

Downloaded Worksheets: A Learning Activity to Enhance Mathematical Level

Elmer C. Zarate, *Tagnate Elementary School, SDO Leyte, Philippines*
Beverly B. Fernandez, *Saint Joseph College, Maasin City, Philippines*
Lorelie E. Dorias, *Saint Joseph College, Maasin City, Philippines*

*Corresponding email: elmer.zarate@deped.gov.ph

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ABSTRACT

The researcher was prompted to conduct this study to give intervention of the alarming situation which there is a low performance in solving problems related to geometry in Grade IV Mathematics. This study was about on how to enhance the mathematical competencies of the grade IV pupils using a downloaded worksheets as a learning activity. This study focused in giving remediation applying the intervention materials. These resources give several approaches to attain mastery using distinct drill cards. The investigation was carried out utilizing quasi-experimental design. During administering the pre-test and post-test, the researcher used the weighted mean and t-test to determine the mean percentage scores of the respondents. The respondents were 56 fourth grade learners enrolled in Marangog Elementary School and Tagnate Elementary School in Hilongos East District for the school year 2019 – 2020. At the end of the study, it was found out the use of downloaded math worksheets were found effective means of improving the mastery level. In addition, based on the results gathered, the downloaded math worksheets which were used in the drills or practice greatly contributed to the elimination of non-numerates, and give significantly increasing the number of pupils who mastered the competencies related to geometry. As a result, a proposed innovative teaching strategy is recommended.

Keywords: downloaded worksheets, mathematical competencies, pre-test, post-test

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INTRODUCTION

Teaching mathematics for mastery requires utilizing ways that allow learners to gain a deep and secure knowledge and comprehension of mathematics at every level of their learning. By the conclusion of every school year or key stage, learners are expected to develop mastery of the mathematical abilities and ideas they have been introduced to. The gained ideas and abilities of the learners assist them to go on safely and securely to more advanced level. Mastery of the mathematical basic skill is very essential in the teaching of Mathematical Competencies in elementary level.

These mathematical abilities include applying and problem-solving, remembering and understanding, expressing and communicating, integrating and connecting, and reasoning and putting ideas into practice. These are the main components of the mathematics teaching and learning method that will be created. These mathematical competencies are relevant for the pupils to be mastered in every stage or school year so that they are prepared for the higher competencies in the next level. In order for the learners to be more equipped with the mastery skills they need to achieve these instructional competencies.

However, there are problems that occurred on how the mathematical competencies are learned by the students. There is a significant disparity in math student success across different geographic areas (MOE, 2015). According to a recent National Assessment of Student Accomplishment (NASA) research, the average achievement score in mathematics in public schools is 26 percent. It can be a result of how well the educational procedures work (MOE 2015). Nowadays, mathematics achievement is gaining momentum as a problem area. Even though mathematical knowledge is highly relevant in and to society, many, if not most, people have increasing difficulty at seeing that mathematics is relevant to them, as individuals. Enhancing the students' mathematical competency is the mission of every math teacher. The low performance of the learners in Mathematics especially in geometry is compelling enough to conduct research to enhance and improve the learners' skill in mathematical competencies.

It is discouraging to see that despite the efforts of the intermediate grade instructors to teach the students the fundamentals of mathematics, many of them still struggle with this subject. Intervention in teaching strategy of the existing problems are very important. There are many existing engaging interventions of the problem of the low performance in mathematics competencies such as peer tutoring, collaborative learning or cooperative learning, number games, giving assignments, giving remedial class and more.

Based on the aforementioned observation, the researcher found out that the same problem observed in his school. The majority of Grade IV students in elementary schools were found to lack proficiency in mathematics, notably in geometry, during the numeracy testing. Additionally, the learners' poor performance in arithmetic skills was noted. In an attempt to deal with problems and challenges such as the ones mention above, the proponent feel ignited at the same time challenge to enhance the mathematical competencies in geometry and decided to give intervention using downloaded worksheets.

The proponent conduct relevance remediation using a more engaging learning activity material which will be downloaded from the internet. It has not yet been clarified if this propose intervention will effective means of enhancing the mathematical competencies of the learners. These learning materials designed to improve and enhance the mathematical skills of the learners. It tries to improve the performance by enhancing the mastery level of the grade 4 pupils in terms of the competencies related to geometry. The instructor may use them as productive teaching strategies.

These downloadable resources provide a variety of strategies or interventions to attain mastery using various drill cards that are aimed at boosting geometry-related mathematical abilities. The proponent believes that there should be a drill and practice in order to master the mathematical competencies using the downloaded worksheets. Moreover, the researcher believes that through quality mathematics instruction and research-based interventions, high numeracy level of the learners of geometry is not impossible.

In the conduct of the study, the researcher tries to establish the impact of downloaded worksheets on the development and enhancement of mathematical competency among learners.

Research Questions

The purpose of the study was to determine the impact of using downloaded worksheets on the mathematical competencies of the 4th graders of Tagnate and Marangog Elementary School for S.Y. 2019-2020. Specifically, the study aimed to answer the following questions:

1. What is the result of the Pre-test and Post-test of the following groups of respondents?
 - 1.1 Control group
 - 1.2 Experimental group
2. Is there a significant difference between the two groups in their results on pre and post-test results?
3. What is the mastery level of the following groups:

- 3.1 Control group
- 3.2 Experimental group
- 4. Is there a significant difference in the mastery level between the control and experimental group?
- 5. What are the learning difficulties of the learners in Mathematics 4?
- 6. What output could be proposed to enhance the mathematical competencies of the 4th graders?

RESEARCH METHOD

Research Design

This study employed a quasi-experimental design since it involves the manipulation of independent variable and it has a comparison between the two groups, control group and experimental group. The design is used in order to gather the desired data and to determine the mastery level in mathematical competencies in geometry of the respondent’s pupils.

Participants

The respondents of this study were the in the 4th graders of Tagnate and Marangog Elementary School. There were 26 respondents from Tagnate Elementary School while respondents from Marangog Elementary School were 30 pupils. They are the complete enumeration of the grade 4 students in both schools.

Data Analysis

The answered questionnaires were collected and data gathered were treated statistically for interpretation. The following tools were used:

- MPS to measure the mastery level of the pre-test and post-test scores of the respondents.
- Pearson r to establish relationship between the pre-test and post-test.
- t-test to establish the significance difference between pre-test and post-test results.

FINDINGS AND DISCUSSION

Results

The Pretest and Posttest Results of the Control and Experimental Groups

All respondents were tested simultaneously using the same worksheets materials. The same test materials were used for pre and posttests.

Table 1 shows the results of the pretest and posttest of the control and experimental group. The control group was exposed to traditional teaching Math while the experimental group made use of the downloaded worksheets.

Table 1. Mean Percentage Scores of the Pretest & Posttest Results of the Control Group and Experimental Group

RESULTS	CONTROL (26)			EXPERIMENTAL (30)		
	MPS	SD	DES	MPS	SD	DES
PRETEST	40.92	15.419	DME	39.77	13.167	DME
POSTTEST	55.69	24.086	DME	76.47	23.525	S

Legend:

MPS	Description
Below 60	Did Not Meet Expectations (DME)
60 – 68	Fairly Satisfactory (FS)
69 – 76	Satisfactory (S)
77 – 84	Very Satisfactory (VS)
85 – 100	Outstanding (O)

The control group had a low mean percentage score which classified them at the **Did Not Meet Expectations** level. Their standard deviation score is quite large indicative of wide distribution of scores. The same observation is true with the experimental group. They were at **the Did Not Meet Expectations** level with wide distribution of scores. The result implies that the learners of the control and experimental groups have varying scores and performed low in the pretest. These results were expected considering that the learners were not yet exposed to the discussion of the topics.

A posttest was given to the respondents composed of 30 questions same material to the pretest was given to the respondents. The control group increased their mean percentage scores however they are still at the **Did Not Meet the Expectations** level. There was large distribution of scores as shown by their large standard deviation which means that they still vary in their test scores. The experimental group after the constant usage of the downloaded worksheets improved their mean percentage scores that classified them at the **Satisfactory** level. They have also a wide distribution of scores which means that scores were at extremes.

With the increased results of the experimental group, teachers need simple resources to correct the deficits in mathematics education and not further strain the delicate system facing our schools today (Moors et al., 2010). The use of activity worksheets can improve students' interest, passion, motivation and stimulation (Rahaj & Wijayanti, 2018).

These results imply that downloaded worksheets can affect a better increase in the performance level of those who are using them.

The Significant Difference Between the Pre and Post-test Results of the Identified Groups

To find the significance difference, T-test was used of their pre and post test results. It is presented in the table below.

Table 2. T-test result of the Pretest and Posttest Scores of the Control and Experimental Group

Group	Mean Difference of Pre & Post Test	Degrees of Freedom	t-test	p-value	Remarks	Mean Difference	Degree s of Freedom	t-test	p-value	Remarks
Control	14.77	25	7.823	0.000	Significant	21.9	52	7.064	.000	Significant
Experimental	36.70 Significant	29	15.046	0.000						

The control group increased its MPS after the discussion of the lesson using the traditional method. The null hypothesis of no significant difference is therefore rejected. The increase in MPS was significant. The control group scored better in the posttest after the discussion of the lesson.

The experimental group improved their MPS. The null hypothesis of no significant difference is rejected. The posttest mean of the learners was significantly higher than the pretest means after using of the downloaded activities from the net.

With respect to the results of the two groups, the two approaches of teaching gave positive mean gains. The mean difference of these mean gains of 21.9 resulted to a t-test value of 7.064 at df = 52 for the assumption of unequal variance. The corresponding p-value was almost 0. The null hypothesis of no significant mean difference is significant.

Based from the result, a drill which are the repetitious and paced reviews of concepts, also have a place in the classroom, Students benefit from practice because they are able to apply knowledge through interaction. The benefits of using worksheets in learning process include: influencing learning outcomes, building knowledge, influencing high-level thinking skills, increasing student competence, communication between students and teachers being effective, increasing conceptual understanding (Cemel, Serdar, & Zea, 2017).

This implies that the two mean gains were significantly different. The experimental group performed better than the control after exposure to the usage of the downloaded activities.

The Mastery Level of the Control and Experimental Group

The mastery level of the control and experimental group was determined after the conduct of the study using their quarterly test scores. Table 3 shows the result.

Table 3. Distribution of the Mastery level of the Learners of the Control and Experimental Group

Group	Mastery Level										Overall Mastery Level	
	VLM		LM		AM		MTM		M			
	F	%	F	%	f	%	f	%	f	%		
Control	0	0.00	8	30.77	16	61.54	2	7.69	0	0.00	26	AM
Experimental	0	0.00	1	3.33	10	33.33	16	53.33	3	10.00	30	MTM

Legend:

MPS	Description
Below 35	Very Low Mastery (VLM)
36 – 65	Low Mastery (LM)
66 – 85	Average Mastery (AM)
86 – 95	Moving Towards Mastery (MTM)
96 – 100	Mastered (M)

The control group has a lower mastery level as compared to the experimental group after the discussion of the lesson. Almost one third of the learners from the control group have low mastery and more than half of the total number of these respondents have mastered the lesson. Overall, the mastery level of the control group is categorized at **Average Mastery**. Average mastery category means that the learners learned the competencies but not to the extent of mastery of the lesson. Meaning most of the learners got the average score. On the other hand, about a half of the experimental group has mastery level ranging from average mastery to mastered. Only one of the learners from the experimental group has low mastery. Overall, the experimental group had increased their mastery level from low mastery to **Moving Towards Mastery** level after the discussion of the lesson and use of downloaded worksheets. The category of moving towards the mastery means that mostly of the learners got the high scores.

In light of this finding, Von Glasersfeld (2001) asserts that we have gone far beyond by basing the subject matter on the interests and context of the students as well as by getting them involved, sharing ideas in the classroom, and actively participating in the meaning-making process as they learn mathematics. Additionally, only the blackboard, chalk, and student geometry box were utilized as teaching aids in mathematics classes (Koirala, 1991). As a result, the absence of resources in public schools has had a significant negative impact on equality and access in mathematics teaching and learning.

It implies that with the help of other resources used in teaching-learning process greatly contributed the learners’ mastery level. Learners who have routine drill and practice using the downloaded worksheets as their learning activities are those who are improving their mastery level. The exposed group who was at low mastery level has become at moving towards mastery. It is evident the impact of the downloaded worksheets in the mastery level of the learners.

The Mean Difference Between the Mastery Level of the Control and Experimental Group

The mean difference in the mastery level of the control and experimental groups after the discussion of the lesson and exposure to traditional and downloaded worksheets was determined. The data is shown below.

Table 4. Mastery Level Between the Control and Experimental Group

Pearson Chi – Square Value	Degrees of Freedom	Significance (p – value)	Remarks
20.537	3	p < 0.001	Significant

Table 4 shows that there is a significant difference in the mastery levels of the control and experimental groups. Experimental group performed better than the control group. This outcome resulted to rejection of the hypothesis of the study.

Based from the data, there is a significant difference of their mastery level. It is obvious that through frequent usage of the downloaded math worksheets can improve of the mastery level of the learners.

This outcome was supported by other studies. According to Anjum (2015), using drill and practice methods of teaching is more effective than the traditional method in understanding geometry concept. Moreover, Isnaini (2017) found that students who taught by concept and practice with realistic Mathematics education had higher conceptual understanding compared to traditional teaching.

The result implies that downloaded worksheets could develop mastery better than the commonly used strategy of the teachers in teaching mathematics. It can be concluded based on the results, the downloaded math worksheets which were used in the drills or practice greatly contributed to the enhance the mastery level of Mathematical Competencies

The Thematic Analysis of the Difficulties of the Learners in Learning Mathematics 4

The researcher conducted an interview to 10 sample respondents. The thematic analysis is used since the researcher is trying to find out the respondents’ opinions, views and knowledge. It involves qualitative data.

Based from the data gathered, out of 10 respondents only 2 learners said that they are not having difficulties in learning geometry. The rest said that they are having difficulties in learning geometry. The 8 respondents who are

experiencing difficulties were asked if why is the geometry difficult to them. They have different answers. The following are their answers to the survey questions:

1. There are a lot of formula to memorize.
2. The different shapes are confusing.
3. There are so many lines to look at.
4. Little mistake can make your answer incorrect.
5. It is difficult to solve the irregular figure because of the long process in finding the answer.
6. I am not good in enough in multiplying.
7. I am having difficulty in solving problem, especially the triangle figure because we need to multiply and also divide.
8. It is very difficult to find the correct solution when it comes in problem solving.

The result of the study revealed that the common learners' difficulty occurred was the learners' prior knowledge. And it was found that topic geometry is difficult to them because of it involves many formulas.

The respondents were also asked what learning competencies related in geometry that they are having difficulties. The learners' learning difficulties in Mathematics 4 in fourth quarter competencies related to geometry is shown by the table below.

Table 5. Ranking of the Difficulties of the Learner in Learning Mathematics

Competencies	Rank
Solve routine and non-routine problems involving area of irregular shapes, triangles, parallelograms and trapezoids	1
Create problems involving perimeter and the area involving squares, rectangles, triangles, parallelograms, and trapezoids.	2
Solve routine and non-routine problems involving the volume of a rectangular prism	3
Find the area of triangles, using sq. cm and sq. m	4
Find the area of irregular figures made up of squares and rectangles using sq.cm and sq.m	5

The result of the study revealed of the competencies that which get the more choice of the respondents in terms of which area they have difficulty in learning. First in rank the competency, solve routine and non-routine problems involving area of irregular shapes, triangles, parallelograms and trapezoids. It indicates that these competencies are less mastered skill.

Children understand when using concrete materials if the materials are presented in a way that helps them connect with existing networks or construct relationships that prompt a reorganization of networks. According to Ketterlin-Geller et al. (2008) and Fuchs et al. (2005), determining what specific instructional strategies, interventions, and services each individual students need is essential.

It implies that prior knowledge is important. The learners must be mastered first the basic skills for the preparation for the higher competencies. In order to the pupils acquire the necessary skills in geometry and learned the difficult competencies in Mathematics, teachers should give remediation and intervention that provide meaningful and engaging activities

Discussions

The following are the major findings drawn in the course of the conduct of the study:

1. The control and the experimental groups have low performance in the pretest. Both groups are Did Not Meet Expectations category. After student exposure to the usual method of teaching for the control group and the utilization of downloaded worksheets for the experimental group, the Experimental group increased their performance and were categorized at Satisfactory level while the control group had a slight increase but remained at Did Not Meet Expectations.
2. The control group had a higher average mean percentage score (MPS) than the experimental group in their pretest. The mean difference is significant. The control group had a lower MPS than experimental group in the posttest. The difference is significant. The experimental group has a higher pre-post mean gain than the control group. The mean difference is significant.
3. After the discussion of the lesson, employment of the usual teaching strategy for the control group and using of downloaded worksheets for the experimental group, the mastery level of the control

group is at Average Mastery and the mastery level of the experimental group is at Moving Towards Mastery.

4. The mastery level of the control and experimental groups after the conduct of the study revealed a significant difference. Experimental group has a higher mastery level than the control group.
5. The result of the study revealed that the common learners' difficulties occurred were; There are a lot of formula to memorize, the different shapes are confusing, there are so many lines that in a little mistake can make your answer incorrect, they have difficulty to solve the irregular figure because of the long process in finding the answer, some says they do not have mastered the multiplication and division, and Learners have difficulty in solving a word problem.

CONCLUSIONS AND RECOMMENDATIONS

The experimental group performed better than the control group after the conduct of the study. Therefore, the use of downloaded worksheets is a tool that can help the learners achieve the intended particular skills of a particular learning content. In addition, downloaded worksheets are effective means in learning mathematics competencies that need to be attained by the learners.

Recommendations

In the light of the findings, the following recommendations are formulated:

1. The teachers may administer pretest before the discussion of the lesson to know the current level of learning mastery of the learners.
2. The teachers may give posttest after every discussion of the lesson to constantly monitor if there is a significant improvement in the mastery level of the learners.
3. The teacher may download more relevant worksheets and make a compilation of effective downloaded worksheets and share them with co-teachers for improvement of learners' mathematical competence.
4. The teacher may use this proposed innovative teaching strategies as enhancement activities.
5. For future researchers, they may find other engaging learning activities to enhance the mathematical skills of the learners. They may also conduct others research focusing teaching strategies or teaching method to develop the mathematical competencies of the learners.

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