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Mathematics Performance of Grade Six Pupils in the National Achievement Test, Division of Northern Samar: Basis in Developing a Workbook in Elementary Mathematics VI

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Abstract: ***Despite the implementation of the BEC Curriculum, significant problems still exist especially on the level of knowledge, mastery and skills of the learners, lack of instructional materials, laboratory apparatuses and physical equipment, as manifested in result of the National Achievement Test (NAT). IN THE National Achievement Test (NAT) results of 2012, there are only few high performing schools with mean percentage score (MPS) of 86% which is still categorized as Closely Approximating Master while there are sizeable number of low performing schools with MPS of 34% and categorized as Low to Absolutely No Mastery. Furthermore, the Percentage of Correct Responses (PCR) per learning competency measured by subject area showed that the pupils' performance in Mathematics is very low. These problems were manifested in the National Achievement Test conducted by the National Educational Testing and Research Center (NETRC), the agency tasked to conduct research, evaluate, and assess the effectiveness of instruction in the Department of Education. Educators confirmed that a significantly low achievement in Mathematics and a relatively low self-efficacy among students who are impatient in solving Mathematical problems posed great challenges to present – day Mathematics educators. Additionally, some individuals regard Mathematics as a waterloo and a difficult subject, both to learn and to teach because of its abstract nature. The act teaching is so complex that it is nearly impossible to claim that a specific way of teaching is superior to other ways. But, one way of maintaining the interest of the learners is to provide them with activities which they could perform individually after being given the proper guidance, instruction to teaching tool such as workbook or module which could make learning interesting. It is at this point, the emphasis in instruction is for the teachers to be equipped with the necessary resource materials to facilitate the development of the cognitive learning skills for all learners. As to the nature of Mathematics perceived to be a difficult subject, despite the teacher's effort in explaining how the pupils should go about the exercises, still the success was marginal. This was also one of the main reasons why teachers and the system continued to develop and design educational books that would enhance the learner's interest to the subject. Considering all these, the researcher was motivated to make Mathematics teaching effective through understanding what pupils know and learn by challenging and supporting them to learn it well. And this could be done by learning mathematics through the experiences that the teacher may provide through a workbook. Taking into consideration the challenges in Mathematics, a workbook on elementary Mathematics is a necessity to meet the learner's needs and equip them with skills required for their level. Learner's with different needs and interest were target users of this workbook. This workbook would be the output of this study based on the needs of the Grade VI pupils in the different schools in the Division of Northern Samar. Both the quality and the quantity of time spent in instruction were critical variables in pupils' achievement. The quality of time spent could be determined by the teachers and pupils' behavior in instruction, application and practice which demanded sufficient time to insure pupils' mastery of the skills and competence through understanding the material. However, this study also aims to; determine the mastery level of the Grade VI pupils' performance in Mathematics in the National Achievement Test in the Division of Northern Samar based on the Percentage of Correct Response (PCR) per learning competency, determine the most and least learned competencies of the Grade VI pupils in Mathematics, draw inputs from the findings based on the mastery level and learning competencies of Grade VI pupils in Mathematics in the NAT that can be included in developing a workbook, ascertain the content validity of the developed Mathematics VI workbook in terms of objectives, key concepts, direction/instruction, practical exercises, reflections and topics, and Identify the leveled of acceptability of the workbook in terms of clarity, usefulness, language and style, illustrations, presentations, and suitability, find out the perception of District I and II teacher-respondents on the evaluation of the developed Mathematics workbook for Grade VI pupils, find out the significant differences between District I and District II in the perception of the teachers evaluation of the developed Mathematics Workbook for Grade VI pupils. After determining the most and least learned competencies in Mathematics VI in the National Achievement Test as found out from the certification rating issued by the National Education Testing and Resources Center (NETRC), in the workbook was developed following the competencies covered by Mathematics VI in the National Achievement Test. The developed following workbook in Mathematics VI was evaluated in the study by Mathematics teachers in 39 high performing elementary schools in Northern Samar which were selected based on the National Achievement Test results in Mathematics VI who got an average rating 86% and above from school year 2010-2012.***

Keywords: Mathematics, Performance, Grade six performance

1. Introduction

Despite the implementation of the BEC Curriculum, significant problems still exist especially on the level of knowledge, mastery and skills of the learners, lack of instructional materials, laboratory apparatuses and physical equipment, as manifested in result of the National Achievement Test (NAT). IN THE National Achievement Test (NAT) results of 2012, there are only few high performing schools with mean percentage score (MPS) of 86% which is still categorized as Closely Approximating Master while there are sizeable number of low performing schools with MPS of 34% and categorized as Low to Absolutely No Mastery. Furthermore, the Percentage of Correct Responses (PCR) per learning competency measured by subject area showed that the pupils'

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performance in Mathematics is very low. These problems were manifested in the National Achievement Test conducted by the National Educational Testing and Research Center (NETRC), the agency tasked to conduct research, evaluate, and assess the effectiveness of instruction in the Department of Education.

Educators confirmed that a significantly low achievement in Mathematics and a relatively low self-efficacy among students who are impatient in solving Mathematical problems posed great challenges to present – day Mathematics educators. Additionally, some individuals regard Mathematics as a waterloo and a difficult subject, both to learn and to teach because of its abstract nature.

The act teaching is so complex that it is nearly impossible to claim that a specific way of teaching is superior to other ways. But, one way of maintaining the interest of the learners is to provide them with activities which they could perform individually after being given the proper guidance, instruction to teaching tool such as workbook or module which could make learning interesting. It is at this point, the emphasis in instruction is for the teachers to be equipped with the necessary resource materials to facilitate the development of the cognitive learning skills for all learners.

As to the nature of Mathematics perceived to be a difficult subject, despite the teacher's effort in explaining how the pupils should go about the exercises, still the success was marginal. This was also one of the main reasons why teachers and the system continued to develop and design educational books that would enhance the learner's interest to the subject.

Considering all these, the researcher was motivated to make Mathematics teaching effective through understanding what pupils know and learn by challenging and supporting them to learn it well. And this could be done by learning mathematics through the experiences that the teacher may provide through a workbook.

Taking into consideration the challenges in Mathematics, a workbook on elementary Mathematics is a necessity to meet the learner's needs and equip them with skills required for their level. Learners with different needs and interest were target users of this workbook. This workbook would be the output of this study based on the needs of the Grade VI pupils in the different schools in the Division of Northern Samar. Both the quality and the quantity of time spent in instruction were critical variables in pupils achievement. The quality of time spent could be determined by the teachers and pupils behavior in instruction, application and practice which demanded sufficient time to insure pupils mastery of the skills and competence through understanding the material.

2. Objectives of the Study

1) Determine the mastery level of the Grade VI pupils' performance in Mathematics in the National Achievement Test in the Division of Northern Samar based on the Percentage of Correct Response (PCR) per learning competency.
2) Determine the most and least learned competencies of the Grade VI pupils in Mathematics;
3) Draw inputs from the findings based on the mastery level and learning competencies of Grade VI pupils in Mathematics in the NAT that can be included in developing a workbook;
4) Ascertain the content validity of the developed Mathematics VI workbook in terms of objectives, key concepts, direction/instruction, practical exercises, reflections and topics; and
5) Identify the leveled of acceptability of the workbook in terms of clarity, usefulness, language and style, illustrations, presentations, and suitability.
6) Find out the perception of District I and II teacher-respondents on the evaluation of the developed Mathematics workbook for Grade VI pupils.
7) Find out the significant differences between District I and District II in the perception of the teachers evaluation of the developed Mathematics Workbook for Grade VI pupils.

3. Methodology

After determining the most and least learned competencies in Mathematics VI in the National Achievement Test as found out from the certification rating issued by the National Education Testing and Resources Center (NETRC), in the workbook was developed following the competencies covered by Mathematics VI in the National Achievement Test. The developed following workbook in Mathematics VI was evaluated in the study by Mathematics teachers in 39 high performing elementary schools in Northern Samar which were selected based on the National Achievement Test results in Mathematics VI who got an average rating 86% and above from school year 2010-2012.

Descriptive-evaluate research design was employed. Before the workbook was evaluated by mathematics teachers, it underwent critiquing by senior faculty members of the College Education who have produced modules, workbooks and textbooks in mathematics. The level of validity was categorized into Very Much Valid, Much Valid, Moderately Valid, Least Valid, Not Valid. The level of acceptability of the workbook was categorized into High Acceptable, Acceptable, Moderately Acceptable, Least Acceptable and Not Acceptable. Statistical tools used were frequency counts, percentages, and weighted means. The t-test was used to test the hypothesis on the significant difference between the two groups of teacher-respondent in District I and District II. Finally, after the evaluation all comments on suggestion were organized and recorded the final revision of the workbook so it will be ready for classroom instruction.

4. Result and Discussion

As shown in table 1. Majority of the Grade VI pupils in Mathematics for SY 2009-2010 and 2010-2011 weremoving towards mastery and closely approximating mastery levels. However for 2011-2012, majority of the pupils were on the average and moving towards mastery level. It means that there was improvement on mastery level from 2010-2011 and there was a decline of the respondents NAT performance on year 2011-2012.hence it can be inferred that

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the pupils in Northern Samar have not yet reached the mastery level in mathematics VI.

Table 1: Mastery Level of the Grade Vi Pupils' Performance in Mathematics in the National Achievement Test in the Division of Northern Samar for School Years 2010-2012 Based on the Percentage of Correct Responses (PCR) PER Learnng Area

Mastery Level	Year						Total	
	2010		2011		2012			
	f	%	F	%	f	%	f	%
Mastery level (M) 96%-100%	3	0.9	30	8.96	1	0.3	34	3.38
Closely Approximating Mastery (CAM) 86%-95%	6	17.91	85	25.37	42	12.54	187	18.61
Moving Towards Mastery (MTM)66%-85%	168	50.15	160	47.76	112	33.43	440	43.78
Average Mastery (AM) 35% -65%	97	28.96	55	16.42	125	37.31	277	27.56
Low Mastery (LM) 15% - 34%	7	2.09	5	1.49	55	16.42	67	6.67
TOTAL	335	100	335	100	335	100	1005	100

On the learning competencies in mathematics VI presented in table 2, the most learned Competencies were identifying congruent polygons, interpreting data presented in a line graphs followed by reading ang interpreting reading from electric meter/water meter. The least learned mathematics competency was in solving word problems involving measurements of solids-prism, finding rates and measurement of surface area of triangle. It could be observed that the most learned competency is in geometry while the least learned concept is also in geometry. The least learned competencies are focused on problem solving. Since there is no competency which was mastered, all competencies served as inputs in developing the workbook for Mathematics VI.

Table 2: The Most and Least Learned Competencies of Grade Six Pupils' in Mathematics in the National Achievement Test Results

Competencies	Percentage of Correct Responses	Mastery level	Rank
1. identify congruent polygons	73.31	MTM	1
2. Interpreting data presented in a line graph	70.7	MTM	2
3. Reading and Interpreting reading from-electric meter/water meter	67.81	MTM	3
4.Subtracting dissimilar fractions in mixed forms with regrouping	67.62	MTM	4
5.Solving word problems involving body temperature	67.15	MTM	5
6.Solving word problems involving finding the percentage	66.15	MTM	6
7.Solving 1 to 3 step word problems involving addition and subtraction of decimals including money	65.99	AM	7
8.Reading and interpreting data presented in a circle graph	65.8	AM	8
9.Solving 1-step word problem involving addition of fractions	65.57	AM	9
10.Subtracting dissimilar fractions	64.2	AM	10
11.Multiplying mixed from by a fraction	62.55	AM	11
12.Solving word problems with proportions	61.95	AM	12
13.Adding similar fractions in mixed forms with regrouping	59.27	AM	13
14.Solving word problems involving measurement of surface area-trapezoid	57.06	AM	14
15.Solving word problems involving measurement of surface area-triangles	53.81	AM	15
16.Solving word problems involving finding the rate	49.82	AM	16
17.Solving word problems involving measurement of solids-prism	45.29	AM	17

Legend: MTM (Moving Towards Mastery) AM (Average Mastery)

Table 3 shows the assessment of the developed workbook in terms of content validity. The respondents rated the objectives, key concepts, directions, practical exercises, reflection, topics as "very much valid". The indicator with the highest mean is that the workbook is "easy to follow".

Table 3: Assessment of the Development Workbook in Terms of Content Validity

Indicator	Mean	Description	interpretation
1. **Objectives**			
1.1 relevant to the topics covered in Mathematics VI	4.79	Strongly Agree	Very Much Valid
1.2 specific and clearly stated	4.77	Strongly Agree	Very Much Valid
1.3 measurable	4.79	Strongly Agree	Very much Valid
1.4 attainable	4.82	Strongly Agree	Very much Valid
1.5 result oriented	4.69	Strongly Agree	Very Much Valid
1.6 time bounded	4.74	Strongly Agree	Very Much Valid
Section Mean	**4.77**	**Strongly Agree**	**Very Much Valid**
2. Concepts/Principles			
2.1 gives insight and ideas what the activity is all about	4.85	Strongly Agree	Very Much Valid
2.2 provides background of concepts and information about the topic to be solved	4.77	Strongly Agree	Very Much Valid
2.3 arouses pupils' interest to solve the exercises	4.79	Strongly Agree	Very Much Valid
2.4 attracts pupils' attention	4.79	Strongly Agree	Very Much Valid
Section Mean	**4.8**	**Strongly Agree**	**Very Much Valid**
3. Direction			

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3.1 simple and clear easy to	4.82	Strongly Agree	Very Much Valid
3.2 follow properly sequenced	4.87	Strongly Agree	Very Much Valid
3.3 can be done independently	4.77	Strongly Agree	Very Much Valid
Section Mean	**4.76**	**Strongly Agree**	**Very Much Valid**
4. Practical Exercises			
4.1 relevance to objective	4.7	Strongly Agree	Very Much Valid
4.2 adequate to develop pupils' mathematical knowledge and skills	4.7	Strongly Agree	Very Much valid
4.3 appropriate to pupils' ability	4.7	Strongly Agree	Very Much Valid
4.4 sufficient enough to determine mastery level of pupils	4.6	Strongly Agree	Very Much Valid
Section Mean	**4.66**	**Strongly Agree**	**Very Much Valid**
5. Reflection			
5.1 motivates pupils to express their learning experience	4.6	Strongly Agree	Very Much Valid
5.2 gives insight to teacher if the pupils need remediation or enrichment	4.7	Strongly Agree	Very Much Valid
Section Mean	**4.67**	**Strongly Agree**	**Very Much Valid**
6. Topics			
6.1 sequence according to PELC	4.6	Strongly Agree	Very Much Valid
6.2 carefully organized	4.8	Strongly Agree	Very Much Valid
6.3 well constructed	4.8	Strongly Agree	Very Much Valid
6.4 logically presented	4.6	Strongly Agree	Very Much Valid
Section Mean	**4.76**	**Strongly Agree**	**Very Much Valid**
GRAND MEAN	**4.74**	**Strongly Agree**	**Very Much valid**

Table 4 revealed the acceptability level of the workbook in Acceptable. The highest mean is on the workbook being terms of clarity, usefulness, language and style, illustration, "relevant to the topic" presentations and suitability. All indicators were rated Very.

Table 4: Level of Acceptability of the Workbook

Indicator	Mean	Description	Interpretation
1. Clarity			
1.1 information is clear and simple	4.31	Strongly Agree	Very acceptable
1.2 languages used is clear and easy to understand	4.69	Strongly Agree	Very acceptable
1.3 the concepts for each activity are arranged logically to ensure that there is no duplication	4.33	Strongly Agree	Very acceptable
Section Mean	**4.44**	**Strongly Agree**	**Very acceptable**
2. Usefulness			
2.1 the materials prepare the pupils to think logically and critically	4.62	Strongly Agree	Very acceptable
2.2 the concepts in the material are simple and comprehensive	4.77	Strongly Agree	Very acceptable
2.3 as a whole the enrichment activity is teachable	4.79	Strongly Agree	Very acceptable
2.4 the material provides opportunity for the development/enhance Of mathematical skills.	4.74	Strongly Agree	Very acceptable
2.5 the learning content provide adequate information on the topics Presented	4.69	Strongly Agree	Very acceptable
2.6 it encourages the pupils to become actively involved in the Learning activities	4.74	Strongly Agree	Very acceptable
2.7 it stimulates the learners to intellectual activities	4.74	Strongly Agree	Vey acceptable
2.8 the activities seek to relate new concepts from previous learning	4.69	Strongly Agree	Very acceptable
Section Mean	**4.7**	**Strongly Agree**	**Very acceptable**
3. Languages and style			
3.1 the presentation is clear observing correct grammar	4.67	Strongly Agree	Very acceptable
3.2 the language is clear and comprehensive in terms of vocabulary	4.69	Strongly Agree	Very acceptable
3.3 there is sufficient familiar vocabulary to ensure learning	4.69	Strongly Agree	Very acceptable
3.4 the structure, style and format are appropriate to the target level	4.62	Strongly Agree	Very acceptable
Section Mean	**4.68**	**Strongly Agree**	**Very acceptable**
4. Illustrations			
4.1 clear and simple	4.71	Strongly Agree	Very acceptable
4.2 arouses pupils interest making learning effective and enjoyable	4.66	Strongly Agree	Vey acceptable
4.3 provides concrete visual clues	4.58	Strongly Agree	Very acceptable
4.4 guides pupils to follow direction	4.74	Strongly Agree	Very acceptable
4.5 relevant to the topic	4.81	Strongly Agree	Very acceptable
Section Mean	**4.7**	**Strongly agree**	**Very acceptable**
5. Presentation			
5.1 topics presented in logical and orderly sequences	4.7	Strongly Agree	Very acceptable
5.2 the direction is concise. Readable and easy to follow	4.73	Strongly Agree	Very acceptable
5.3 topics to fit the sequences of the course	4.7	Strongly Agree	Very acceptable
Section Mean	**4.71**	**Strongly agree**	**Very acceptable**
6. Suitability			
6.1 the activity takes in consideration the varying attitudes and Capabilities of the learner	4.47	Strongly Agree	Very acceptable
6.2 the activities are suitable to the subject matter	4.74	Strongly Agree	Very acceptable
6.3 the activities are relevant, interesting and self-motivating to the learning	4.69	Strongly Agree	Vey acceptable
6.4 the use of enrichment activity is adaptable to classes with Large Number of pupils	4.59	Strongly Agree	Very acceptable

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Section Mean	**4.64**	**Strongly agree**	**Very acceptable**
GRAND MEAN	**4.66**	**Strongly Agree**	**Very acceptable**

5. Conclusion

The Grade VI pupils have not mastered the learning competencies. There is a need for Elementary math teachers to devise way to teach word problems, particularly applied to triangles, prisms and finding the rate. The developed workbook is valid and acceptable. This signifies that the material could be a potential tool enhance in Mathematics VI.

6. Recommendation

1) Teachers should devise innovative ways to teach the least learned skills.
2) The developed workbook should be published, disseminated, and used by teachers in mathematics classes to enhance pupils' academic performance and to elicit feedback for the improvement of the material.
3) The government should financially support teachers who have the interest and potentials in developing workbook and other instructional materials to provide quality education. This could also serve as an income-generating project in school.
4) A study should be conducted to assess the relevance and usefulness of the workbook by subjecting it to the use of Grade VI pupils.
5) Similar study be conducted to other learning areas of the elementary grade level.

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