

# Improving Math Performance of the Grade III-Level through Daily Remedial Math Class: An Innovative Educational Intervention

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**Abstract** This study aims to improve the pupils' skills on the four basic mathematical operations. Competencies like addition with regrouping, subtraction with regrouping and multiplication with regrouping are usually the most difficult topic for primary graders. For pupils to excel in Math these competencies should be mastered. To fully grasp the effectiveness of this program, all grade 3 pupils were asked to answer a pre-test worksheet depending on the competency targeted in a week. The research gave special emphasis on pupils who got the lowest scores. Forty participants were selected for the study. Parent's permits were then given to these pupils informing about their participation to the remedial program. Throughout the week, pupils went through discussion of the competency, one-to-one instruction by the researchers and peer tutoring. However, when the child still had difficulty grasping the concept parents were involved in the tutorial. The researchers oriented them as to how they could best guide their children. Weekly monitoring of individual progress was regularly observed. Results showed significant improvement on the performance of pupils on the four basic operations. Pupils were excited and loved to join every DRMC session. Parents also had positive attitude towards DRMC. They found it beneficial not just in terms of intellectual aspect, but also in terms of their emotional aspect. Because parents reported that DRMC were able to understand their children more and provided proper motivation for them to develop and master these basic Math skills. It was found out that this program can develop more Math lovers and confident individuals. It is recommended that this remedial program be implemented to others grade levels or schools for further studies.

**Keywords:** *innovative intervention, mathematics education, mathematics performance, mathematics achievement*

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## 1. Introduction

Researchers and scholars around the world have long agreed that mathematics has a huge role in academic and professional success [1]. Lower achievement in Mathematics in the higher grades is due to lack of basic competencies such as counting in groups, understanding the ten-based system and performing the four (4) basic operations [2]. These competencies are predictors of success in mathematics in later years. Pupils with learning difficulties needed all the attention or interventions they can get in order to learn. In line with this, it is necessary to evaluate remedial intervention programs aimed at fostering basic arithmetic understanding among elementary with mathematical difficulties.

The Program for International Student Assessment (PISA) is a worldwide study by OECD [3] in nearly 80 nations of 15-year-old students' scholastic performance on

mathematics, science and reading. According to PISA (2018) result, expenditure per student in the Philippines was the lowest amongst all PISA-participating countries or economies and 90% lower than the OECD average. By comparison, expenditure per student in Indonesia was 83% lower than the OECD average and students there outperformed students in the Philippines. Some 19% of students in the Philippines attained Level 2 or higher in mathematics. These students can interpret and recognize, without direct instructions, how a simple situation can be represented mathematically (e.g. comparing the total distance across two alternative routes, or converting prices into a different currency). With this, it becomes a challenge to all teachers handling mathematics to develop programs and interventions that will aid the pupils who have math difficulties as early as elementary level.

NAT Overview and Test Results 2012-2014 showed that students are on the average mastery level with a percentage of 59 for Mathematics subject and this score reflect public schools only. Private schools score much

better than public schools. Trainings and methods in teaching mathematics from both schools vary as well as their scores. Mostly, students who were having mathematical difficulties came from public schools. According to Anderson [4], students with mathematical difficulties display persistent problems in the four domain specific arithmetic components that includes conceptual understanding, solving word problems, procedural knowledge and factual knowledge. Therefore, remedial instruction focuses on this domain.

Remedial instruction is the process of providing help to students who are having difficulties so that they can understand and master the concept with which they are struggling. In math, each concept is the foundation for new learning, and when a student has not mastered one concept, they are unable to move on to the next concept. In this case, remediation helps to get the student back on track so they can continue their learning on the math continuum. Teaching remedial math means that you will be working with students who might be missing foundational skills that are required for learning higher-level concepts. Whether because of a learning difficulty or another situation that impacted their learning, these are pupils, for example, who may not have mastered adding one digit numbers and are now being asked to add two-digit numbers with regrouping.

The fundamental underlying principles of the No Child Left Behind (NCLB) Act of 2001 focus on holding all learners to high standards of learning and instruction, and in turn, increasing academic achievement of all identified subgroups in the K-12 population. With this, all the students have the right to be promoted to the next level along with the rest. Therefore, remediation or intervention is needed for everybody to be moved to the next level most especially those who are having difficulties in different subject areas. Some schoolchildren may lack interest in their studies, basic Math skills, and refuse to learn. Others may have not mastered number recognition and counting at an early age. Some slow learners usually have behavioral problems that is why they are often misunderstood.

Montague et al. [5] reports that highly structured and organized programs for teaching mathematics were effective. This approach is supported by the results of a meta-analysis by Gersten [6], who specify five instructional components that appear to be fruitful for students with mathematical difficulties such as teaching heuristics to solve word problems; explicit instruction; the use of graphical representations and manipulatives; thoughtful selection and sequencing of instructional examples, and encouraging students to verbalize their own strategies or the strategies modeled by the teacher.

This study is conducted to address the needs of the students in the grade three (3) level of Indahag Elementary School who were having mathematical difficulties specifically with the four (4) basic operations. Daily Remedial Math Class (DRMC) aims to provide extra remediation for pupils that can help them develop conceptual knowledge and increase arithmetic competence. The researchers assumed that having a firm grasp of basic arithmetical concept is a prerequisite to understand the different components of the mathematics curriculum.

## 2. Methods

This study used the non-experimental pretest-posttest design [7]. There were five (5) Grade 3 sections at Indahag Elementary School with a population of 169 pupils for the SY 2019-2020. The researchers selected ten (10) participants from each section who were having difficulties in the four (4) basic math operations. The researchers got the names of the pupils enrolled in the each section from the teacher-adviser using a printed copy of School Form 1 downloaded from the Learner Information System (LIS). Pretest was conducted at first. In it, pupils underwent a certain test with ten (10) items each for the four basic mathematical operations. The researchers recorded the score as soon as the participants finished.

The participants of this study were exposed to 1-hour daily remedial class in Mathematics for 10 weeks. At the end of the 10-week period, posttest was conducted. Their scores during pretest and posttest were compared and analyzed. Focus Group Discussion was conducted after the program to determine the experiences of pupils when exposed to DRMC.

The study employed quantitative analysis of data using descriptive and inferential statistics. Specifically, the following statistical tools were used: frequency, mean, percentage, standard deviation were used to determine the participants' attitude towards remedial class and parents' attitude towards school active participation and remedial class. T-Test was used to determine the difference between students' math achievement with or without the Daily Remedial Math Class (DRMC). Qualitative analysis was also employed from the FGD conducted by the researchers to parents and participants [8].

## 3. Results and Discussions

### 3.1. Student's Performance in Basic Mathematical Operations

The main goal of this innovative educational intervention is to improve the performance of students in basic mathematical operations. Table 1 shows the participants' pretest and posttest results in addition. It can be gleaned from the Table that 57.50 percent of the grade 3 level are slow in addition; 42.50 percent needs practice and none of them mastered addition. Fortunately, after the one-week intervention through daily remedial math class the performance of the participants improved with 40 percent mastered and 35 percent were improving. However, there were 15 percent of the participants who needs practice and 10 percent who were slow. One of the most identified cause of elementary student's poor performance of in mathematics is math anxiety. In one study, math anxiety was found to have a detrimental effect on math achievement regardless whether students have anxiety related to numbers or to the situation and social experience of doing math [1]. Thus, this is expected since the participants of this research were those who performed least in their classes, and may have developed math anxieties.

**Table 1. Math Achievement of Participants before and after Being Exposed to Daily Remedial Math Class (DRMC) in Addition**

Performance*	Before the Intervention		After the Intervention	
	F	Percent	F	Percent
Mastered	0	0	16	40.00
Improving	0	0	14	35.00
Needs Practice	17	42.50	6	15.00
Slow	23	57.50	4	10.00
Total	40	100.00	40	100.00

\*Legend: Slow=0-34 PL; Needs Practice=35-74 PL; Improving=75-89 PL; Mastered=90-100 PL.

Students performance in subtraction was also assessed before and after the intervention. Table 2 shows the participants' pretest and posttest during math remedial classes in subtraction. The data revealed that before DRMC, 67.50 percent of the grade 3 level were slow and 32.50 percent needs. Fortunately, after one-week exposure to DRMC the performance of the participants improved with 50 percent mastered and 27.50 percent were improving. However, 10 percent of the participants still needs practice and 12.50 percent were slow. The results show that majority of the students really requires intervention to master the subtraction operation.

**Table 2. Math Achievement of Participants before and after Being Exposed to Daily Remedial Math Class (DRMC) in Subtraction**

Performance*	Before the Intervention		After the Intervention	
	F	Percent	F	Percent
Mastered	0	0	20	50.00
Improving	0	0	11	27.50
Needs Practice	13	32.50	6	15.00
Slow	26	67.50	4	10.00
Total	40	100.00	40	100.00

\*Legend: Slow=0-34 PL; Needs Practice=35-74 PL; Improving=75-89 PL; Mastered=90-100 PL.

Meanwhile, the performance of students in multiplication are summarized in Table 3. It is shown that before the intervention, 90 percent of the grade 3 were slow and 10 percent needs practice. Fortunately, after the one-week duration of the daily remedial math class the performance of the participants improved with 75 percent mastered and 5 percent were improving. However, there were 15 percent of the participants who needs practice and 5 percent who were slow. The scores of students before intervention is a sounding bell that there is an immediate need to address this problem.

**Table 3. Math Achievement of Participants before and after Being Exposed to Daily Remedial Math Class (DRMC) in Multiplication**

Performance*	Before the Intervention		After the Intervention	
	F	Percent	F	Percent
Mastered	0	0	30	75.00
Improving	0	0	2	5.00
Needs Practice	4	10.00	6	15.00
Slow	36	90.00	2	5.00
Total	40	100.00	40	100.00

\*Legend: Slow=0-34 PL; Needs Practice=35-74 PL; Improving=75-89 PL; Mastered=90-100 PL.

In terms of the division operation, Table 4 summarizes the participants' pretest and posttest scores. The data revealed that before the intervention, all the participants in grade 3 were slow in division. Basic calculation skill develops from second to third grade [9]. This suggest that students did not achieve any level of mastery of this basic operation since they were still at the second grade, thus the problem is compounded when they reached the third grade level. Fortunately, after exposing the participants to daily remedial math class, their performance improved with 70 percent mastered and 7.50 percent improving. However, 5 percent of the participants still needs practice and 17.50 percent were slow.

**Table 4. Math Achievement of Participants before and after Being Exposed to Daily Remedial Math Class (DRMC) in Division**

Performance*	Before the Intervention		After the Intervention	
	F	Percent	F	Percent
Mastered	0	0	28	70.00
Improving	0	0	3	7.50
Needs Practice	0	0	2	5.00
Slow	40	100.00	7	17.50
Total	40	100.00	40	100.00

\*Legend: Slow=0-34 PL; Needs Practice=35-74 PL; Improving=75-89 PL; Mastered=90-100 PL.

### 3.2. Student's Attitude towards DRMC

This study also sought to determine the attitude of students exposed in DRMC. Table 5 presents the frequency and percentage distribution of the participants' attitude towards Daily Remedial Math Class (DRMC). The data showed 18 pupils or 45.00 percent of the participants assessed their DRMC experience as a great intervention for them to easily learn the four basic math operations.

**Table 5. Participants' Assessment of their Attitude towards Daily Remedial Math Class (DRMC)**

Indicators	Mean	SD	Description
1. I attend remedial classes which I involved in.	4.00	0.01	Very true of me
2. I am doing well with my remedial class.	4.00	0.01	Very true of me
3. I communicate with my teachers.	4.00	0.01	Very true of me
4. I volunteer at school.	4.00	0.01	Very true of me
5. We discussed things about Mathematics.	4.00	0.01	Very true of me
6. I would contact my teacher if I am having a problem with school.	4.00	0.01	Very true of me
7. I read the school newsletter and let my parents know.	3.53	0.85	Very true of me
8. My parents sees me doing Mathematics well.	4.00	0.01	Very true of me
9. I will be rewarded when I'm doing well with my remedial class.	3.05	1.28	Generally true of me
10. I talk negatively about school and remedial classes.	1.03	0.16	Not at all true of me

The data also revealed that participants had a positive feeling towards Daily Remedial Math Class (DRMC) with  $M=4.00$ . The participants attended remedial classes every day, they are doing well with their remedial classes, like to communicate with their teacher if problem arises, volunteer to help their classmates who are having difficulty in Mathematics, love to talk about Mathematics in school and at home, and their parents were happy enough to see their improvement, and all of them don't talked negatively about school and remedial classes  $M=1.03$  However, not all of them were given rewards when they did something good in school  $M=3.05$  and. Overall, DRMC intervention and it improved their mathematical performance.

### 3.3. Parent's Assessment of Their Attitude towards Schools' Active Participation

Parents were also asked to assess their attitude towards school participation. Table 6 presents the frequency and percentage distribution of the parents' assessment on attitude towards school active participation. The data showed that 38 or 82.61 percent of the participants assessed school active participation as moderate while 1 or 2.71 percent of them assessed the said variable as "low".

As gleaned from the table, parents like to communicate with teachers ( $M=3.89$ ), expecting their child to finish Grade 3 level ( $M=3.84$ ). They also loved to help with their child's homework ( $M=3.89$ ), monitored and encouraged their children to successfully finish their homework ( $M=3.84$ ). In addition, parents in the grade three level knew that grades were important ( $M=3.60$ ) as well as the

education of their child ( $M=3.80$ ). It also shows that most of the parents loved to be part of any school activities ( $M=3.56$ ) because they wanted their children to see their support not just for them but also for the school. Furthermore, negative aspects including parents or teacher conferences are waste of time ( $M=1.80$ ), parents should not volunteer in school ( $M=2.29$ ), everything is just the responsibility of the school ( $M=1.80$ ) were low.

### 3.4. Parent's Assessment of Their Attitude towards DMRC

The parent's assessment of their attitudes towards DRMC. Table 7 presents the frequency and percentage distribution of the parents' assessment on attitude towards Daily Remedial Math Class (DRMC). The data showed that 25 or 53.19 percent of the participants assessed daily remedial math class as high, 20 or 42.55 percent as moderate, 1 or 1.06 percent of them assessed the said variable as "low" and "very slow".

The data further reveal that the parents of the DRMC participants were happy to have this program for their children. They also showed support on this program for almost one month. It goes to show that this program has been helpful not just for their kids but also for them because their responses were "high". These parents were good models to their children because they have not said anything negative about school in front of their child ( $M=1.36$ ) as assessed with "very low". However, they need the help of the teachers because they are not confident enough that they can do Mathematics well ( $M=3.47$ ) with their response as "moderate".

Table 6. Parents' Assessment of their Attitude towards Schools' Active Participation

Indicators	Mean	SD	Description
1. Communicating with my child's teacher is a pleasant experience.	3.89	0.49	High
2. I expect my child to finish Grade 3.	3.84	0.52	High
3. It upsets me when my child is not doing well in school.	3.18	0.91	Moderate
4. Helping my child with homework is important.	3.89	0.49	High
5. Monitoring my child's homework is an important part of his/her education.	3.87	0.50	High
6. It's important to encourage my child so he/she feels successful for simply working hard on his/her homework.	3.84	0.56	High
7. My child will know how much he/she can handle when it comes to deciding how many activities to belong to.	2.84	1.17	Moderate
8. My child knows that I feel grades are important.	3.60	0.84	High
9. There should be time set aside each evening for homework.	3.80	0.55	High
10. Parents have a responsibility to see that their children have their homework done.	3.87	0.50	High
11. My child's education is very important.	3.80	0.66	High
12. It's important for my child to see that I am involved in school functions.	3.56	0.94	High
13. Mathematics was hard for me.	3.04	1.02	Moderate
14. My view of school affects my child's view of school.	3.04	1.19	Moderate

Table 7. Parents' Assessment of their Attitude towards Daily Remedial Math Class (DRMC)

Indicators	Mean	SD	Description
1. I attend remedial classes my child is involved in.	3.91	0.47	High
2. I see that my child is doing well with his/her remedial class.	3.84	0.52	High
3. I communicate with my child's teachers.	3.84	0.56	High
4. I volunteer at school.	3.53	0.66	High
5. We discussed things about Mathematics.	3.64	0.80	High
6. I would contact the teacher if my child seems to be having a problem.	3.76	0.48	High
7. I attend parent/teacher conferences.	3.83	0.39	High
8. My child sees me doing Mathematics well.	3.47	0.66	Moderate
9. I reward my child for doing good in his/her remedial class.	3.38	0.91	High
10. I talk negatively about school in front of my child.	1.36	0.88	Very Low

Table 8 presents the results of the test of difference of the participants' performance before and after Daily Remedial Math Class (DRMC). As shown in the table, the performance of the students were significantly different before and after the intervention. The p-value, which is 0.001 for the four basic operations, was highly significant. It goes to show that there is a big difference in using the Daily Remedial Math Class (DRMC) as an effective innovation that promote high mathematical performance in the grade three level. This result supports the idea that repetitions has a significant effect on the mastery of calculation [10]. More number of repetitions is required to master certain topics in math for those who are in lower grades compared to those in older years or with higher math skills. This is significant since this could have significant implications in the curriculum. More so, basic skills predicts later success with more advanced skills [11].

**Table 8. Results on the Test of Difference of Participants' Pretest and Posttest before and after Daily Remedial Math Class (DRMC)**

Variables	Pretest	Posttest	p-value
Addition	27.71	76.88	< 0.001*
Subtraction	21.00	76.50	< 0.001*
Multiplication	7.00	86.00	< 0.001*
Division	3.50	81.75	< 0.001*

\*significant at 0.05 level.

### 3.5. Pupils' Learning Experiences when Exposed to DRMC

During the conduct of DRMC, the participants were excited to join every session, DRMC boosted their self-confidence in answering Math activities. Some participants felt the support and love of their parents. Others had developed a sense of leadership and most importantly, they are beginning to love Math. There are the results from our FGD with the participants.

Excited to join every DRMC session. The participants regularly joined each DRMC session. Even if it is still early in the morning, they were always excited and would ask what they will do later in the afternoon for the Remedial Math Class.

We were always excited for our DRMC sessions because it allows us to go to Maam Lara's room and learn the new Math concepts easily. We hate to be absent from school because we didn't want to miss DRMC. We were also thrilled to see the improvement of our scores after posttest. We feel very happy every time we finished our remedial class for the day.

Boosted their self-confidence. At the start of the remedial class, the participants were a bit worried of what they'll do or whether they had to adjust to their new class schedule. But a day or two after, they have somehow gained confidence in answering the activities and willingly volunteers to be "little teachers" during peer tutoring.

Through the help of DRMC, we feel that we now know how to compute mathematical concepts using the four basic operations. It made us realize that our remedial class is a great help for us to understand mathematics well. We feel more capable as little teachers teaching our classmates and schoolmates doing mathematics well.

Felt the support and love of their parents. It is but normal that some participants would still find it hard to master the competency after two days or more of remedial teaching. The researchers' solution for this is to involve the parents in helping their children by tutoring them during DRMC session. Some participants claimed that:

We were so excited for our remedial class to start because our parents are with us during the session. It made me realize that my parents can also teach us mathematics well because they are so good in it. No matter how busy they are because of work, they chose to be with us during our remedial class and they were so happy so see our improvements. We sometimes do math at home if we have free time.

Sense of leadership. Even if these selected participants got the lowest scores during pre-test, they still had opportunity to improve and help their co-participants through peer tutoring in they will act as "little teachers", and they loved it very much. They said that:

We were not confident enough to talk with other classmates because Were too shy but with the help of DRMC we were able to experience talking to our classmates while helping in answering math and being a teacher to our classmates. We enjoyed it and we love the experience of tutoring our classmates.

Love for Math. As days went by, participants of DRMC became more active and participative during the sessions. Most of them would volunteer themselves to solve given activities. They were beginning to love Math and would even treat it as their favorite subject. One participant claimed that:

When I experienced DRMC, I was so scared because I do not know how to do mathematical operations well. I also hate the idea of going home late because of the remedial class. As time passed by, I was already enjoying it and I love how I can solve the different math operations. I can now teach my brother who is in Grade 1 to do simple math as well as my classmates during our math class. I felt like I am advanced to them.

### 3.6. Parents' Experiences when Exposed to Daily Remedial Math Class (DRMC)

Thankful for a Very Helpful Program. The parents expressed their heartfelt gratitude to all the Grade 3 teachers for initiating DRMC. One participant said that:

Being a working mother I made it hard for me to follow up my son after class because when I reached home he is already asleep. This program really helped my child improve his performance in Mathematics and I salute all the teachers for this.

Being a Volunteer at School. The parents on the first week of the DRMC were not aware that they also had a role to play on the process. One participant said that:

I thought it will only be the teacher who will handle my child who is having difficulty in Mathematics, not me because I am not also good in it. However, it is still a good idea in the end knowing that I can monitor how good my daughter is when it comes to the four basic math operations. I am also learning not just my daughter.

Parent Tutoring. This focuses on the possibilities that families help their children learn or better internalize the

contents of school subjects from home. This is about constituting pairs where the tutor is a family member (normally the father or mother) and the tutored, a child. Studies carried out in the United States and Britain in 2015 show that connection between school and family enhances good academic results. One participant said that:

It was a great experience because my child and I were learning together. It can also help me improve my previous understanding of the concepts and how to apply techniques that will make it easy for me and my child to answer. There are tricks that were never introduced to me when I was at school, which I find very interesting.

#### 4. Conclusion

DRMC as an innovative educational intervention was effective in improving the mathematical achievement of the grade 3 pupils at Indahag Elementary School. Teachers do not have to sacrifice great teaching pedagogy to achieve high stake tests. What is important is that students can learn difficult math concepts when instructional methods and materials are motivating and appropriate.

DRMC enabled the teachers in grade 3 level to equip their pupils with the basic mathematical skills and prepared them face different math concepts ahead with full confidence because they were already trained in the earlier years. DepEd is doing its best to help provide different technical assistance to math teachers through innovations that would improve the quality of education in the Philippines, most especially in Mathematics subject.

Overall, participants and their parents were thankful about DRMC intervention. The results showed how their children improved from the first day of the intervention up to the end. They also wanted to have this intervention to the next level so that the insights and learnings they had from the DRMC intervention will continue that shows successful outcomes in helping the mathematical skills of their children improved. As researchers, we also wanted to apply this intervention with our new batches of students,

share results of this study to the other levels hoping that they will apply DRMC intervention.

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