifications (TOS), daily lesson logs, and the Grade 7 Mathematics curriculum guide, which incorporates the Most Essential Learning Competencies (MELCs). The academic performance levels of Grade 7 learners were assessed using their first-quarter grades, based on the Department of Education (DepEd) report card's grading scale. These grades provided a baseline for comparing the effectiveness of the teaching methods used in the study. The results were analyzed using descriptive statistics.

A test questionnaire containing thirty questions was used as an instrument for administering both the pretest and posttest. The questionnaire was adopted from the Learning Resources Management and Development System (LRMDS) provided by the Department of Education (2019) and anchored in the Most Essential Learning Competencies (MELCs). It was utilized to assess the learning performance of Grade 7 learners in mathematics. These assessments served as the basis for determining the learners' learning performance in the subject. Both the control and experimental groups took the pretest and posttest to measure the learners'

understanding before and after the instructional interventions. Descriptive statistics were used to analyze the data, summarizing learners' progress and achievement clearly and systematically. Together, these instruments, ranging from grading sheets and assessments to curriculum-aligned tools, created a robust methodology for evaluating both learner performance and the effectiveness of the instructional approaches employed in the study.

Procedure

Before conducting the study, the researcher ensured ethical compliance and obtained permissions from relevant stakeholders, including the school principal, teacher advisers, and the parents or guardians of participants. Clear explanations regarding the significance and purpose of the study were provided to all involved parties. To collect the necessary data for the study, the researcher first submitted a formal request to the Schools Division Superintendent to obtain approval for conducting the research at Dadiangas North High School. After receiving approval, the researcher then submitted a letter to the school principal to secure permission for data collection within the school.

After obtaining the necessary clearance, the researcher conducted the study by administering a pretest to all participants, assessing their prior knowledge of the topics covered in the intervention. These topics included operations on integers, properties of integer operations, forms of rational numbers, operations involving rational numbers, scientific notation, and measurement.

The researcher determined which group would be the control and the experimental group. The learners in the experimental group were asked to install the Mathrix mobile application on their smartphones. A brief tutorial on how to use Mathrix was conducted by the researcher to the experimental group before discussing the topics included in the study. The two groups were then exposed to different methods of teaching the same lessons. The researcher used a traditional teaching approach in teaching the control group, while the experimental group was exposed to the use of Mathrix Sense Intervention. After the delivery of all the lessons, a posttest was administered to the learners, and the same set of tests was administered to both groups.

The pretest and posttest scores of learners in both the experimental and control groups were analyzed using appropriate statistical tools. The results of the statistical analysis of data served as the basis for the interpretation and the formulation of conclusions and recommendations of the study.

Data Analysis

This study employed quantitative methods to analyze the data and determine the effect of the Mathrix Sense Intervention on the learning performance of Grade 7 learners in mathematics. Descriptive statistics such as mean, frequency, and percentage were used to summarize learners' performance levels. In contrast, inferential statistics, including independent and paired samples t-tests and Cohen's *d*, were utilized to test for significant differences and measure effect size. Before conducting these parametric tests, normality testing was performed using the Shapiro-Wilk test to ensure that the data were approximately normally distributed. All quantitative data were interpreted using a standardized rubric and the DepEd grading scale, and statistical significance was set at 0.05.

To assess the academic performance of Grade 7 learners in Mathematics for the School Year 2019–2020, the learners' final grades were gathered and analyzed using frequency, percentage, and mean. These grades were interpreted to provide a baseline understanding of learners' overall academic achievement before the intervention was introduced. This baseline allowed for a clearer comparison of their performance after the Mathrix Sense Intervention, highlighting any improvements or changes in their learning outcomes.

The level of learning performance in multiplication fact recall before the intervention was determined by analyzing the pretest scores of both the control and experimental groups. These scores were computed into percentages and evaluated using descriptive statistics to assess the learners' performance. This analysis provided a clear understanding of their progress and proficiency in the subject area, allowing for an in-depth comparison of their performance before and after the intervention.

To determine if any significant initial differences existed between the control and experimental groups before the intervention, the pretest results of the two groups were compared using an independent samples t-test. A *p*-value of less than or equal to 0.05 indicated a statistically significant difference in initial performance levels.

Following the implementation of the Mathrix Sense Intervention, the posttest scores of both the control and experimental groups were analyzed to determine their respective levels of learning performance. These results were interpreted using the same scale and statistical measures as those applied to the pretest, allowing for a clear comparison of learning gains.

To examine whether the post-intervention performance differed significantly between the two groups, the posttest results of the control and experimental groups were compared using an independent samples t-test. This analysis revealed whether the intervention produced a statistically significant improvement in the experimental group compared to the control group.

The study also explored whether there were statistically significant differences between the pretest and posttest scores within the control group. This was done through a paired samples t-test, which determined whether any observed changes in learning performance occurred despite the absence of the intervention.

Similarly, the learning gains of the experimental group before and after the intervention were examined using a paired samples t-test.



This tested the influence of the Mathrix Sense Intervention in improving the multiplication fact recall of learners who received the treatment.

To compare the learning progress of both groups, the mean gain scores, calculated as the difference between pretest and posttest scores, were analyzed using an independent samples t-test. This analysis helped determine whether the experimental group showed a greater improvement in learning compared to the control group.

Lastly, the practical contribution of the intervention was assessed using Cohen’s d to compute the effect size. This analysis helped determine the degree of difference in learning performance between the two groups, offering a clear understanding of the significance of the Mathrix Sense Intervention on learners' outcomes.

Ethical Considerations

The researcher made certain that all ethical considerations were followed as mandated by the Holy Trinity College to avoid practices that may implicitly or explicitly abuse or exploit those with whom she sought to conduct research.

Informed Consent. Before the study was conducted, approval was secured from the School Division Superintendent and the School Principal. Informed consent forms were distributed to parents or guardians, detailing the research aims, procedures, potential risks, and benefits. Only learners whose parents or guardians provided written consent participated. Additionally, the research goals and significance were clearly explained to the learners to ensure their complete understanding and voluntary participation.

Data Privacy. The researcher maintained the strict confidentiality of all respondents' identities throughout the study. No personal details were disclosed at any stage. Collected data was used solely for academic purposes and securely stored to prevent unauthorized access. Ethical protocols ensured privacy and integrity in the documentation and dissemination of findings.

Voluntary Participation. Respondents were provided with detailed and comprehensive information regarding the objectives of the study, procedures, and expectations before the administration of the pretest. They were asked to confirm their willingness and commitment to participate in the study, thereby ensuring informed consent. No form of coercion or undue influence was exerted, and respondents were allowed to take part at their convenience. Furthermore, they were informed of their right to withdraw from the study at any point without fear of penalty or negative consequences.

Gender Sensitivity. In upholding gender sensitivity, the researcher ensured that all respondents were treated with equal respect, regardless of gender. Equal opportunities were provided for both male and female respondents to demonstrate their prior knowledge and learning during the testing process. The study avoided any form of gender bias in the selection of respondents, instructional delivery, and data interpretation.

Cultural Sensitivity. To foster inclusivity and respect, the researcher recognized and honored the cultural backgrounds of all respondents. Their beliefs, traditions, values, and lived experiences were acknowledged and respected throughout the conduct of the study. No respondent was discriminated against based on cultural background during the selection process or the administration of data-gathering tools. Culturally responsive approaches were observed to ensure fairness and comfort among all respondents.

Results and Discussion

This section contains the presentation, analysis, and interpretation of the data gathered in this study. The various results are presented in the succeeding tables with corresponding discussions and explanations. It also answers specific problems stated in the previous section.

Academic Performance of Grade 7 Learners in Mathematics

Assessing learners’ academic performance is crucial for determining their mathematical proficiency and readiness for instruction. In this study, official grading sheets were used as baseline data to evaluate learning progress and to identify and select learners who require targeted intervention to enhance their mathematical skills.

Table 1. *Academic Performance of Grade 7 Learners in Mathematics*

Grading Scale	Frequency	Percentage (%)	Description
90 -100	7	3.02	Outstanding
85 – 89	85	36.64	Very Satisfactory
80 – 84	62	26.72	Satisfactory
75 – 79	78	33.62	Fairly Satisfactory
75 below	0	0	Did Not Meet Expectations
Total	232	100.00	
Overall Mean Percentage		83.03	Satisfactory

As shown in Table 1, the academic performance of the Grade 7 learners is satisfactory with an overall mean percentage of 83.03. Only 85 or 36.64% of the 232 learners achieved a very satisfactory grade of 85-89, 62 or 26.72% obtained a satisfactory grade of 80-84, and 78 or 33.62% received a fairly satisfactory grade of 75-79. Additionally, only 7 or 3.02% of the learners excelled with an outstanding



performance grade of 90-100.

This finding implies that before the experiment, learners had adequate understanding and proficiency, meeting basic curriculum expectations. However, there is still a need for improvement to achieve higher levels of mastery and excellence in mathematics, especially for the 78 learners who belonged to the fairly satisfactory performance group.

The outcome is supported in the study conducted by Flores (2023), affirming that nearly half of the respondents achieved a Satisfactory performance in mathematics, scoring between 80 and 84, suggesting that a significant number of learners possess a solid understanding of mathematical concepts, likely attributed to diligent study habits and active participation in class discussions. Such engagement fosters a positive learning environment, enabling learners to grasp complex topics and solve problems effectively. The collaborative efforts of teachers and parents play a crucial role in enhancing learners' academic performance, as consistent guidance and effective teaching strategies contribute to improved outcomes in mathematics.

Level of Learning Performance on the Pretest of Grade 7 Learners in Multiplication Fact Recall

The control group received instruction through the traditional teaching approach in mathematics. The initial performance of the learners was evaluated through a pretest, and the mean scores were calculated to assess their baseline understanding. Table 2 presents the results of this analysis.

Table 2. *Level of Learning Performance on the Pretest of Grade 7 Learners in Multiplication Fact Recall of the Control Group*

<i>Interval Scores</i>	<i>Frequency</i>	<i>Percentage (%)</i>	<i>Description</i>
24.01 – 30.00	0	0	Very High
18.01 – 24.00	1	3.33	High
12.01 – 18.00	10	33.34	Moderately High
6.01 – 12.00	15	50.00	Low
0.00 – 6.00	4	13.33	Very Low
Total	30	100.00	
Overall Mean Percentage		11.40	Low

Table 2 presents the pretest mean scores in mathematics for the control group. The highest percentage of learners, comprising 50%, performed within the low category, indicating a basic yet incomplete understanding of multiplication facts. This was followed by 33.34% of learners who obtained scores in the moderately high category, suggesting a developing but inconsistent level of recall proficiency. Meanwhile, 13.33% of learners were categorized as very low, reflecting minimal mastery and a significant need for intervention. Only 3.33% of the learners reached the very high category, demonstrating strong automatic recall ability. The overall mean score was 11.40, which corresponds to the low performance level. These findings suggest that prior to the implementation of the intervention, most learners experienced difficulty in recalling multiplication facts automatically, underscoring the necessity of introducing targeted strategies to enhance foundational mathematical skills.

The results imply that the control group generally showed low performance in the pretest, suggesting a potential need for remedial interventions to enhance these basic competencies before advancing to more complex mathematical concepts. These results highlight the need for targeted instructional strategies to improve their skills in this subject and provide important guidance for improving teaching methods to boost learning outcomes for the control group in future assessments.

Moreover, these findings align with national trends observed in the United States. According to the 2022 National Assessment of Educational Progress (NAEP), 26% of fourth-grade learners performed below the basic level in mathematics, reflecting a significant portion lacking fundamental skills. Such data emphasize the urgency for early assessment and the implementation of data-driven interventions to address learning gaps.

Furthermore, research by Layug et al. (2021) at Baguio City National High School emphasized the importance of tailored interventions in enhancing numeracy skills among Grade 7 learners. Their study found that specific teaching strategies effectively addressed learners' difficulties in mathematics, leading to improved performance.

The experimental group used the Mathrix Sense Intervention to enhance their understanding and application of mathematical concepts, offering a comprehensive, interactive learning approach. To ascertain the mathematics performance of learners in the experimental cohort with the use of Mathrix Sense Intervention in the numeracy skills during pretest, the mean was calculated.

Table 3 presents the pretest mean scores in mathematics for the experimental group. The highest percentage of learners, comprising 66.67%, performed within the low category, indicating a basic but incomplete understanding of multiplication facts. This was followed by 33.33% of learners who achieved scores in the moderately high category, suggesting a developing yet inconsistent level of recall proficiency. The overall mean score was 11.73, which corresponds to the low performance level.

These findings suggest that before the implementation of the intervention, most learners in the experimental group experienced difficulty in recalling multiplication facts automatically, emphasizing the necessity of targeted instructional approaches to strengthen foundational mathematical skills.



Moreover, this finding aligns with Mabena et al. (2021), who emphasized that multiple factors shape learners’ self-confidence and academic success. These include learner-related aspects such as poor self-discipline, language barriers, and negative attitudes toward learning. Such factors can hinder learners’ engagement, comprehension, and willingness to persevere in challenging subjects. In mathematics, these influences are particularly significant, as confidence and consistent practice play key roles in mastery. When learners struggle with discipline or face communication barriers, their ability to grasp concepts and solve problems diminishes, ultimately lowering performance outcomes. Addressing these issues is essential for improving mathematical achievement.

Table 3. *Level of Learning Performance on the Pretest of Grade 7 Learners in Multiplication Fact Recall of the Experimental Group*

<i>Interval Scores</i>	<i>Frequency</i>	<i>Percentage (%)</i>	<i>Description</i>
24.01 – 30.00	0	0	Very High
18.01 – 24.00	0	0	High
12.01 – 18.00	10	33.33	Moderately High
6.01 – 12.00	20	66.67	Low
0.00 – 6.00	0	0	Very Low
Total	30	100.00	
Overall Mean Percentage		11.73	Low

Technology integration in mathematics education has become increasingly pivotal, as empirical evidence demonstrates that it can substantially improve learning outcomes and foster pedagogical innovation. For instance, Sunzuma (2023) conducted a systematic review of geometry teaching and learning, finding that integrating tools such as GeoGebra, augmented reality, and interactive whiteboards can transform learners’ conceptual understanding and motivation levels. Studies have shown that these tools not only improve computational fluency but also foster motivation and self-paced learning, aligning with the Department of Education's push for digital innovation under the National Learning Recovery Plan (DepEd, 2021).

Similarly, Infante et al. (2025) found that integrating digital tools such as GeoGebra, Desmos, and PhotoMath enhanced learner engagement, accessibility, and problem-solving skills in mathematics education. Meanwhile, Paglomutan et al. (2024) showed that gamified applications boost engagement and retention. Despite national goals for improving digital competence, classroom use of technology often remains teacher-centered and limited (Blikstad-Balas & Klette, 2020). The limited adoption of innovative pedagogical practices, combined with learners' constrained access to educational technologies, underscores the imperative for comprehensive teacher professional development and the establishment of resilient digital infrastructure (Khamidovich, 2020).

Table 4 provides a summary of the pretest learning performance in multiplication fact recall for the Grade 7 learners in the study. This data offers a crucial baseline for comparison, as it illustrates the learners' foundational proficiency before the intervention was implemented. The table is essential for establishing the initial state of the control and experimental groups, confirming their comparability before any intervention takes place. This preliminary data is vital for ensuring that any subsequent differences in posttest scores can be attributed to the intervention and not to pre-existing differences between the groups.

Table 4. *Summary Result on the Level of Learning Performance on the Pretest of Grade 7 Learners in Multiplication Fact Recall*

<i>Groups</i>	<i>Mean</i>	<i>Description</i>
Control	11.40	Low
Experimental	11.73	Low
Overall Mean	11.57	Low

The pretest results revealed that both the control group, with a mean score of 11.40, and the experimental group, with a mean score of 11.73, of Grade 7 learners exhibited low multiplication fact fluency, with an overall mean of 11.57. This indicates that the learners demonstrated minimal mastery of the basic multiplication facts. These findings suggest that prior to the implementation of the intervention, the learners’ performance levels were generally low and that they had limited knowledge of the topics included in the study. Moreover, the results imply that the learners faced difficulties in understanding fundamental mathematical concepts, highlighting the need for targeted instructional strategies to improve foundational skills.

Furthermore, insufficient prior knowledge and limited interest are significant factors contributing to learners’ difficulties in mathematics, a finding consistent with Acharya’s (2020) study. A negative perception of a topic diminishes learner interest, which in turn reduces their motivation to acquire fundamental skills. This can lead to a limited understanding and a superficial grasp of the subject, ultimately contributing to academic struggles. Learners with weak foundational knowledge often find it more challenging to achieve academic success.

This aligns with Acharya's (2020) study, which identified a lack of prior knowledge and interest as key factors contributing to difficulties in mathematics. Consequently, a learner's initial attitude can create a cycle of disengagement that hinders academic progress. Learners with weak foundational mathematical knowledge often find it more challenging to achieve academic success.



Significant Difference in the Level of Learning Performance on the Pretest of Grade 7 Learners in Multiplication Fact Recall Between the Control and Experimental Groups

Before implementing any intervention, it is essential to determine whether the groups under study are statistically comparable, as this ensures that any subsequent differences in learning outcomes can be attributed to the intervention rather than to pre-existing disparities in learners' abilities. In this study, the control and experimental groups were assessed through a pretest focused on multiplication fact recall to evaluate their initial levels of proficiency.

Table 5 presents the mean pretest scores for both groups, along with the corresponding t-value and p-value. These statistical indicators were used to determine if a significant difference existed in the groups' performance before the implementation of the Mathrix Sense Intervention. The analysis confirms whether the two groups were comparable at the beginning of the study, which is a critical prerequisite for drawing valid conclusions about the intervention's effectiveness.

Table 5. Significant Difference in the Level of Learning Performance on the Pretest of Grade 7 Learners in Multiplication Fact Recall Between the Control and Experimental Groups

Groups	Mean	t-value	p-value	Remarks
Control	11.40			
Experimental	11.73	0.409	0.684	No Significant Difference
Mean Difference	0.33			

The computed p-value of 0.684 exceeded the 0.05 level of significance, indicating that there was no statistically significant difference between the pretest scores of the control and experimental groups. This finding supports the acceptance of the null hypothesis, suggesting that both groups had comparable levels of performance prior to the intervention. Specifically, the control group obtained a mean score of 11.40 out of 30, while the experimental group recorded a slightly higher mean of 11.73. Despite this minimal difference, the lack of statistical significance confirms that both groups began the study with similar proficiency in multiplication fact recall.

The equivalence of the groups ensures that any differences observed in the posttest can be confidently attributed to the effect of the Mathrix Sense Intervention. These results indicate that the assignment of learners to groups was unbiased and that both the control and experimental groups possessed comparable prior knowledge. As Creswell (2012) emphasized, the quasi-experimental pretest-posttest design establishes baseline equivalence between groups, allowing researchers to attribute changes in posttest performance to the intervention rather than to initial differences in understanding. In this study, the pretest results confirmed the homogeneity of the two groups, thereby maintaining the internal validity of the experiment and ensuring equivalent initial competencies allowed for a fair and unbiased evaluation of the effectiveness of the Mathrix Sense Intervention on the learning performance of Grade 7 learners in mathematics.

Level of Learning Performance on the Posttest of Grade 7 Learners in Multiplication Fact Recall

In addition to assessing the performance of the experimental group, this study also examined the learning outcomes of the control group, which received instruction through the traditional teaching approach. The purpose of this assessment was to compare the effectiveness of the Mathrix Sense Intervention with conventional methods in enhancing multiplication fact recall. To measure the learning performance, a posttest in Multiplication Fact Recall, adopted from the Learning Resources Management and Development System (LRMDS) provided by the DepEd (2019), was administered after the study. The results of this posttest are presented in Table 6.

Table 6. Level of Learning Performance on the Posttest of Grade 7 Learners in Multiplication Fact Recall of the Control Group

Interval Scores	Frequency	Percentage (%)	Description
24.01 – 30.00	0	0	Very High
18.01 – 24.00	9	30.00	High
12.01 – 18.00	9	30.00	Moderately High
6.01 – 12.00	12	40.00	Low
0.00 – 6.00	0	0	Very Low
Total	30	100.00	
Overall Mean		15.00	Moderately High

As shown in Table 6, the posttest results of the control group reveal varied achievement levels. Notably, the largest proportion of learners, 12 out of 30 (40%), scored from 6.01 to 12, corresponding to the low performance level. In contrast, 9 learners (30%) achieved scores ranging from 12.01 to 18, classified as moderately high performance. Meanwhile, another 9 learners (30%) obtained scores between 18.01 and 24, categorized as high performance. Overall, despite the differences in individual achievement, the posttest mean score was 15.00, which falls within the moderately high performance level. These findings indicate that learners in the control group, who were taught using the traditional approach, achieved only partial mastery of Multiplication Fact Recall.

Furthermore, these results are supported by previous studies. Smael et al. (2020) found that traditional teaching methods moderately improved learners' performance in Finite Mathematics. Similarly, Vergara et al. (2022) noted that while direct instruction facilitates



the acquisition of basic skills, interactive teaching strategies significantly enhance learner achievement. In addition, Yusof et al. (2022) highlighted that passive teaching approaches, such as direct instruction, tend to result in lower engagement and retention compared to learner-centered strategies. Taken together, these studies suggest that although traditional teaching may lead to some academic improvement, it is generally less effective in promoting deep understanding and long-term mastery of mathematical concepts.

Consequently, after implementing the Mathrix Sense Intervention, the posttest results of the experimental group were analyzed to evaluate its impact on learners' multiplication fact recall. The analysis focused on assessing both the learners' proficiency in recalling multiplication facts and the accuracy of their responses, thereby determining the effectiveness of the intervention.

Table 7. Level of Learning Performance on the Posttest of Grade 7 Learners in Multiplication Fact Recall of the Experimental Group

Interval Scores	Frequency	Percentage (%)	Description
24.01 – 30.00	17	56.67	Very High
18.01 – 24.00	12	40.00	High
12.01 – 18.00	1	3.33	Moderately High
6.01 – 12.00	0	0	Low
0.00 – 6.00	0	0	Very Low
Total	30	100.00	
Overall Mean		24.70	Very High

As shown in Table 7, the posttest results of the experimental group reveal varied levels of achievement. Notably, the largest proportion of learners, 17 out of 30 (56.67%), scored between 24.01 and 30.00, corresponding to the very high level of performance. This was followed by 12 learners (40.00%) who obtained scores ranging from 18.01 to 24.00, classified as high proficiency. Meanwhile, only one learner (3.33%) scored between 12.01 and 18.00, interpreted as moderately high performance. Overall, the group achieved a posttest mean score of 24.70, which falls within the very high level of proficiency. These results indicate that the majority of learners in the experimental group benefited substantially from the Mathrix Sense Intervention, demonstrating significant improvements in multiplication fact recall, computational accuracy, and fluency.

Furthermore, these findings suggest that integrating gamified, learner-centered strategies into mathematics instruction can effectively enhance learners' computational fluency, engagement, and confidence in recalling basic math facts. This conclusion is supported by recent studies: Jutin and Maat (2024) reported that gamification in mathematics education improved learner engagement, motivation, and academic performance, while Sanchez Gonzalez (2023) found that gamified strategies in secondary mathematics enhanced learning outcomes through increased motivation and active participation. Similarly, Maryana et al. (2024) observed that gamified learning environments positively influenced learner engagement and mathematics achievement. In the Philippine context, Abuda et al. (2021) noted that gamified, track-based remote instruction contributed to the improvement of mathematics competence among senior high school learners.

Collectively, these findings support the conclusion that the Mathrix Sense Intervention significantly improved the posttest performance of Grade 7 learners in multiplication fact recall. The results underscore the effectiveness of learner-centered, game-based instructional approaches in promoting engagement, retention, and mastery of foundational mathematical skills. Overall, the success of the intervention highlights the critical role of interactive, multifaceted teaching strategies in closing learning gaps and enhancing academic performance in contemporary classroom environments.

Table 8 presents the summary results of the posttest administered to Grade 8 learners to assess the effect of the Mathrix Sense Intervention on multiplication fact recall. The experimental group received the intervention, while the control group was instructed using the traditional teaching method. The posttest measured the learning performance of each group after the instructional period. By comparing mean scores and descriptive interpretations, the results provide evidence of the intervention's effectiveness in improving recall skills and highlight performance differences between the groups, demonstrating the potential of innovative instructional strategies. The performance gap between the control and experimental groups underscores the importance of integrating engaging, innovative strategies in math instruction. It supports the use of evidence-based approaches to enhance foundational skills and educational outcomes.

Table 8. Summary Result on the Level of Learning Performance on the Posttest of Grade 7 Learners in Multiplication Fact Recall

Groups	Mean	Description
1. Control	15.00	Moderately High
2. Experimental	24.70	Very High
Overall Mean	19.85	High

Table 8 presents a summary of the posttest mean scores of Grade 7 learners in Multiplication Fact Recall. Notably, the experimental group, which was exposed to the Mathrix Sense Intervention, achieved the highest mean score of 24.70, classified as very high. In contrast, the control group, which received instruction through the traditional teaching approach, obtained a mean score of 15.00, interpreted as moderately high. Overall, the combined mean score for both groups was 19.85, indicating a generally high level of



performance among the learners.

The findings of the study indicate that traditional instruction alone may not sufficiently address the diverse learning needs of twenty-first-century learners. In contrast, the Mathrix Sense Intervention, which integrates gamified learning, interactivity, and learner-centered strategies, markedly improved learners’ retention, mastery, and recall of multiplication facts. Furthermore, these results highlight the pedagogical value of gamified, learner-centered approaches in promoting engagement, motivation, and academic achievement in mathematics. By fostering active participation, sustained attention, and confidence in basic computation, such instructional strategies provide an effective and contemporary framework for enhancing foundational mathematical skills while supporting meaningful learning outcomes.

These conclusions are supported by recent research. Zhao et al. (2021) investigated the impact of gamified learning environments on mathematics achievement and motivation among middle school learners. Their study revealed that learners exposed to game-based instructional strategies demonstrated significantly higher test performance and reported increased motivation compared to those taught through traditional methods. Gamification was found to reduce learner anxiety, sustain attention, and encourage active participation—factors critical for developing fluency in basic mathematical skills. Importantly, these results have implications for curriculum development, particularly in addressing foundational numeracy gaps identified in Philippine national assessments (SEAMEO INNOTECH, 2023).

Significant Difference in the Level of Learning Performance on the Posttest of Grade 7 Learners in Multiplication Fact Recall Between the Control and Experimental Groups

To evaluate the Mathrix Sense Intervention’s effectiveness, the study compared posttest results between the control and experimental groups to determine whether the intervention yielded statistically significant improvements over traditional teaching. At the end of the experiment, similar posttests were administered to both the control and experimental groups, and a t-test for independent samples was conducted to assess the statistical significance of their performance. The analysis utilized data such as mean scores, t-values, and p-values to establish whether a meaningful difference existed between the two groups. As presented in Table 9, the results revealed notable differences in learning performance, highlighting the impact of the intervention.

Table 9. Significant Difference in the Level of Learning Performance on the Posttest of Grade 7 Learners in Multiplication Fact Recall Between the Control and Experimental Groups

<i>Groups</i>	<i>Mean</i>	<i>t-value</i>	<i>p-value</i>	<i>Remarks</i>
Control	15.00			
Experimental	24.70	11.034	0.000	With Significant Difference
Mean Difference	9.70			

The data presented in Table 9 revealed that the experimental group obtained the highest mean percentage score of 24.70, classified as very high. In contrast, the control group recorded the lowest mean percentage score of 15.00, classified as satisfactory. The computed overall mean difference indicated that learners exposed to the Mathrix Sense Intervention significantly outperformed those taught through traditional instruction. Furthermore, the computed p-value of 0.000, which is less than the 0.05 level of significance, provided strong statistical evidence to reject the null hypothesis. This confirmed that there was a significant difference in the posttest scores between the control and experimental groups.

These findings demonstrated that the Mathrix Sense Intervention, which integrates gamified, interactive, and learner-centered strategies, effectively enhanced the multiplication fact recall of Grade 7 learners. Learners who engaged with the digital intervention showed higher motivation, retention, and mastery of multiplication facts compared to those who experienced conventional instruction.

The results suggest that educators should incorporate digital tools like Mathrix Sense into classroom instruction to improve engagement and mastery of foundational mathematical skills. The study supported the notion that traditional teaching approaches alone are insufficient to meet the diverse learning needs of 21st-century learners, particularly in mathematics. Technology-enhanced, learner-centered strategies enable teachers to foster active learning, critical thinking, and sustained motivation among learners.

Consistent with this, Jamaludin et al. (2022) found that digital gamification in mathematics instruction enhanced both academic achievement and learner motivation, especially when lessons encouraged problem-solving and critical thinking in an interactive environment. Likewise, a study by Enrique and Cusipag (2025) in the Philippines revealed that implementing video- and game-enhanced lessons via tablets led to significant improvements in Grade 4 learners’ performance in mathematics across all quarterly examinations.

Overall, the findings of this study reinforce the effectiveness of learner-centered digital interventions like Mathrix Sense in improving fundamental mathematical skills. Specifically, such tools promote greater engagement, personalized learning experiences, and better retention of multiplication facts. Hence, integrating gamified digital interventions into mathematics instruction can foster more effective and inclusive learning environments for modern classrooms.



Significant Difference Between the Level of Learning Performance on the Pretest and Posttest of the Control Group

In this study, the control group received instruction in Multiplication Fact Recall using a traditional teaching approach, which primarily involved direct instruction and practice through conventional methods. To evaluate the effectiveness of this approach, a t-test for dependent samples was utilized to compare the learners’ performance before and after the intervention. This statistical test aimed to determine whether the improvement observed in the posttest scores was statistically significant. By analyzing the difference between the pretest and posttest results, the study assessed the impact of traditional teaching strategies on learners’ mastery of multiplication facts. The results are summarized in Table 10.

Table 10. *Significant Difference Between the Level of Learning Performance on the Pretest and Posttest of the Control Group*

Category	Mean	t-value	p-value	Remarks
Pretest	11.40			
Posttest	15.00	5.021	0.000	With Significant Difference
Mean Difference	3.60			

Table 10 presents the difference between the pretest and posttest mean scores of the control group. The p-value of 0.000, which is less than the significance level of 0.05, indicated a statistically significant difference between the pretest and posttest results. This finding led to the rejection of the null hypothesis, suggesting that the observed improvement was not due to chance. Specifically, the control group's mean score increased from 11.40 in the pretest to 15.00 in the posttest, reflecting a mean gain of 3.60. While this improvement suggests that the traditional teaching approach contributed positively to the learners' performance in multiplication fact recall, the progress was relatively modest. Compared to the experimental group that received the Mathrix Sense Intervention, the control group’s gains highlighted the limitations of conventional instruction in promoting deeper understanding and retention. These results underscore the need for more interactive, engaging, and learner-centered teaching strategies to enhance mathematical learning outcomes more effectively.

Similarly, a 2024 systematic review found that emerging technologies, including augmented reality, virtual reality, mixed reality, and gamification, consistently enhance learner engagement by providing immersive and interactive learning experiences while also improving learning outcomes across disciplines (Bando et al., 2024). A study conducted in the Philippines on blended learning revealed that the integration of various digital tools fosters learning communities and promotes sustained engagement, enabling learners to access instruction anytime and anywhere (Villanueva et al., 2023). These findings reinforce the argument that although traditional instruction establishes foundational knowledge, it should be supplemented with dynamic, technology-based strategies such as Mathrix Sense to strengthen academic performance.

Furthermore, the study emphasized the necessity of instructional methods in mathematics. While traditional methods could still play a role, more innovative and interactive strategies should be integrated to optimize learning outcomes. Future research should continue to explore the comparative effectiveness of traditional and digital approaches.

Significant Difference Between the Level of Learning Performance on the Pretest and Posttest of the Experimental Group

The experimental group received instruction in Multiplication Fact Recall through the Mathrix Sense Intervention. To determine whether this instructional method led to a significant improvement in learner performance, a t-test for dependent samples was conducted. The statistical findings from this analysis, which evaluate the effectiveness of the intervention, are presented and discussed in Table 11.

Table 11. *Significant Difference Between the Level of Learning Performance on the Pretest and Posttest of the Experimental Group*

Category	Mean	t-value	p-value	Remarks
Pretest	11.73			
Posttest	24.70	26.332	0.000	With Significant Difference
Mean Difference	12.97			

Table 11 reveals a statistically significant improvement in the experimental group’s learning performance following the Mathrix Sense Intervention. The p-value of 0.000, which is below the 0.05 significance threshold, indicated that the difference between the pretest and posttest scores was not due to chance. Correspondingly, the computed t-value of 26.332 further confirmed the strength of this result. The experimental group’s mean score increased substantially from 11.73 in the pretest to 24.70 in the posttest, yielding a notable mean gain of 12.97. This significant improvement demonstrated that the Mathrix Sense Intervention had a strong positive effect on learners’ multiplication fact recall, supporting the effectiveness of gamified and interactive instructional approaches in enhancing mathematical performance.

These results demonstrate the effectiveness of interactive, gamified, and technology-based interventions in improving math performance, aligning with Zhao et al. (2021), Barzilai and Blau (2021), and Jamaludin et al. (2022), who found such interventions boost achievement and motivation. This study also emphasized the limitations of traditional teaching approaches and highlighted the



need for more dynamic, learner-centered approaches in mathematics education.

Furthermore, this research emphasized the shortcomings of traditional teaching methods in addressing the diverse needs of learners in modern classrooms. The results indicated that integrating learner-centered digital tools, like the Mathrix Sense Intervention, could notably enhance foundational math skills. It specifically boosted multiplication fact recall through increased engagement, personalized learning, and improved retention. These findings highlight the potential of digital interventions in creating more effective and inclusive learning environments.

Significant Difference in the Learning Performance in the Mean Gain Scores Between the Control and Experimental Groups

In this study, a key component of the analysis was the examination of mean gain scores between the control group and the experimental group to evaluate the effects of the intervention. To determine the comparability of these groups, an independent-samples t-test was employed to analyze the differences between their pretest and posttest results. The outcomes of this statistical test are presented in Table 12, offering insights into the significance of the observed differences in learning progress between the two groups.

Table 12. Significant Difference in the Learning Performance in the Mean Gain Scores Between the Control and Experimental Groups

Category	Mean	t-value	p-value	Remarks
Control	3.60			
Experimental	12.97	10.769	0.000	With Significant Difference
Mean Difference	9.37			

Table 12 shows a statistically significant difference in the mean gain scores between the control and experimental groups. The p-value of 0.000, which is well below the 0.05 significance level, confirms that the observed difference is statistically significant. The t-value of 10.769 further supports this conclusion. The control group achieved a mean gain of 3.60, while the experimental group demonstrated a significantly higher mean gain of 12.97. These results highlight the effects of the Mathrix Sense Intervention compared to the traditional teaching approach in improving learners' performance in multiplication fact recall. The intervention's gamified, interactive approach led to a much more substantial improvement in the experimental group's learning outcomes.

These findings further emphasized the effects of the Mathrix Sense Intervention compared to traditional instructional methods. The control group, which received instruction through the traditional teaching approach, demonstrated some improvement in their mean gain scores; however, this improvement was significantly lower than that observed in the experimental group. This suggested that, although traditional methods facilitated some learning gains, they were not as effective as more interactive and engaging approaches, such as the Mathrix Sense Intervention, in enhancing learners' mastery of multiplication facts.

The findings aligned with Constructivist Learning Theory, particularly Vygotsky's Social Constructivism, which emphasizes the importance of interactive, learner-centered approaches in the learning process. The Mathrix Sense Intervention embodied these principles through its focus on gamification, interactivity, and learner-centered strategies. This approach provided opportunities for active participation, collaboration, and immediate feedback, all of which contributed to improved learner outcomes.

These findings are further supported by Zhao et al. (2021) and Barzilai and Blau (2021), who also emphasize the effectiveness of game-based learning tools in improving both learner engagement and academic achievement. The significant difference in mean gain scores between the experimental and control groups reinforced the argument that digital interventions, such as the Mathrix Sense Intervention, are more effective in enhancing academic performance compared to traditional methods.

Moreover, traditional teaching approaches, while still providing educational benefits, may be insufficient to address the diverse learning needs of learners in contemporary classrooms. The implementation of interactive, learner-centered strategies such as technology-integrated tools demonstrated greater effectiveness in promoting engagement and improving academic performance, especially in mathematics. These results underscore the importance of adapting instructional methods to meet the evolving needs of modern learners. Consequently, to enhance learner outcomes more effectively, future research should investigate the broader impact of these innovative strategies across diverse subjects and learning environments.

Size Effect of the Mathrix Sense Intervention

This study assessed the effect size of the Mathrix Sense Intervention by analyzing quantitative measures of its effect on improving learners' fluency in recalling multiplication facts. Effect size is a crucial statistical metric used to quantify the strength of the relationship between an intervention and its outcomes, allowing for meaningful comparisons across different studies. Table 13 presents the effect size, which provides a measure of the intervention's impact on learners' performance in multiplication fact recall. This analysis is vital as it highlights the effectiveness of the intervention relative to a traditional instructional method, offering a more robust conclusion than simple significance testing alone.

Table 13. Size Effect of the Mathrix Sense Intervention

Category	Mean	SD	Cohen's d	Remarks
Pretest	3.60	3.93	2.385	Large Effect
Posttest	12.97	2.70		

Table 13 presents the effect size of the Mathrix Sense Intervention, determined by the difference in mean gain scores between the control and experimental groups. The computed Cohen's d value of 2.385 indicates a large effect size based on Cohen's (1988) benchmarks, suggesting a strong effect of the intervention on improving Grade 7 learners' multiplication fact recall.

This finding demonstrates both statistical and practical significance, emphasizing the substantial educational value of the Mathrix Sense Intervention. Similar outcomes were reported by Suarez and Casinillo (2020), who found that Strategic Intervention Materials (SIM) significantly enhanced learners' understanding and retention, confirming the effectiveness of structured instructional strategies in improving academic performance. These results align with the principles of Constructivist Learning Theory, which asserts that learners build knowledge through meaningful, interactive experiences. The Mathrix Sense Intervention provided a game-based, engaging learning environment that promoted deeper cognitive involvement and improved retention of multiplication facts.

Likewise, this learner-centered strategy encouraged learners to take active ownership of their learning, contributing to long-term mastery and skill development. Supporting evidence from Magno and Lirios (2020) and Fabito and Buenviaje (2021) also highlighted the positive influence of digital tools on academic performance and learner motivation. The Mathrix Sense Intervention exemplifies the transformative potential of integrating technology into traditional instruction, making mathematics more interactive, personalized, and enjoyable.

Consequently, the Mathrix Sense Intervention's integration of game-based elements effectively caters to diverse learning needs, particularly for foundational concepts like multiplication fact recall. The approach emphasizes learner autonomy, interactive content, and personalized learning, aligning with contemporary educational objectives to boost engagement and academic achievement. Moreover, the intervention encourages deeper cognitive engagement, which ensures the long-term mastery of mathematical concepts.

Ultimately, these findings emphasize the capacity of technology-enhanced strategies to augment traditional pedagogical approaches, thereby fostering a more inclusive, engaging, and effective learning environment. This approach accommodates diverse learner needs and promotes improved academic performance, underscoring the necessity of integrating modern tools to address the multifaceted challenges of contemporary education.

Constructivist Learning Theory and the Research Findings

The findings of this study are strongly grounded in the principles of Constructivist Learning Theory, as advanced by Jean Piaget (1972) and Lev Vygotsky (1978). This theory posits that learners actively construct knowledge through engagement, exploration, and reflection, rather than through passive reception of information. In this study, the Mathrix Sense Intervention embodied these constructivist principles by enabling learners to interact meaningfully with mathematical concepts through gamified, technology-based activities. Through interactive challenges, problem-solving tasks, and immediate feedback, learners were able to construct their understanding of multiplication facts while connecting new information to their prior knowledge. The self-paced and exploratory design of the Mathrix Sense activities aligns with Piaget's view that learners develop cognitive structures by actively engaging in experiences that promote reflection and conceptual growth.

Furthermore, the findings illustrate Vygotsky's concept of the Zone of Proximal Development (ZPD), which emphasizes that learning is most effective when instructional support or scaffolding helps learners progress from guided practice to independent mastery. The digital platform incorporated step-by-step prompts, adaptive levels of difficulty, and supportive feedback, allowing learners to learn at their own pace while receiving necessary guidance. This process demonstrates how constructivist principles can be effectively operationalized in digital learning environments, fostering autonomy, confidence, and improved recall of multiplication facts.

Overall, the significant improvement in the experimental group's posttest performance validates that a constructivist, learner-centered digital approach can effectively enhance mathematical learning. The integration of Constructivist Learning Theory with the study's empirical findings confirms that technology-enhanced, learner-centered instruction empowers students to take ownership of their learning, encourages active participation, and promotes deeper conceptual understanding and long-term mastery of fundamental mathematical skills.

Conclusions

Based on the findings of the research, the following conclusions were drawn:

Learners possessed an adequate understanding and proficiency in the subject, meeting the basic expectations of the academic curriculum. However, there is still a need for further improvement to attain higher levels of mastery and excellence in mathematics. Learners in the control group lack understanding of essential mathematical concepts. Similarly, learners in the experimental group demonstrated comparable performance with the control group. These results underscore the necessity of targeted instructional strategies to address learning gaps and improve proficiency in mathematics. No significant difference was observed in the pretest mean scores between the control and experimental groups. This outcome confirmed that both groups were comparable at the outset of the study, thereby establishing a valid basis for evaluating the effects of the intervention. The posttest results revealed moderate improvement among learners in the control group, manifesting minimal enhancement of the learners' performance with the use of the traditional teaching approach. In contrast, learners in the experimental group exhibited substantial progress in mathematics performance during

the second quarter, attributed to the implementation of the Mathrix Sense Intervention.

A significant difference in mathematics performance was found between learners exposed to the traditional teaching approach and those who received the Mathrix Sense Intervention. This result led to the conclusion that the intervention had a statistically meaningful impact on the learning outcomes. Learners in the control group exhibited statistically significant improvement from pretest to posttest; the mean gain was relatively modest. This emphasized the importance of continuously assessing and adapting teaching practices to support learner achievement better. The experimental group showed a notable performance improvement, as evidenced by the significant difference between their pretest and posttest mean scores. This indicated that the Mathrix Sense Intervention effectively enhanced the learning and mastery of mathematical concepts and served as a valuable supplementary tool for instruction and review. A substantial enhancement in learning performance was observed when comparing the mean gain scores of the control and experimental groups. The statistical analysis affirmed that the variation in gains was not due to chance but was the outcome of the intervention. This provided strong empirical support for the positive impact of the Mathrix Sense Intervention on learners' academic progress. The intervention demonstrated a large effect size, indicating a significant and positive influence on learners' performance. This underscored the Mathrix Sense Intervention's potential as an effective instructional strategy in mathematics education.

Building upon the findings and conclusions of this study, the following recommendations are proposed:

The Department of Education may adopt the study to develop programs integrating technology-based strategies like Mathrix Sense to improve foundational mathematical skills. The administrator may support teacher training on Mathrix Sense and evaluate its long-term efficacy across different math topics and learner groups. Teachers may implement a comprehensive system for ongoing monitoring and evaluation to assess the efficacy of instructional strategies.

Learners may actively engage in interactive and gamified learning activities, which may help improve motivation, retention, and mastery of mathematical concepts through self-paced and exploratory learning. Parents may encourage students to use educational digital tools at home to reinforce classroom learning and cultivate self-directed and independent study habits. Future researchers may investigate specific factors affecting mathematics learning, such as learners' prior knowledge, learning motivation, study habits, classroom environment, access to technology, and teacher instructional strategies, as well as the long-term effects of the Mathrix Sense Intervention on learners' mastery of multiplication facts and other foundational mathematical skills.

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