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Effect of D.E.S.I.R.E. (Drill Exercises Towards Students' Increased Responsive Engagement) on the Improvement of Higher Math Skills

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Abstract The teacher-researcher conducted a study to develop, implement, and evaluate a teaching strategy utilizing mental math and speed tests to improve the higher math skills of 4th-grade learners at Apolinario Mabini Elementary School, Division of City Schools, Manila. The study included 40 4th-grade students whose learning progress fell under "fairly satisfactory" (75-79) during the previous grading period. Twenty students were assigned to receive the interventions at least three times a week for four weeks, while another twenty were assigned to the "Non-Intervention Group." The researcher collected qualitative (through teachers' and students' interviews) and quantitative (through pre- and post-assessment scores/results) data from both intervention and non-intervention groups. The mean score of the intervention group was 5.20 out of a 20-item pretest, with a standard deviation of 1.58. The computed t-value for the pretest was 0.47, and for the post-test, it was 3.97. The intervention strategy increases the performance of the pupils. The researcher suggests that Drill Exercises for Students' Increased Responsive Engagement (DESIRE) be used as an instructional method to increase the learners' performance in higher mathematics.

Keywords: *intervention group, non-intervention group, mental math, speed test*

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1. Introduction

One of the disciplines in the education system is mathematics, which is considered a collection of knowledge and practice derived from the contributions of intellectuals throughout history and around the globe. It enables learners to recognize patterns, quantify relationships, and forecast the future.

Math enables humans to comprehend the world and apply math to it. It plays a significant role in thinking and reasoning and works to improve our understanding of the outside world and ourselves. It is an excellent strategy for fostering mental rigor and logic while also fostering mental discipline.

On the same note, a learner's mental math and speed test performance reflects his ability to provide answers correctly and rapidly. This strategy tries to get better performance scores by forcing pupils to use a method that encourages them to aim for high accuracy faster.

In the Philippines, it has been observed that pupils in elementary school cannot tell the difference between verbal and written procedures. The only difference is that when they perform mental calculations, they visualize the procedures, and as a result, they solve both types of problems in the same way.

Unfortunately, the rapid spread of the COVID-19 pandemic has necessitated a halt in the processes and procedures used for teaching across the globe. The current situation has made it hard for students to participate in any learning activities, especially those directly relevant to their education. According to Yung [1], the activities of the students are being disrupted, and it is now being determined how much longer the situation will persist. In light of the current circumstances, transitioning to a platform for online distance learning is of the utmost importance. In a nation like the Philippines, which has a wide variety of learner groups and struggles with its infrastructure, the question of whether or not it is possible to learn through an online mode has long been a point of contention.

Sabando [2] looked into how elementary school mathematics teachers use intervention strategies. One possible explanation is that children aren't given enough time or opportunity to practice the mental math skills they'll need to solve these problems on their own. Even when guidance is offered, people often lack the experience to put it into effect. As a result, written procedures aid in long-term memory retention more so than mental calculation methods.

As a result, the students asked to take the survey needed help getting high enough math scores to pass. Evidence includes pupils' miscomputations on tests involving problems in measurement, such as finding the perimeter and area of rectangles, the volume of time, the calendar, and other more straightforward problems involving estimation or multiplication of numbers by multiples of 10, 100, and 1000.

Similarly, the researcher's pupils had trouble with higher math skills because they needed to remember basic facts about adding, subtracting, multiplying, and dividing. Even though enough time has been allotted to learn specific higher-level math skills, most pupils need help with their computations and calculations. Nevertheless, they show an understanding of the concept being learned (such that, to solve for the area of a rectangle, pupils understand that they have to multiply the measurement of the length by the measurement of the width). Most of the mistakes pupils make show that they do not know how to calculate well, which is why they get bad scores and grades in math.

The researcher's professional experiences, whether during in-person or blended learning modes, were inspired because they showed how undervalued mental math skills are in education. Several observations of lessons show that most classrooms put little emphasis on improving mental math computation skills. While the central portion of the lesson concentrated on different concerns, these problems were typically addressed at the start of the class in the warm-up section.

This study aimed to contribute to understanding the efficacy of using mental math and speed tests in mathematics under the new K–12 curricula in the Division of City Schools, Manila. It aligns with advancing the following sectors: the Department of Education, School Administration, Master Teachers, Parents, and Other Researchers. It will help the pupils deal with the problems and challenges they faced during the pandemic; teachers will find other ways to help pupils learn in the classroom, and parents will determine the type of help they will give their children regarding education. It will also benefit the learners by assessing their learning experience during a pandemic and providing necessary information for future researchers.

2. Research Objective

This study aimed to develop, implement, and evaluate a teaching strategy utilizing mental math and speed tests to improve the higher math skills of 4th-grade learners at Apolinario Mabini Elementary School, Division of City Schools, Manila, for the school year 2021-2022.

3. Scope and Delimitation

The respondents of this study were the 40 4th-grade pupils at Apolinario Mabini Elementary School in the Division of City Schools, Manila, for the school year 2021-2022. Pupils whose learning progress fell under "fairly satisfactory" (75-79) during the previous grading period were included.

The respondents were coordinated with the researcher through the Division Research Committee of the Schools Division Office of Manila. This study did not look at other sections, grade levels, schools, or divisions because measuring their reliability and effectiveness would have been hard.

4. Materials and Methods

This study utilized a mixed-methods research design via the exploratory sequential method. It was defined by an initial qualitative phase of data gathering and analysis, a quantitative phase of data collection and analysis, and a final phase of data integration or linking from the two independent strands of data.

The researcher utilized two sets of 20-item teacher-made tests and unstructured interviews to obtain the respondents' responses.

Taking into consideration the previously mentioned design, the researcher incorporated the A.D.D.I.E. Model in order to further the analysis, design, development, implementation, and evaluation of the proposed intervention material in the process of determining whether or not mental math and speed tests are effective in improving the learners' higher math skills.

Ishartono et al. [3] contend that for learning to be successful, instruction must be learner-centered rather than typically teacher-centered. This contention suggests that the learning outcomes—defined after a rigorous analysis of the needs of the learners—rule over all other aspects of training.

In the development phase, a documentary analysis approach was employed. The researcher analyzed the least-mastered skills of the learners in the last three school years: SY 2019–2020, S.Y. 2020–2021, and S.Y. 2021–2022. Then, the researcher devised a design suitable for the learners who participated in the study.

The analyses and design became the basis for the researcher to develop an intervention strategy titled DESIRE (Drill Exercises Towards Pupils' Increased Responsive Engagement), where sub-skills will be developed through the drill and practice, which should serve as the foundation for more meaningful learning to develop or maintain one's specific skills.

Adhering to the efficiency of qualitative data, the researcher employed the grounded theory approach, which served as a backdrop for understanding the processes grounded in a specific context. Kolb's theory of experiential learning as an a priori lens for the current study further justified this. In this regard, there are implicit assumptions embedded in data analysis procedures. A focus group discussion was utilized to validate the results of the documentary analysis. It is necessary to start with a comprehensive and exhaustive review of related literature on the main research topic and to detail specific procedures in undertaking this research study. Such appreciative inquiry can address the present study's central question (how and why).

Baseline data from the least mastered competencies were used in the implementation phase. The primary aim of the present study was to develop or test a theory about a phenomenon to explain how and why it operates. Further, no manipulation was undertaken.

The DESIRE intervention strategy was a repetitive drill. It was given 10 minutes prior to the lesson proper. The pupils were given three to four trials with the same questions. The highest score was recorded. Each trial was timed in a decreasing manner. The first trial was 2 minutes (up to 10 mental math items; no need for a solution on paper). The second trial was to be answered in 1 1/2 minutes (same items), and the third trial was allotted 1 minute or 45 seconds. It was a combination of mental mathematics and speed tests. The mathematics teacher was the person in charge of the process.

Lastly, in the evaluation phase, both groups were given a post-test to determine the effectiveness of the intervention strategy after four weeks of research. The pupils were also interviewed about their perceptions of mathematics teaching. The result of this phase became the baseline data to improve the strategy further.

5. Results and Discussion

5.1. Development Phase

This section discusses the basis for the development of the intervention strategy.

A. Least Mastered Skills

Table 1 presents the identified least mastered skills and the corresponding frequency of errors for each competency based on 4th-grade learners' performance level in Mathematics for the School Year 2021–2022.

As shown in the table, of the 45 items in the third quarter test, 27 or 67.50% committed errors in item number 35, "If the start time is 10:32 am and the end time is 10:58 am, what is the estimated elapsed time?" The competency being measured in this test item is "Solving Problems Involving Elapsed Time."

Another least-mastered skill is item 42: "Ryan enclosed a rectangular vegetable garden with a fence. The dimensions of the garden are 12 m by 6 m. What operation is needed to solve the problem?" 25 or 62.5 Percent of the learners got the wrong answer. The measured competency is "Solving Routine Problems in Real-Life Situations Involving Perimeter."

Furthermore, competencies in determining the missing terms in a sequence of numbers, finding the missing number in an equation, and measuring the perimeter of triangles were among the skills with the highest number of errors, with 24 or 60.00% of the 40 grade 4 pupils.

More than half of the respondents struggled to answer problems that required deeper analysis—their prior knowledge of the prerequisite skills needed to be established.

This result implied that pupils needed clarification about when to apply their previously learned concepts to the presented problems. The students still needed to grasp the sense of numbers, which is considered a bottleneck in higher levels of mathematics.

The results further revealed that many pupils struggle with problem-solving in mathematics because they may have gaps in their foundational knowledge or lack the skills to analyze and approach problems effectively. Additionally, some pupils may need help to persevere through complex problems or become frustrated when encountering obstacles.

Furthermore, pupils also struggled to gain familiarity with real-world situations. Pupils found it challenging to apply mathematical concepts to real-life situations if they were not familiar with the context of the problem. For example, a problem involving the perimeter of a garden can be complex for pupils who have never worked in a garden and have little experience with gardening.

Pupils also need more practice. To develop mastery in determining missing terms in a sequence of numbers, pupils need opportunities to practice solving problems and applying mathematical rules. With sufficient practice, pupils can apply the concepts they learn in class to real-world problems.

Similarly, it could be inferred from the results that the skills were challenging for pupils because they lacked an understanding of algebraic concepts. Algebraic concepts involve using letters and symbols to represent unknown quantities, which can be difficult for pupils to grasp. With a solid understanding of these concepts, pupils can apply mathematical rules to solve equations.

According to Bradshaw & Hazell [4], problem-solving is a challenging skill to master in mathematics because it requires more than just memorizing formulas or following procedures. Effective problem-solving in mathematics involves understanding the problem. It is necessary to carefully read and analyze the problem to comprehend what questions are being asked and what information is being provided.

Likewise, Khalid et al. [5] emphasized that to become good at problem-solving in mathematics, practicing consistently and seeking resources and advice when required. Teachers, tutors, and online resources can provide additional support and help pupils develop their problem-solving skills.

Table 1. Frequency of Errors

Item Number	Frequency of Errors	Question	Competency
35	27	What is the estimated elapsed time if the start time is 10:32 am and the end time is 10:58 am?	*Solving Problems Involving Elapsed Time*
42	25	Ryan enclosed a rectangular vegetable garden with a fence. The dimensions of the garden are 12m by 6 m. What operation is needed to solve the problem?	*Solving Routine Problems in Real Life Situations Involving Perimeter*
30	24	Using the given equation, find the missing number in 9 x __ = 8 + 7 + 3	*Determining the Missing Terms in a sequence of numbers*
29	24	What is the missing number in 16 – (2 + 3) = 4 + __ + 3?	*Finding the missing number in an Equation*
40	24	Given the dimensions, what is the perimeter of the triangle?	*Measuring the perimeter of triangles*

B. Mathematics Performance (Pretest)

Table 2 shows the level of performance of two groups of pupils before the conduct of the study. The researcher made a 20-item pretest to assess the level of the respondents' performance before implementing the intervention strategy.

The data revealed that the mean score of the Intervention Group was 5.20 with a standard deviation of 1.58. At the same time, the Non-Intervention Group obtained a mean score of 5.05 with a standard deviation of 1.88. The two groups' performances were low, and the standard deviation revealed that the scores were less scattered.

With these findings, it could be inferred that pupils struggled to meet grade-level expectations for the subject. Pupils with low performance in Mathematics 4 struggled with basic math skills such as addition, subtraction, multiplication, and division.

Table 2. Performance of the Respondents in Mathematics Based on Their Pretest

Group	Mean	Int.	S.D.
Intervention Group	5.20	LP	1.58
Non-Intervention Group	5.05	LP	1.88

Legend:

Mean Score	Interpretation
17-20	Very High Performance (V.H.P.)
13-16	High Performance (H.P.)
9-12	Moderate Performance (MP)
5-8	Low Performance (L.P.)
0-4	Very Low Performance (V.L.P.)

Furthermore, learners need help understanding and applying mathematical concepts to real-world situations. Likewise, pupils with low performance in Mathematics 4 need more confidence in their math abilities and may feel frustrated or discouraged when faced with math-related tasks or problems.

In the study of Michael [6], findings indicated that teaching and learning mathematics faced challenges such as a poor teaching environment, poorly managed mathematics departments, inadequate self-practice, and students' poor backgrounds in mathematics. The pupils were not eager to answer problems with higher-order skills.

C. Developed Intervention Program

Given the competencies mentioned earlier that the learners least master, the researcher utilized them to serve as bases in developing an intervention strategy for Grade 4 learners titled "Drill Exercises towards Pupils' Increased Responsive Engagement (DESIRE)."

The baseline data revealed that they need more rehearsal and practice of the basic operations as they answer complex problems. They still have to master the basic operations in mathematics.

Drill and practice were instructional methods that systematically repeated concepts, examples, and practice problems. Drilling and practicing were disciplined and repetitive exercises to teach and perfect a skill or procedure. It promotes acquiring knowledge or skill through systematic training through multiple repetitions, rehearsing, practicing, and engaging in a rehearsal to learn or become proficient. Drill and practice, like memorization, involve repeating specific skills, such as spelling or multiplication. Subskills developed through drill and practice were the foundation for more meaningful learning to develop or maintain specific skills.

The study emphasized that the goals were realistic and aligned with the individual's or group's overall objectives after identifying the least-mastered abilities and defining SMART (specific, measurable, attainable, relevant, and time-bound) targets for each talent.

One specific strategy was an explicit instruction in math concepts and procedures to improve mastery of Math 4 skills. This strategy included breaking down complex concepts into smaller, more manageable steps using visual aids or manipulatives.

5.2. Implementation Phase

A. Drill Exercises towards Pupils' Increased Responsive Engagement (DESIRE)

The intervention strategy involved providing targeted instruction and practice in the areas where the individual or group had the least mastery. It also involved breaking down complex skills into simpler components, using explicit instruction, modeling, and providing immediate feedback. This strategy was effective in improving mathematical skills. The key to designing an effective intervention strategy was tailoring it to the specific needs of the individual or group and ensuring that it was evidence-based, feasible, and sustainable over time.

The intervention was implemented through the teacher. The teacher types the nine items they have prepared on a Google Doc or Word file. Copy and paste it on the same page for three or four trials. Each trial is timed differently: 2 minutes for Trial 1, 1.5 minutes for Trial 2, 1 minute for Trial 3, and 45 seconds or 30 seconds for the last trial or Trial 4. Pupils can write their answers in their notebooks or on paper. The teacher records the pupils' highest scores among the four trials.

After each trial, the teacher and pupils discuss the answer key; either the teacher dictates the answers or elicits answers from the pupils. There should be no explanation of the answers. The student checker writes the score for that trial. After the first trial's checking, trial 2 follows for a shorter time. After Trial 2's checking, Trial 3 follows for a shorter time, and so on.

B. Weekly Progress Scores

Table 3 shows their scores during the employment of mental math and speed tests in mathematics.

Monitoring the weekly progress of learners in Math 4 helped identify areas where they needed additional support and helped adjust the intervention strategy if necessary.

The researcher tracked the progress of each learner throughout the week. This progress monitoring process was done through regular assessments, quizzes, and check-ins.

Table 3. Weekly Progress in the Scores Using Mental Math and Speed Test

Intervention Group						Non-Intervention Group			
Wk No.	**1**	**2**	**3**	**4**	**Wk No.**	**1**	**2**	**3**	**4**
H.S.	**5**	**5**	**5**	**5**	**H.S.**	**5**	**5**	**5**	**5**
Learner					**Learner**				
A	2	3	4	5	A1	3	3	3	3
B	3	4	5	5	B2	2	4	2	3
C	3	4	5	5	C2	3	2	4	1
D	2	3	4	5	D2	3	4	2	3
E	4	4	5	5	E2	2	2	2	3
F	3	4	5	5	F2	3	1	1	2
G	3	4	5	5	G2	3	2	1	3
H	3	4	5	5	H2	4	3	2	3
I	3	4	5	5	I2	3	4	2	2
J	3	4	5	5	J2	1	3	1	2
K	4	4	5	5	K2	2	3	1	4
L	3	4	5	5	L2	2	1	4	3
M	1	3	4	4	M2	3	5	2	4
N	2	3	4	5	N2	3	4	1	1
O	2	3	4	4	O2	2	2	3	3
P	3	4	5	5	P2	2	2	3	1
Q	2	3	4	5	Q2	3	4	2	4
R	2	3	4	5	R2	4	4	4	4
S	3	4	5	5	S2	5	4	5	3
T	3	3	4	5	T2	3	4	5	3
Mean Score	**2.7**	**3.6**	**4.6**	**4.9**		**2.8**	**3.05**	**2.5**	**2.75**

In this study, a formative assessment was conducted every week. By monitoring the weekly progress of learners in Math 4 and adjusting instruction or intervention strategy as needed, the teacher can ensure that each learner is making steady progress towards mastering the Math 4 skills.

The table revealed that respondents in the intervention group obtained mean scores of 2.7, 3.6, 4.6, and 4.9 in weeks 1–4, respectively. On the other hand, the weekly mean scores of respondents in the non-intervention group were 2.8, 3.05, 2.5, and 2.75.

The data shows a clear progression in the weekly scores of the pupils in the intervention group compared to the non-intervention group, which showed inconsistency throughout the study.

The findings also indicated that the employment of mental math and speed tests among Grade 4 learners is effective. The weekly graphing and reflection activity allowed the pupils to track their progress. The learners who participated in goal setting improved their mathematical performance.

Furthermore, the findings revealed that the intervention group, which used mental math and speed tests, had statistically significantly higher learning performance results than the non-intervention group. Even though there was a slight difference in favor of the treatment group, the difference in arithmetic fluency was not statistically significant.

However, the difference in fluency test errors was statistically significant in favor of the treatment group. Statistical significance does not necessarily mean that the effect or relationship is significant in practical terms. It means that the results are unlikely to be due to chance.

In the study of Fababaer [7], the comparative results on the automaticity level showed that many of the identified non-numerate students had not mastered the multiplication table before they entered high school; most of the students were "very poor" or "poor" at performing single-digit multiplication, which may explain why most of the students were not participating in class discussion or not answering questions related to multiplication. (b) After the intervention, many students improved their automaticity from "poor" to "very satisfactory" performance. This indication proves the effectiveness of the 3-minute oral drill intervention. (c) In addition, after the intervention, most students improved their accuracy, whereas most belonged to the "excellent and best imaginable" level. Improving the students' skills shows the positive effect of the intervention applied to them.

5.3. Evaluation Phase

In this phase, the researcher determined the post-test results of the respondents and the significant difference in the performance of the two groups after the implementation of the intervention.

A. Mathematics Performance (Post-test)

Table 4 shows the performance of the pupils in the post-test. The data revealed that the mean score of the intervention group was 12.45, with a standard deviation of 2.70, while the non-intervention group had a score of 9.10 and a standard deviation of 2.51.

Table 4. Performance of the Respondents in Mathematics Based on Their Post-test

Group	Mean	Int.	S.D.
Intervention Group	12.45	MP	2.70
Non-Intervention Group	9.10	MP	2.51

Legend:

Mean Score	Interpretation
17-20	Very High Performance (V.H.P.)
13-16	High Performance (H.P.)
9-12	Moderate Performance (MP)
5-8	Low Performance (L.P.)
0-4	Very Low Performance (V.L.P.)

The pupils' mathematics performance was moderate, and the standard deviation indicated that the group was homogeneous.

This finding implied that the potential of the intervention with mental math and speed tests was to increase the learners' performance in mathematics. There was evidence of improvements in the mathematics performance of the pupils after the investigation.

Furthermore, the pupils' misconceptions of the concepts of the prerequisite skills in Mathematics IV were also removed because of the constant practice and drills prior to the discussion of the lessons. Constant practice and drills increased students' interest in learning mathematics and reduced their anxiety, especially when solving non-routine problems.

According to Paul et al. [8], it has been claimed that learners' early math abilities depend on different cognitive competencies (e.g., core number skills, working memory, and general math and reading abilities). Clarifying the relative importance of these various cognitive markers in predicting critical early math skills would provide a conceptual framework for comprehending math competence development.

Teachers should provide more activities that make the learners active in teaching and learning. The strategy could be expanded to other grade levels and higher mathematics to increase the learners' retention.

B. Significant Difference

Table 5 shows the significant difference in the performance of the pupils in the pretest. The data revealed that the computed t-value was 0.47, and the critical value was 2.093 at a 0.05 level of significance.

Table 5. Significant Difference between the Respondents Pretest Results

Indicators	t- value	Critical Value	Decision	Remarks
Pretest (Intervention Group)	0.47	2.093	Accept H_o	Not Significant
Pretest (Non-Intervention Group)				

The findings revealed no significant difference in the performance of the two groups in the pretest. Their performance prior to the integration of the intervention strategy was low. This finding proved that the null hypothesis of pretest equivalence between the two groups was accepted.

This analysis implied that the strategies teachers utilized in teaching the Mathematics IV competencies needed to be revised to increase the retention rate and mastery of the pupils.

Table 6 shows the significant difference in the performance of the pupils in the post-test. The data showed that the computed t-value was 3.97, and the critical value was 2.093 at the.05 level of significance.

The data revealed a significant difference in the post-test results between the intervention and control groups after the strategy DESIRE was incorporated into the teaching and learning process.

This finding implied that the intervention strategy effectively improved the pupils' performance in mathematics. The mental math and speed tests helped the learners efficiently arrive at the desired answers and correct solutions without using pencil and paper.

Table 6. Significant Difference Between Respondents' Post-test Results

Indicators	t- value	Critical Value	Decision	Remarks
Post-test (Intervention Group)	3.97	2.093	Reject H_o	Significant
Post-test (Non-Intervention Group)				

Furthermore, the competencies in solving problems involving elapsed time, solving routine problems in real-life situations involving perimeter, determining the missing terms in a number sequence, finding the missing number in an equation, and measuring the perimeter of triangles were much learned and mastered by those pupils who were exposed to the intervention strategy because it was not the conventional way of learning competencies in mathematics.

Pupils also became more confident in communicating their answers to problems because they were no longer hesitant to commit mistakes with the multiple trials allotted by the teachers for each question.

In the study of Varaidzaimakondo & Makondo [9], mathematics teachers occasionally make use of teaching aids. The research, earlier on, had hypothesized that pupils would understand better if teachers used various teaching aids. The results of this study confirmed this hypothesis. The study showed that concrete materials are adequate for instructional purposes in mathematics.

C. Pupils' Perception of the Intervention

Finally, the researcher examined and extracted concepts from the participants' perceptions as regards mathematics teaching.

There were positive and negative perceptions and feedback from the learner participants regarding teaching mathematics. Based on the focus group discussion on selected participants, it was found that some of them considered their mathematics teachers as motivators. This finding was the primordial reason they tended to become attentive, interested, motivated, excited, and inspired to do well in the subject matter. Learners who see their instructors as their primary sources of motivation almost always exhibit higher levels of engagement, autonomy, self-efficacy, and mastery in the classroom, in addition to a more pleasant emotional climate. They are more likely to be motivated to learn and experience greater fulfillment and achievement in their learning experiences.

The respondents' positive feedback was stated as follows:

"Gusto ko magturo si Ms. Pena kasi nakaka-inspire po sya." (I like the way Ms. Pena teach. She is inspiring)

"Magaling pong magturo si Ma'am Pena kaya po ginagalingan ko rin po sa class namin." (Ma'am Pena is good, that's why I'm performing in class also.)

"Nung una po di ko ma-gets yung nasa blackboard, pero nung tinuro na sa min ni Ma'am Pena, gets ko na kagad." (At first, I couldn't understand what is written on the board, but when Ms. Pena taught it, I already got it instantly)

"Excited po akong pumasok kasi si Ma'am Pena po ang teacher ko." (I am excited because Ms. Pena is our teacher)

"Natutuwa po ako kasi magaling po si Ma'am Pena magturo." (I am happy because ma'am Pena is a good teacher)

"Magaling pong mag-motivate si Ma'am Pena kahit po di ko alam yung ibang tinuturo nya." (She is motivating us, although we are confused.)

"Gusto ko pong matuto sa Math kasi magaling po si Ma'am Pena." (I want to learn because Ma'am Pena is good)

The remarks unmistakably demonstrated that students are more likely to be inspired if their teacher knows their specific learning needs. Teachers greatly influence the success of the teaching-learning process.

This finding further implied that the teacher, as the process's facilitator and designer, needs to have a toolkit of instructional strategies and techniques to motivate students, particularly in mathematics.

Since mathematics is the subject in the curriculum that is learned the least, it needs to be presented in a way that is more engaging for students. Students would become more involved in the material, ultimately leading to improved performance in the class.

According to Paechter et al. [10], this unexpected finding revealed little correlation between mathematics performance and interest. The study used interest and self-efficacy as motivational variables and concluded that their teachers' emotional support influenced students' interest in mathematics. Mathematics performance may not be directly correlated with interest because of the potential reciprocal impacts of student- or school-related variables, such as classroom practices, or personal characteristics, such as self-efficacy or self-regulation.

Environmental factors such as how teachers engage with their pupils in the classroom, how parents evaluate their children's aptitude in mathematics, societal trends, or even individual qualities such as features or gender can all play a role in the development of mathematics anxiety in students.

In the focus group discussion with the participant learners, unfavorable viewpoints surfaced. Math anxiety made it difficult to succeed in the topic. As they put it:

"Nalilito po ako pag Math na po ang subject namin" (I am confused when our subject is Math)

"Ayoko po ng Math kasi nai-stress lang po ako" (I don't like Math because it is stressful)

"Di ko ma-gets yung nasa blackboard." (I do not understand what is written on the board)

"Natatakot po akong pumasok kasi magagaling po mga classmates ko." (I am afraid to attend class because my classmates are good).

"Ayoko pong pumasok kasi natatakot po ako kay Ma'am." (I do not want to attend class because I am scared of Ma'am)

"Kinakabahan po ako kaya kailangan ko pong mag-focus." (I am nervous that's why I need to focus)

"Ayako pong sumagot baka pagtawanan lang ako ng classmates ko pag mali sagot ko." (I do not want to answer because they will laugh at me when I answer wrong.)

"Ayaw ko pong mapahiya sa klase." (I do not want to be humiliated.)

These comments indicated how concerned the learner participants were with the topic matter. Because of their attitude toward mathematics as a subject that was too challenging to acquire and understand, they lacked the motivation to study new concepts.

The achievement of the desired learning outcome after each session was also significantly influenced by the subject matter, the instructor, and the learning environment. In order to make learning more engaging, it was necessary to create a peaceful atmosphere.

Students learn best when they are actively involved in the process. Alternatives to the conventional approach to teaching mathematics include manipulative and other tools and techniques.

Math anxiety was found to be a significant predictor of lower S.T.E.M. grades and a reduction in the number of S.T.E.M. classes that students enrolled in, according to a study conducted by Daker and colleagues [11]. Importantly, these correlations persisted even after accounting for arithmetic proficiency (and other covariates). Contrary to popular belief, math anxiety's impacts on academic performance probably function via processes other than negatively influencing arithmetic ability, as the finding that math anxiety predicts math-related academic accomplishment irrespective of math ability. Additionally, we provide evidence that correlations between math aptitude and S.T.E.M. outcomes can be explained by math anxiety, indicating that previous associations between math aptitude and real-world outcomes may be at least partially explained by attitudes toward math. These results demonstrate the need for designing and evaluating therapies that address math anxiety and imply that improving S.T.E.M. outcomes through math aptitude alone may not be as effective as it could be.

Similarly, Khasawneh et al. [12] said that mathematics anxiety is a problem that impacts numerous disciplines throughout numerous nations and sectors. Gender may affect how one develops math anxiety; women are more likely than men to experience it. Self-awareness is related to mathematical self-confidence, mathematical values, and mathematical self-efficacy. Enhancing these ideas might help people overcome their math phobia and perform better.

6. Conclusions and Recommendations

This study examined the effectiveness of mental math and speed tests among Grade 4 learners. Results showed that the Intervention group had significantly higher learning performance than the Non-Intervention group.

Based on the findings of the study, it was concluded that the learners' mathematics performance was low. The performance of the pupils in the intervention group increased progressively compared to the non-intervention group, which was inconsistent. Moreover, the DESIRE intervention strategy was effective. It was effective because there was a significant difference in the performance of the pupils between the two groups after the intervention.

The study suggested that the teacher should design and develop an intervention strategy to increase the performance of the pupils in mathematics based on the least mastered competencies.

In addition to this, they should make consistent use of the intervention strategy and broaden the scope of the mathematical competences that are being addressed. They should work on developing and having a variety of teaching approaches at their disposal in order to meet the needs of the students. They should also participate in ongoing professional development in order to further enhance their teaching methodologies and techniques.

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