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INDIGENIZED BLOCK MODELING APPROACH IN TEACHING MATHEMATICS AMONG IPED INTERMEDIATE PUPILS: BASIS FOR PROPOSED INSTRUCTIONAL MATERIAL DEVELOPMENT IN MATHEMATICS PROBLEM

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ABSTRACT

This study determined the effectiveness of Block Modelling Approach in teaching Mathematics among intermediate Indigenous People Education pupils in LupangPangako Resettlement School, Division of Zambales during the SY 2018-2019 as basis for proposed instructional material development in solving Mathematics problem. The study utilized the descriptive survey research method and descriptive statistics (percentage, frequency counts, and mean), Analysis of Variance (ANOVA) and inferential statistics (T - Test) using SPSS version 20. The respondents of the study were the intermediate IPED pupils of LupangPangako Resettlement School with 70 pupils as respondents from Grade IV-Talisay with 25 pupils respondent which focus on four fundamental operation and fraction, Grade V-Kawayan with 25 pupils respondent which focus on four fundamental operation, fraction, decimal, ratio, and percentage and Grade VI-Agoho with 20 pupils respondent which focus on four fundamental operation, fraction, decimals, ratio and proportion, and percentage. In this study, the use of block models has a great potential for enhancing learners' strategic problem-solving abilities. As a result, teachers should include this method into their teaching practices and utilize it as the foundation for developing instructional resources in teaching Mathematics.

Key Words: Block Modelling Approach; Learning Mathematics; Intermediate Indigenous Education; Instructional Material; Mathematics Problem.

1. INTRODUCTION

Problem solving is cognitive processing directed at achieving a goal when no solution method is obvious to the problem solver, Mayer and Wittrock, (2006). According to Stendall (2009), the abilities to give good concentration, to make meaningful perceptions, to think logically and to use memory effectively are important factors in learning skills and solving problems. These abilities vary among students. Cognitive and psychological factors could affected the ability to use mathematics skills and thinking in problem-solving. Miranda (2006) stated that children might experience difficulties in thinking and learning when they demonstrated difficulty in giving attention, describing orientation of shape and space, making perception by visual and auditory, memorizing simple things and understanding language.

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De Guzman (2009) investigated the Block Model Approach in Problem Solving: Effects on Problem Solving Performance of Grade V Pupils in Mathematics. The result shows that teaching of mathematics involves problem solving skills which prove to be difficult on the part of the pupils due to misrepresentation of the word problems. Oftentimes, pupils tend to represent the phrase "more than" as addition and the word difference as "less than". Block model approach which is based on concrete - representation – abstract principle of teaching mathematics. One of the grounds breaking new study Joonkoo Park & Elizabeth Brannon (2013) found that the most powerful learning occurs when we use different areas of the brain. When students work with symbols, such as numbers, they are using a different area of the brain than when they work with visual and spatial information, such as an array of dots. The researchers found that mathematics learning and performance was optimized when the two areas of the brain were communicating (Park & Brannon, 2013).Each of these visuals highlights the mathematics inside the problem and helps students develop understanding of multiplication. Pictures help students see mathematical ideas, which aid understanding. Visual mathematics also facilitates higher-level thinking, enables communication and helps people see the creativity in mathematics.

Mahoney (2012) investigated the impact of Singapore's Model Method, commonly known as "model drawing" or "bar modelling," on third and fourth grade children' word problem-solving ability.Employing a single-case design, the researcher-designed teaching intervention was delivered to a child in third grade over the course of 8 teaching sessions. Using researcher-designed assessment probes, repeated measures of the dependent variable (percentage of problems solved correctly) were taken throughout the experiment through three different phases: baseline, intervention, and maintenance.

Jonathan Hsu (2013) conducted a study on the strengths and limitations of applying Singapore math techniques with high school students in a private school geometry class. A qualitative method with a constructivism framework was used to collect the data from surveys and interviews. The students were then introduced to the Singapore math's bar modelling techniques through solving a word problem activity. The students were all visibly impressed and full of praise of Singapore math's bar modelling techniques. Singapore math has influenced his teaching style that appeals to all of the students visually. He visually inclined teaching style will be used continually to engage my students in math. Singapore math's bar modelling techniques should have a place in high schools because it can help increase student's confidence in math and improve student's level of critical thinking and problem solving skills.

The development of good problem-solving skills is an important element of mathematics learning, and it is a main concern of teachers for their pupils. Visualizing a problem often is the key to helping students understand the problem and develop a solution (Emeny, 2014; Kenan, 2018; Krawec, 2014). Block Model method gained popularity in Singapore as it empowers learners to solve mathematics problems that were traditionally set only at higher levels (Fong, 1993; Fong, 1999a; Fong, 1999b; Ng & Lim, 2001). Students learn to represent simple and multi-step word problems by drawing bars to indicate how the known elements of the problem relate to one another, and then place one or more question marks to indicate what they need to find out (Hoven &Garelick, 2007). Seemingly, a positive learning experiences in mathematical problem solving leads to a good academic level of achievement (Casinillo&Casinillo, 2020; Casinillo et al., 2020a). Mathematical models help students gain concrete experiences which are pre-requisites for understanding abstract symbols of mathematics and their manipulation (Kho,

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1982). The model method provides many opportunities to use heuristics such as "Draw a diagram", "Use a model", or 'Use visualization" (Cheong, 2002). Visual representation in mathematics involves creating and forming models that reflect mathematical information (Garderen& Montague, 2003). It is an important skill because higher-level math and science courses increasingly draw on visualization and spatial reasoning skills to solve problems (Zhang, Ding, Stegall, & Mo, 2012).

Using the Block Model for solving word problems is a terrific way for pupils to organize their thinking, concretely show the pupils what the elements of the word problem are, and help them understand word problems on a more fundamental level. Further, having them really investigate the questions and the relationship between information in the problem helps them think critically about the problem and think of a logical solution. As pupils use this method, they are thinking algebraically, identifying the missing variable and solving for it. However, this ingenious method of representing numerical values and relationships with a symbolic bar helps to simplify even the most complex of problems. Along with it, the researcher find it essential to find out how Block Modelling Approach in teaching Mathematics can be the basis in developing instructional material that can use to solve Mathematics problem among intermediate Indigenous People education learners to improved their Mathematics performance level.

2. STATEMENT OF THE PROBLEM

The study aimed to determine the effect of Indigenized Block Modeling Approach to the Mathematics performance of intermediate IPED pupils in Lupang Pangako Resettlement School, Division of Zambales during the SY 2018-2019 as basis for proposed instructional material development in solving Mathematics problem.

Specifically, it sought to answer the following questions:

1. What is the profile of Intermediate IPED pupils-respondents with regards to:
    - 1.1 Age;
    - 1.2 Sex;
    - 1.3 Ethnicity;
    - 1.4 Family Income and;
    - 1.5 Parent's Educational Background?
2. What is the level of the Pupils' Mathematics performance using the Block Modeling Approach to IPED pupils in the following during the pre-test and post-test:
    - 2.1 Four Fundamental Operation (grades 4-6);
    - 2.2 Fraction (grades 4-6);
    - 2.3 Decimal (grades 5-6);
    - 2.4 Ratio (grades 5-6); and
    - 2.5 Percentage (grades 5-6)?
3. Is there a significance difference on the results of pre-test and post-test when grouped according to the pupils profile variables?
4. Is there a significance difference between the pre-test and the post-test using Block Modeling Approach in teaching Mathematics?

3. MATERIALS AND METHODS

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The researcher used the Quasi-Experimental design of research which is quantitative. This design was appropriate in determining the effectiveness of block model approach in the problem solving skills of a pupil.

The subjects of the study were the intermediate IPED pupils of Lupang Pangako Resettlement School in Iba District, Division of Zambales S.Y 2018-2019 as respondents of this school. They were required to answer the pre-test and post-test given after using block modelling approach in teaching Mathematics. The researcher used Seventy (70) intermediate Iped pupils from Lupang Pangako Resettlement School in Iba district, Division of Zambales.

Researcher used test questionnaires as their main tool in gathering the data. The first part of the questionnaire includes the profile of the pupil-respondent as regards to age, sex, ethnicity, family income and parents' educational background. The second parts were the worded problem based on k to 12 Mathematics books to test their Mathematics problem solving skills. The pupil-respondent used block model to solve the problem.

To ensure the validity of the instrument, a dry-run was conducted at Doña Luisa Obieta Elementary School in Iba District, Division of Zambales. The main purpose of the testing of the questionnaire was to improve the items included in the instrument. The instrument was presented to the school head of LupangPangako Resettlement School and District Mathematics Coordinator and critics for comments, suggestions, and recommendations. Results of the test and the suggestion were all noted and incorporated to further improve the instrument before the final draft was reproduced for distribution and administration.

A letter of permission was secured by the researcher from the Schools Division Superintendent (thru channels) in the distribution of research questionnaires.

After it has thoroughly examined by the adviser and approved by the Dean of Graduate Studies, a letter was formulated to ask permission to launch a study in the specific IPED educational institution. The researcher submitted a letter requesting permission to the School Head of LupangPangako Resettlement School and to the NCIP head of Zambales to conduct study.

The questionnaire personally made by the researcher and it contains the pre-test and post-test of the pupils' respondents before and after taking the Block Modeling Approach in teaching Mathematics problem in four fundamental operation, fraction, decimal, ratio and proportion, and percentage. Pre-test was administered to the pupils' respondents, ordinary examination rules apply into this test. At the end of the 4th grading period same rules for the post-test examination.

4.RESULTS AND DISCUSSIONS

4.1 Profile of the Respondents

The frequency, percentage and mean distribution of the respondents profile variables as to age, sex, grade level, ethnicity, family monthly income, and parents' educational attainment is shown in Table 1.

Table 1.Frequency and Percentage Distribution of the Respondents' Profile Variables
N = 70

Profile Variables		**Frequency**	**Percent**
Age	16	1	1.43
Mean of age = **11.31 or 11 years old**	15	2	2.86
	14	4	5.71

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	13	5	7.14
	12	17	24.29
	11	21	30.00
	10	10	14.29
	9	10	14.29
Sex	Male	32	45.71
	Female	38	54.29
Grade Level	6	20	28.57
	5	25	35.71
	4	25	35.71
Ethnicity	Aeta	70	100.00
Family Monthly Income Mean = **₱ 5600.49**	₱10,001.00 - ₱ 15,000.00	8	11.43
	₱ 5001.00 - ₱10 000.00	24	34.29
	₱ 1,001.00 - ₱5,000.00	37	52.86
	Below ₱ 1,000.00	1	1.43
Parent's Educational Background	College graduate	1	1.43
	Vocational Course	1	1.43
	High school graduate	2	2.86
	High school undergraduate	6	8.57
	Elementary graduate	7	10.00
	Elementary undergraduate	49	70.00
	Never attended school	4	5.71
	Total	**70**	**100.00**

For age profile, out of seventy (70) respondents, there is only 1 or 1.43 % are 16 years old; 2 or 2.86% are 15 years old; 4 or 5.71% are 14 years old; 5 or 7.14% are 13 years old; 17 or 24.29% are 12 years old; 21 or 30.00% are 11 years old; and 10 or 14.29% are 10 and 9 years old respectively. The computed mean age of the respondents was 11.31 or 11 years old. The data shows that majority of the respondents are from age or 11 years old. This signifies that they are on their middle childhood life stage. This is an important time for children to gain a sense of responsibility along with their growing independence.

For sex profile, out of seventy (70) respondents, there were 32 or 45.71% male and 38 or 54.29% female. The data clearly indicates that majority of the respondents are female.

For grade level profile, out of seventy (70) respondents, 20 or 28.57% are in grade 6; 25 or 35.71% are in grade 4 and grade 5 respectively.

For ethnicity profile, out of seventy (70) respondents, 70 or 100.00% are Aetas. The data clearly implies that pupils' in LupangPangako are IPEd pupils.

For family monthly income profile, out of seventy (70) respondents, 8 or 11.43% has a family monthly income of ₱10,001.00 - ₱ 15,000.00; 24 or 34.29% has a family monthly income of ₱ 5001.00 - ₱10 000.00; 37 or 52.86% has a family monthly income of ₱ 1,001.00 - ₱5,000.00 and only 1 or 1.43% has a monthly family income below ₱ 1,000.00. The computed mean for family monthly income is ₱ 5600.49.

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For parents' educational background profile, out of seventy (70) respondents, there is only 1 or 1.43% whose parents attained college graduate and vocational course respectively; 2 or 2.86% attained high school graduate; 6 or 8.57% are high school undergraduate; 7 or 10.00% are elementary graduate; 49 or 70.00% are elementary undergraduate and 4 or 5.71% never attended school. The data shows that majority of the respondents parents attained are undergraduate of elementary.

5. SUMMARY OF LEVEL OF PERFORMANCE IN MATHEMATICS OF THE RESPONDENTS

Table 2 shows the summary of level of performance in Mathematics of the respondents.

Table 2 .Summary of Level of Performance in Mathematics of the Respondents

	Pre - test		**Post - test**	
Grade 4	**AWM**	**DE**	**AWM**	**DE**
Addition & Subtraction	70.20	Did not meet expectation	83.12	Satisfactory
Multiplication & Division	69.52	Did not meet expectation	76.40	Fairly Satisfactory
Addition & Subtraction of Fraction	69.60	Did not meet expectation	75.32	Fairly Satisfactory
Overall Weighted Mean	**69.77**	**Did not meet expectation**	**78.28**	**Fairly Satisfactory**
Grade 5	**AWM**	**DE**	**AWM**	**DE**
Four Fundamental Operation	70.20	Did not meet expectation	83.12	Satisfactory
Fraction	71.92	Did not meet expectation	75.72	Fairly Satisfactory
Decimal	72.40	Did not meet expectation	78.16	Fairly Satisfactory
Ratio	79.92	Fairly Satisfactory	80.12	Satisfactory
Percentage	74.12	Did not meet expectation	76.52	Fairly Satisfactory
Overall Weighted Mean	**73.71**	**Did not meet expectation**	**78.73**	**Fairly Satisfactory**
Grade 6	**AWM**	**DE**	**AWM**	**DE**
Four Fundamental Operation	70.20	Did not meet expectation	83.12	Satisfactory
Fraction	78.40	Fairly Satisfactory	82.55	Satisfactory
Ratio & Proportion	74.70	Did not meet expectation	77.60	Fairly Satisfactory

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Percentage	76.50	Fairly Satisfactory	92.10	Outstanding
Overall Weighted Mean	**74.95**	**Did not meet expectation**	**83.84**	**Satisfactory**

Grade 4 respondents obtained 69.77 (Did not meet expectation) performance in the pre – test. And obtained 78.28 (Fairly Satisfactory) after using block modellingapproach.

Grade 5 respondents obtained 73.71 (Did not meet expectation) performance in the pre – test. And obtained 78.73 (Fairly Satisfactory) after using block modellingapproach.

Grade 6 respondents obtained 74.95 (Did not meet expectation) performance in the pre – test. And obtained 83.84 (Satisfactory) after using block modellingapproach.

Block Model Approach helps pupils visualize situations because it creates concrete picture of from abstract situation. It may satisfies the pupil's learning through seeing and doing. Finally, it transforms words into recognizable pictures for young minds.

One of the grounds breaking new study Park and Brannon (2014) found that the most powerful learning occurs when we use different areas of the brain. When students work with symbols, such as numbers, they are using a different area of the brain than when they work with visual and spatial information, such as an array of dots. The researchers found that mathematics learning and performance was optimized when the two areas of the brain were communicating (Park and Brannon, 2014).

6. SIGNIFICANT DIFFERENCE ON LEVEL OF PUPILS' MATHEMATICS PERFORMANCE IN PRE – TEST AND POST TEST WHEN GROUPED ACCORDING TO PROFILE VARIABLE

6.1 Grade 4

Table 3 shows the analysis of variance on significant difference on level of the grade 4 pupils' mathematics performance in pre – test and post-test when grouped according to profile.

Table 3 Analysis of Variance on Significant Difference on Level of the Grade 4 Pupils' Mathematics Performance in Pre – test and Post Test when Grouped According to Profile Variable

Source of Variation		**Pre - Test**			**Post - Test**	
		df	**Sig.**	**Decision/ Interpretation**	**Sig.**	**Decision/ Interpretation**
Age	Between Groups	4	0.45	Accept Ho Not Significant	0.16	Accept Ho Not Significant
	Within Groups	20				
	Total	24				
Sex	Between Groups	1	0.72	Accept Ho Not Significant	0.09	Accept Ho Not Significant
	Within	23				

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	Groups					
	Total	24				
Family Monthly Income	Between Groups	3	0.56	Accept Ho Not Significant	0.24	Accept Ho Not Significant
	Within Groups	21				
	Total	24				
Parent's Educational Background	Between Groups	6	0.84	Accept Ho Not Significant	0.37	Accept Ho Not Significant
	Within Groups	18				
	Total	24				

Pre – test. The computed significant value for four age (0.45); sex (0.72); family monthly income (0.56) and parents' educational background (0.84) were all greater than 0.05 alpha level of significance; the results indicate that there is no significant difference on level of the grade 4 pupils' mathematics performance in pre – test when grouped according to age, sex, family monthly income and parent's educational background profile. Therefore, null hypothesis is accepted.

Post – test. The computed significant value for four age (0.16); sex (0.09); family monthly income (0.24) and parents' educational background (0.37) were all greater than 0.05 alpha level of significance; the results indicate that there is no significant difference on level of the grade 4 pupils' mathematics performance in post-test when grouped according to age, sex, family monthly income and parent's educational background profile. Therefore, null hypothesis is accepted.

Researchers from the School of Education and Department of Mathematics and Computer Science at North Georgia College and State University (NGCSU) conducted an empirical study that evaluated the implementation of Singapore Math in all 21 elementary schools in Hall County during the 2008-2009 and 2009-2010 school years. The results indicate that students who have not previously worked with Singapore Math have had a steeper learning curve as a group than is expected in subsequent years.

6.2 Grade 5

Table 4 shows the analysis of variance on significant difference on level of the grade 5 pupils' mathematics performance in pre – test and post-test when grouped according to profile.

Table 4 .Analysis of Variance on Significant Difference on Level of the Grade 5 Pupils' Mathematics Performance in Pre – test and Post Test when Grouped According to Profile Variable

Source of Variation	Pre - Test			Post - Test	
	df	Sig.	Decision/ Interpretation	Sig.	Decision/ Interpretation

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Age	Between Groups	4	0.17	Accept Ho Not Significant	0.46	Accept Ho Not Significant
	Within Groups	20				
	Total	24				
Sex	Between Groups	1	0.75	Accept Ho Not Significant	0.35	Accept Ho Not Significant
	Within Groups	23				
	Total	24				
Family Monthly Income	Between Groups	3	0.30	Accept Ho Not Significant	0.00	Reject Ho Significant
	Within Groups	21				
	Total	24				
Parent's Educational Background	Between Groups	6	0.21	Accept Ho Not Significant	0.07	Accept Ho Not Significant
	Within Groups	18				
	Total	24				

Pre – test. The computed significant value for four age (0.17); sex (0.75); family monthly income (0.30) and parents' educational background (0.21) were all greater than 0.05 alpha level of significance; the results indicate that there is no significant difference on level of the grade 5 pupils' mathematics performance in pre – test when grouped according to age, sex, family monthly income and parent's educational background profile. Therefore, null hypothesis is accepted.

Post – test. The computed significant value for four age (0.46); sex (0.35); and parents' educational background (0.07) were all greater than 0.05 alpha level of significance; the results indicate that there is no significant difference on level of the grade 5 pupils' mathematics performance in post-test when grouped according to age, sex, e and parent's educational background profile. Therefore, null hypothesis is accepted. However, the computed significant value for family monthly income (0.00) is less than 0.05 alpha level of significance; the results indicate that there is a significant difference on level of the grade 5 pupils' mathematics performance in post-test when grouped according to family monthly income profile. Therefore, null hypothesis is rejected.

Among the topics commonly taught to math students, word problems pose significant challenges to teaching and learning for elementary students and their teachers. Skilful problem solving is widely considered an essential asset not only for elementary mathematics students but also for any person who wishes to succeed in the global marketplace (Reed, 1999; Stigler &Hiebert, 1999; U.S. Department of Education, 2008). In addition, children's ability to analyse and interpret word problems directly impacts the results of mathematics achievement tests (Bhattacharjee, 2004; National Research Council, 2001; National Council of Teachers of

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Mathematics, 2000; National Governors Association, 2011), with implications for national and international comparisons.

6.3 Grade 6

Table 5 shows the analysis of variance on significant difference on level of the grade 6 pupils' mathematics performance in pre – test and post-test when grouped according to profile.

Table 5.Analysis of Variance on Significant Difference on Level of the Grade 6 Pupils' Mathematics Performance in Pre – test and Post Test when Grouped According to Profile Variable

Source of Variation		Pre - Test			Post - Test	
		df	Sig.	Decision/ Interpretation	Sig.	Decision/ Interpretation
Age	Between Groups	2	0.16	Accept Ho Not Significant	0.39	Accept Ho Not Significant
	Within Groups	22				
	Total	24				
Sex	Between Groups	1	0.09	Accept Ho Not Significant	0.28	Accept Ho Not Significant
	Within Groups	23				
	Total	24				
Family Monthly Income	Between Groups	1	0.24	Accept Ho Not Significant	0.00	Reject Ho Significant
	Within Groups	23				
	Total	24				
Parent's Educational Background	Between Groups	1	0.37	Accept Ho Not Significant	0.08	Accept Ho Not Significant
	Within Groups	23				
	Total	24				

Pre – test. The computed significant value for four age (0.16); sex (0.09); family monthly income (0.24) and parents' educational background (0.37) were all greater than 0.05 alpha level of significance; the results indicate that there is no significant difference on level of the grade 5 pupils' mathematics performance in pre – test when grouped according to age, sex, family monthly income and parent's educational background profile. Therefore, null hypothesis is accepted.

Post – test. The computed significant value for four age (0.39); sex (0.28); and parents' educational background (0.08) were all greater than 0.05 alpha level of significance; the results indicate that there is no significant difference on level of the grade 5 pupils' mathematics

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performance in post-test when grouped according to age, sex, and parent's educational background profile. Therefore, null hypothesis is accepted. However, the computed significant value for family monthly income (0.00) is less than 0.05 alpha level of significance; the results indicate that there is a significant difference on level of the grade 6 pupils' mathematics performance in post-test when grouped according to family monthly income profile. Therefore, null hypothesis is rejected.

7. SIGNIFICANT DIFFERENCE OF PRE – TEST AND POST – TEST ON LEVEL OF THE PUPILS' MATHEMATICS PERFORMANCE USING THE BLOCK MODELING APPROACH

The T – Test on the significant difference on level of the pupils' Mathematics performance before and after using the block modeling approach is shown in Table 6.

Table 6 T – Test on the Significant Difference on Level of the Pupils' Mathematics Performance Before (Pre – test) and After (Post – Test) using the Block Modeling Approach

Grade 4	**t**	**df**	**Sig. (2-tailed)**	**Decision/ Interpretation**
Addition & Subtraction	7.27	24	0.00	Reject Ho Significant
Multiplication & Division	-3.26	24	0.00	Reject Ho Significant
Addition & Subtraction of Fraction	-3.13	24	0.00	Reject Ho Significant
Grade 5				
Four Fundamental Operation	-4.23	24	0.00	Reject Ho Significant
Fraction	-2.83	24	0.01	Reject Ho Significant
Decimal	-4.53	24	0.00	Reject Ho Significant
Ratio	1.36	24	0.19	Accept Ho Not Significant
Percentage	-4.03	24	0.00	Reject Ho Significant
Grade 6				
Four Fundamental Operation	-2.13	19	0.04	Reject Ho Significant
Fraction	-3.24	19	0.00	Reject Ho Significant
Ratio & Proportion	-2.18	19	0.04	Reject Ho Significant
Percentage	-2.13	19	0.04	Reject Ho Significant

Grade 4. The computed significant value in addition and subtraction; multiplication and division and addition and subtraction of fraction (0.00) were all less than 0.05 alpha level of significance. The results indicate that there is difference on level of performance of grade 4 pupils in Mathematics during pre – test and post – test of the respondents in addition and

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subtraction; multiplication and division and addition and subtraction of fraction. Therefore, null hypothesis is rejected

Grade 5. The computed significant value for four fundamental operations (0.00); fraction (0.01); decimal (0.00) and percentage (0.00) were all less than 0.05 alpha level of significance; the results indicate that there is difference on level of performance of grade 5 pupils in Mathematics during pre – test and post – test of the respondents in four fundamental operations; fraction; decimal and percentage. Therefore, null hypothesis is rejected. On the other hand the computed significance value for ratio (0.19) which is greater than 0.05 alpha level of significance; the results signifies that there is no significant difference on level of performance of grade 5 pupils in Mathematics during pre – test and post – test of the respondents in terns if ratio, The null hypothesis is accepted.

Grade 6. The computed significant value in four fundamental operation (0.04); fraction (0.00); ratio and proportion (0.04) and percentage (0.04) were all less than 0.05 alpha level of significance; the results indicate that there is difference on level of performance of grade 6 pupils in Mathematics during pre – test and post – test of the respondents in four fundamental operation, fraction, ratio and proportion and percentage. Therefore, null hypothesis is rejected.
Teachers can make such mathematical eagerness in classrooms with any mathematics question by asking students for the different ways they see and can solve the problems and by encouraging discussion of different ways of seeing problems.

Kevin Mahoney (2012) conducted a study on the effects of Singapore's Model Method, also known as "model drawing" or "bar modelling" on the word problem-solving performance of third and fourth grade students. The results demonstrated the existence of a positive functional relationship between the independent variable (the model drawing intervention) and the participant's problem-solving performance. The percentage of problems solved correctly rose significantly as soon as the intervention phase began and the child employed Singapore's Model Method in solving complex word problems. The pattern was repeated across two different problem types, multiplicative comparison word problems and fraction word problems. The validity of the findings was strengthened considerably when the results showed a very similar functional relationship across four different subjects in grades 3 and 4.

In the study of De Guzman (2009) the effect of the problem solving approach on the problem solving performance test is significant. Also, mathematical ability has a significant effect on the problem solving performance as expected. However, the interaction effect of the problem solving approach on mathematical ability on problem solving performance is not significant. On the other hand, the performance of the experimental group which was exposed to block model approach performed better than the control group which used the traditional method.

This means that the effect of the block modeling approach on problem solving performance is effective in mathematical ability. Thus, regardless of the type of problem solving in mathematics, block modeling approach is effective and can be utilized.

8. CONCLUSION

Based on the findings obtained in the study, the researcher concluded that:

1. The respondents are in their early adolescence, female, intermediate level, Aetas, parents were elementary undergraduate and with a below average family monthly income

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2. The level in Mathematics performance of grade 4 respondents is did not meet expectation performance in the pre – test and fairly satisfactory during post-test. Grade 5 respondents attained did not meet expectation performance in the pre – test and fairly satisfactory in the post-test. Grade 6 respondents attained did not meet expectation performance in the pre – test and obtained a satisfactory performance during post-test.
3. There is no significant difference on level of the grade 4 pupils' mathematics performance in pre – test and post-test when grouped according to age, sex, family monthly income and parent's educational background profile. Therefore, null hypothesis is accepted. There is no significant difference on level of the grade 5 & 6 pupils' mathematics performance in pre – test when grouped according to age, sex, and parent's educational background profile. Moreover, there is a significant difference on level of the grade 5 & 6 pupils' mathematics performance in pre – test when grouped according to family monthly income profile.
4. There is a significant difference on level of performance of grade 4 pupils in Mathematics during pre – test and post – test of the respondents in addition and subtraction; multiplication and division and addition and subtraction of fraction. There is a significant difference on level of performance of grade 5 pupils in Mathematics during pre – test and post – test of the respondents in four fundamental operations; fraction; decimal and percentage. There is a significant difference on level of performance of grade 6 pupils in Mathematics during pre – test and post – test of the respondents in four fundamental operation, fraction, ratio and proportion and percentage.

9. RECOMMENDATIONS

1. Teachers can utilized the Block Modeling Approach with activities to help the pupils visualize concepts or even manipulate problem situations
2. Teachers may use other teaching strategies in mathematics to motivate the pupils to learn mathematics in spite of difficulties.
3. Teachers and researchers should investigate and develop fresh instructional strategies that would help students develop interest in Mathematics subject.
4. Teachers may continue to adopt and use new curriculum materials, active learning approaches and current methods of teaching proven to be effective with today's learners.
5. Teachers need to consider various strategies to teach pupils grasp difficult concepts in Mathematics.
6. Instructional material developed maybe further reviewed and presented to a panel of curriculum planner for its implementation in teaching Mathematics problem.
7. It is suggested that further studies be made in order to widen the scope of the study and validate the result obtained.

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