#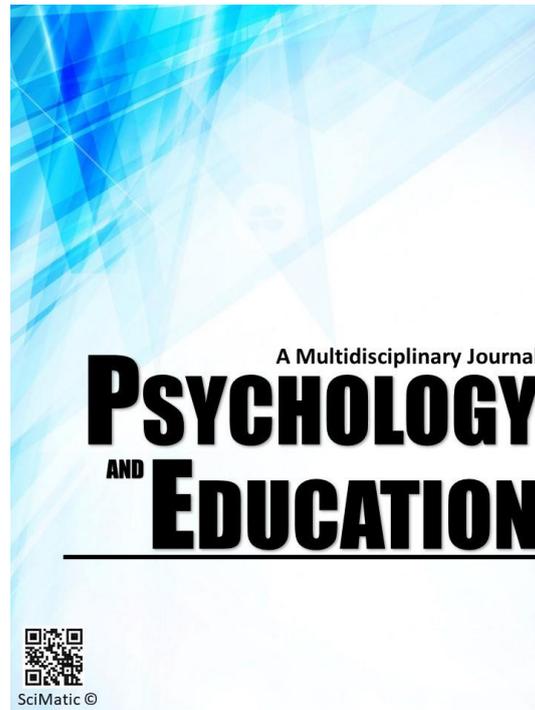 ACADEMIC PERFORMANCE OF GRADE 6 PUPILS IN CANDELARIA DISTRICT, SCHOOLS DIVISION OF ZAMBALES VIS-A-VIS INSTRUCTIONAL STRATEGIES IN MATHEMATICS

Academic Performance of Grade 6 Pupils in Candelaria District, Schools Division of Zambales Vis-À-Vis Instructional Strategies in Mathematics

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Abstract

The study aimed to determine the perceptions of the grade 6 pupils on the teaching strategies of Mathematics teachers in Candelaria District, Schools Division of Zambales. Likewise, it attempted to determine its relationship to pupils' academic performance. For a meaningful analysis of the data, the hypothesis tested was: there is no significant relationship between pupils' academic performance and teaching strategies of teachers. The descriptive type of research was used in this study using lottery technique in choosing its sample. The researcher used frequency distribution and percentage to quantify the data and employed Pearson r to test the hypothesis at .05 level of significance. From the given findings, the following conclusions were drawn:1) The academic performance of the pupils in terms of Mathematics Ratings and Grade Weighted Average were generally Very Satisfactory and Satisfactory, respectively; 2) The teaching strategies of teachers as perceived by the participants were under the qualitative index of "Always"; 3)Only the second grading in Mathematics Rating and second grading in Grade Weighted Average were significantly related to teaching strategies of Teachers; and 4) No significant relationship was noted between the perceptions of grade 6 pupils on instructional strategies used by their teachers in Mathematics and their academic performance.

Keywords: *mathematics, instructional strategies, public school, pupils' academic performance*

Introduction

The complexity and demands of our 21st century makes education more challenging for both the teachers and the learners. Teachers are saddled with more responsibilities to effectively promote the physical, social, emotional and intellectual development, including values formation of the students for their holistic learning development. In view of this, as what Serrano,et.al.(2015) underscored, whatever innovations are made in education for the learners and the teachers who will implement them must address the real issue of transforming the learners in this age of globalization. This important function of education must take place in the spirit of effective interplay between the teachers and the learners in a conducive learning environment. The effective and meaningful interaction between the teacher and the learner in a conducive learning environment will help improve the quality of education. The 21st century has changed the teachers' way of teaching and thinking. These changes expose teachers to many challenges and new roles in the implementation of the K to 12 curriculum. Specifically, they are now faced with the challenge of improving pupils' achievement in Mathematics through a more defined and enhanced instruction and to provide the support necessary for all students to meet or surpass the Mathematics standards set forth by the Department of Education. However, it is an accepted fact that a number of students have fear in Mathematics. Many struggle in their Mathematics subjects for one reason or another. When a pupil fails in Mathematics, it is often attributed to the pupils lack of interest in the subject, irregular attendance, lack of assignments or projects or may be can be attributed on how the lessons are taught by the teachers. Corpuz,et.al. (2015) emphasized that the mission of a Mathematics teacher therefore, is to make their lessons interesting by utilizing various teaching strategies so as to reduce, if not eliminate the fear of the pupils in Mathematics. In so doing, Mathematics becomes a palatable menu and that pupils begin to like it and in effect fall in love with it.

Based on the K to 12 Curriculum Guide for Mathematics, the two (2) main goals in Mathematics teaching are critical thinking and problem solving. These two (2) big goals of teaching Mathematics are expressed in the learning area/program standards. These learning area standards are expressed in the grade level standards that at the end of grade 6, the learner demonstrates understanding and appreciation of key concepts and skills involving number and number sense, geometry, patterns and algebra, measurement, and statistics and probability as applied using appropriate technology in critical thinking, problem solving, reasoning, communicating, making connections, representations and decisions in real life (DepEd, K to 12 Curriculum Guide,2013). To achieve this, however, requires a good foundation at the very start of the educative process particularly in the

elementary level. The child should not only be taught the basic tools in learning but should also be taught on how to think and decide critically, how to do and acquire desirable skills and habits of work that would mold him into productive citizen in the future. Viewed by society, that the Mathematics teachers are important ingredients in the achievement of the pupils' quality performance in the subject, they therefore, should look into their utilization of different strategies such as their art of questioning, the general communication situation established and the materials and equipment they use in teaching Mathematics. The dynamic atmosphere of allowing the learners to share their talents, interests, experiences, and beliefs to support the cognitive aspect of the lesson coupled with teacher's good foundation about the subject matter are effective means to promote lively interaction in the classroom. Likewise, the vibrant attitude of the teacher towards the lesson and teaching strategies employed, are essential factors in encouraging pupils to join and actively participate in the learning process resulting to a more meaningful learning outcomes. Being able to get the interest of the pupils to engage in various tasks in Mathematics and successfully demonstrate comprehension of the key concepts to be learned is an indication that Mathematics teachers have used different strategies effectively. It is undeniable that the academic performance of pupils in Mathematics is solely dependent on their understanding of the lessons and concepts in Mathematics. Without understanding those lessons and concepts, the pupils will fail to show mastery and skills in mathematical problems. Relative to this, a reliable educational assessment plays an important role. Results and findings of such assessment could effect changes and improvement. Recognizing the vital role that assessment plays in education, the Department of Education conducts national student assessments to monitor the public education system and schools for public accountability; help provide information to better identify instructional practices; measure students achievement; and evaluate student's master skills (DepEd Order No.5, S. 2005). Along this line, the teacher are expected to be fully conversant of the measurement and assessment procedures that underpin testing in the cognitive, affective, and psychomotor domain. Given this scenario, the researcher, a public elementary Mathematics teacher was motivated to conduct this study to find out the perceptions of the pupils regarding the instructional strategies used by their Mathematics teachers and how these affect their academic performance. The contention of this study was that teachers as vital components in the learning process of the pupils must adopt strategies that will enhance their academic performance. This was the

parameter by which this study would like to find its meaning in the pursuit of determining the relationship of the pupils' academic performance vis-à-vis instructional strategies in Mathematics.

This study aimed to determine the relationship of the academic performance of Grade 6 pupils in Candelaria District, Schools Division of Zambales vis-à-vis teachers' teaching strategies in Mathematics during the school year 2016-2017. Specifically it sought to investigate the academic performance of the pupil respondents be described in terms of mathematics rating and grade weighted average; teaching strategies of Mathematics teachers in terms of cooperative learning, questioning, active listening, demonstration, and using textbooks; and the significant relationship between pupils' academic performance and instructional strategies of teachers. Subsequently, the implication of the results of the study to the improvement of instructional strategies of Mathematics teachers.

Methodology

This study used the descriptive type of research. Descriptive research involves the purposive process of gathering, analyzing, classifying and tabulating data about prevailing conditions, practice, process, trends and cause that effect relationships and their making adequate and accurate interpretation about such data (Calmorin, 2010). The study was descriptive in nature because it described the academic performance of Grade 6 pupils vis-à-vis teachers' teaching strategies in Mathematics in Candelaria District during the school year 2016-2017. The participants of this study were the Grade 6 public elementary pupils, that were randomly drawn from the various public elementary schools in Candelaria District, Schools Division of Zambales during the school year 2016-2017. Scientific sampling using lottery technique was employed. The one hundred ninety-five (195) pupil participants in this study were drawn from the five hundred sixty-eight (568) Grade 6 pupils of the sixteen (16) public elementary schools in Candelaria District during the school year 2016-2017.

The researcher devised her instrument based from readings in the review of related literature and studies.

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Moreover, informal interview, observations and actual experiences of the researcher as mathematics teacher were considered in the construction of the instrument. Different books and references and the guidelines for constructing a questionnaire were reviewed. Part I of the survey-questionnaire was about the pupils' profile comprising the Mathematics ratings and Grade Weighted average of the participants for the first and second grading periods. Part II. Of the instrument contains the different teaching strategies used by the teachers in teaching Mathematics. In establishing the content validity of the instrument, the initial draft of the questionnaire in English and Filipino was shown by the researcher to the principal in-charge of Mathematics, her public schools district supervisor and finally to her thesis adviser for their comments and suggestions. Several changes were made. Some items considered not relevant to the study were discarded. For reliability, the researcher used the test-retest technique with an interval of two weeks in the administration of the instrument to the grade 6 pupils who were not included as participants in this study. The revised form was then pretested twice to fifteen (15) grade 6 pupils of Lauis Elementary School who were not participants of the study with an interval of two (2) weeks. The responses of the group were closely similar in the first and second administration of the questionnaire. The coefficient of correlation between the first and second administration with the use of Spearman Rank correlation coefficient yielded computed r of .73 which indicates high relationship. This means that their responses were reliable. According to Garett as cited by Zulueta (2003) when the computed coefficient correlation is high, it follows that the research instrument is considered both valid and reliable. The researcher sought permission from the Schools Division Superintendent, Schools Division of Zambales through the School Principal before the administration of the questionnaire to the participants. Upon approval, the assistance of the school heads was likewise solicited to ensure success in the administration and retrieval of the instrument. Further, the researcher requested the school head to explain to the concerned teachers the purpose of the study. The researcher personally administered the instrument and took the opportunity to interview some of them. The data gathered were statistically treated using frequency and percentage to describe the academic performance of the participants, weighted Mean was employed to determine the indicators in teaching strategies, and the Pearson Product Moment Correlation (Pearson r) was used to determine the variables that were significantly related to instructional strategies. This statistical technique was used to determine the relationship between two variables that are of the interval type of data.

Results and Discussion

Academic performance of the pupil respondents.

On Mathematics rating. Table 1 shows the frequency distribution, percentage and description of the participants according to Mathematics rating. The most number of participants obtained a rating of 80-84 or Satisfactory with 91 or 46.67 percent of the total participants during the first grading period. Thirty two (32) or 16.41 percent had a rating of "Outstanding" while 42 or 21.54 percent acquired a rating of "very Satisfactory". Twenty-five (25) or 12.82 percent of the participants obtained a rating of Satisfactory and "Below 75" (70-74) which was described as "Did Not Meet Expectations" obtained by five (5) or 2.56 percent of the participants. The obtained average of 84.31 was described as Satisfactory. The data indicated that generally, pupils were equipped with mathematical ability. They passed the standards set by the Department of Education (DepEd) satisfactorily as stipulated in DepEd Order No. 8, s.2015 "Policy on Classroom Assessment for the K to 12 Basic Education Program". Likewise, it could be gleaned from the table, the ratings during the second grading period increased slightly, higher than the first grading. Within the range of 90-100 thirty-nine (39)or 20 percent obtained an "Outstanding" rating an increase of 7 pupils from the first grading. Forty eight (48) or 24.62 percent had a "Very Satisfactory" rating of 85-89. Eighty four (84) or 43.08 percent earned a satisfactory rating of 80-84 with a decrease of 7 pupils. Nineteen (19) or 9.74 obtained 75-79 a rating described a "Fairly Satisfactory" while 5 or 2.56 percent of the pupils still "Did Not Meet Expectations", the same number of pupils during the first grading period. The computed mean was 85.09 described as "Very satisfactory" higher than the "Satisfactory" rating during the first grading period. Evidently, there was an increase in the Mathematics rating obtained by the pupils at the end of the second grading period. According to the pupils interviewed by the researcher, although tasks were becoming more difficult as a new grading period began, and found difficulty in adjusting themselves they tried their best to cope up with the lessons by listening intently to the lesson being presented and asked questions for concepts they did not understand.

Table 1. *Frequency, percentage and qualitative indices of participants according to mathematics rating*

| Descriptor | Grading Scale | MATHEMATICS RATING | | | |
| | | FIRST GRADING | | SECOND GRADING | |
		f	%	f	%
Outstanding	90 - 100	32	16.41	39	20.00
Very Satisfactory	85 - 89	42	21.54	48	24.65
Satisfactory	80 - 84	91	46.67	84	43.08
Fairly Satisfactory	75 - 79	25	12.82	19	9.74
Did Not Meet Expectations	Below 75 (70-74)	5	2.56	5	2.56
TOTAL		195	100	195	100
AVERAGE		84.31		85.09	

Overall Rating for the 1st and 2nd Grading Period = 84.70 Very Satisfactory

Table 2. *Frequency, percentage and qualitative indices of pupils According to Grade Weighted Average (GWA)*

| Descriptor | Grading Scale | FIRST GRADING | | SECOND GRADING | |
		f	%	f	%
Outstanding	90 - 100	38	19.49	42	21.54
Very Satisfactory	85 - 89	32	16.41	44	22.56
Satisfactory	80 - 84	96	49.23	84	43.08
Fairly Satisfactory	75 - 79	24	12.31	20	10.26
Did Not Meet Expectations	Below 75 (70-74)	5	2.56	5	2.56
TOTAL		195	100	195	100
AVERAGE		84.48		85.16	

Overall Rating for the 1st and 2nd Grading Period = 84.82 Very Satisfactory

On grade weighted average. Table 2 reveals the frequency distribution, percentage and descriptors of the pupils according to grade weighted average. During the first grading period, 38 or 19.49 percent earned "Outstanding" rating of 90-100. Thirty two (32) or 16.41 percent earned a rating of 85-89 or "Very Satisfactory". Ninety six (96) or 49.23 percent achieved a "Satisfactory" while twenty-four or 12.31 percent obtained a "Fairly Satisfactory Rating" and five (5) or 2.56 percent did not meet expectations. Apparently, a great number of pupils massed under "Satisfactory" descriptor. In an interview conducted informally with the pupils they said that since their Mathematics rating during the first grading period was "Satisfactory" it follows that their general weighted average for the said period was affected. According to them the reason behind such performance was, they found difficulty in some topics that were introduced which required understanding of basic concepts. The mean obtained in the first grading was 84.48 with a descriptor of "Satisfactory". Going further to the second grading, 42 or 21.54 percent obtained a grade weighted average of 90-100 with an "Outstanding" as descriptor. Forty-four (44) or 22.56 percent earned 85-89 described as "Very Satisfactory". Eighty-four (84) or 43.08 percent achieved 80-84. Twenty (20) or 10.26 percent obtained 75-79 grade weighted average rated as Fairly Satisfactory" and five (5) or 2.56 percent did not meet expectations. The mean obtained in the second grading was 85.16 described as Very Satisfactory, an increase of 0.68 from the first grading mean of 84.48. It could be noted that as the rating in Mathematics increases, it follows, the grade-weighted average also increases. Thus, Mathematics rating affects pupils' general weighted average based on the data for the first and second grading periods.

Teaching Strategies of Mathematics Teachers

Cooperative learning. According to the pupils interviewed by the researcher their Mathematics teacher always discussed and explained what task they have to accomplish. Their teacher always made it a point that every detail on how to accomplish assigned task was well communicated to them. They were often encouraged by their teacher to work together, and share ideas, materials and resources with their peers. Often, their teacher provided appropriate cues and feedbacks; often monitored progress of individual member in the group and the group as a whole; and often rewarded the group for team performance. The pupils said, they appreciated the efforts exerted by their Mathematics teacher because they were often guided accordingly before the activity started until its completion. As observed by the researcher in one of the class sessions, where the teacher used cooperative learning as her strategy pupils were actively engaged into an atmosphere of giving and sharing ideas and materials or resources with their co-members in the group. Group interaction were very much evident. The teacher as facilitator of learning often monitored the progress of each member and the group in general and was ready to assist the pupils on whatever difficulty they encountered in doing the activity. Such strategy eased the burden of going through the difficulty of accomplishing activities in Mathematics subject. According to the pupils since Mathematics is a difficult subject, working with their peers in a group was more preferred because they shared resources, ideas and skills with one another in order to accomplish assigned tasks.

Questioning strategy. In informal interviews conducted with the pupils, revealed that their Mathematics teachers had a way of asking questions that challenged them to think critically. Likewise, they were taught on how to solve problems through application of mathematical formulas previously learned. They also said that the art of questioning used by their teachers gave them the opportunities to identify the problem asked and employ appropriate mathematical solutions. They were encouraged to reflect on what to do with problems when applied to real life situations. Majority of the pupils responded that their teachers often asked questions that arouse their interest and attention. Their teachers often observed individual differences by rephrasing the questions so that all pupils even the slow learners could take part in the discussion. They were encouraged by their teachers to ask questions and make comments for better understanding of the lesson.

Active listening. Majority of the pupils responded that their Mathematics teacher always restructured the physical setting of their classroom to minimize distraction; and always checked if the pupils have understood the question. Moreover, their teachers often encouraged them to listen very well to what the reporter was discussing, prepare questions for the reporter to answer, Often, allowed them to ask questions related to the lesson and often provided them with key words. The average weighted mean obtained was 4.06 described as Often. Generally, pupils believed that by using the active listening strategy, their teachers taught them how to be critical, logical and analytical.

Demonstration strategy. It was apparent that based on the responses of the pupils, their Mathematics teachers always made sure that all materials were available before the demonstration started; always presented the demonstration in context based on what they have already learned; always made it a rule that everybody participated in the class discussion or in the different tasks assigned to them; always rearranged the seating arrangement so that all pupils can see and hear the demonstration; always encouraged them to ask questions, make observation first before making generalizations and always gave them enough time to analyze the problem before conclusions were made applying the principles they have learned. As seen by the pupils, they found their teachers to be effective in this area. In order to conduct demonstrations that are well planned and implemented, the Mathematics teacher should plan in advance so that all necessary materials are collected before the demonstration; make sure all materials are available and in working condition. Likewise, teachers should see to it that the learners have the background knowledge or skill necessary for understanding the demonstration. If necessary teachers should rearrange the seating arrangement in the classroom so that all learners can see and hear what is going on; and solicit learner questions and comments so that they will be actively involved in the activity. Finally, at the end of the demonstration, summarize the key points or review the major steps.

Using textbooks. During an interview conducted by the researcher, pupils explained that they used the textbooks to understand the lessons imported by their Mathematics teachers. Majority of the pupils responded that they believed their teacher always adopts the textbooks to their needs and objectives of the lesson. Their teacher always reread and explained unclear and difficult words or concepts for them to understand; often taught them how to analyze the text by noting important details; Often assigned follow-up activities found in the textbook for remediation, reinforcement and enrichment purposes; and often reminded them how to interpret and use aids in the text such as table of contents, when textbooks were used they were able to cope easily with the lesson. As always, the pupils recognized that their teachers served as their guide in understanding the meaning and usage of the textbooks.

Correlation between pupils' academic performance and teachers' teaching strategies. Table 3 shows the correlation matrix between pupils' academic performance and teachers' teaching strategies. It could be noted that only the pupils' Second Grading Mathematics Rating and Second Grading Grade Weighted Average were significantly related to the cooperative learning strategy of mathematics teachers. An r of +0.4187 and +0.4661 denote Moderate Correlation. The table further shows the negligible correlation with an r difference of +0.1242 between the first and second grading Mathematics Rating and cooperative learning strategy. With regards to Average Weighted Average, only cooperative learning strategy was related to pupils' academic performance in the second grading with an r of +.04661 with qualitative index of moderate correlation. As gleaned from the table, the first and second grading Mathematics Ratings and Grade Weighted Average of pupils for the first and second grading periods were not significantly related to teachers' teaching strategies, namely: questioning, active listening, and demonstration because of their negative computed r which denote negative correlation. Such findings could be partly attributed to the inadequacy of teachers' background

knowledge, skills and competencies in using the aforementioned teaching strategies effectively to improve pupils' academic performance specifically in Mathematics. Moreover, the grade weighted average had no significant relationship to teaching strategies employed in teaching mathematics because there were other teaching strategies employed by the teacher in the different subjects areas. Relative to using textbook, the table shows that -0.111 Mathematics rating obtained during the first grading period was increased to +0.3035 from negligible relationship to low correlation. The grade weighted average during the first grading period of .1065 described as negligible correlation was increased to 0.3028 with description of low positive correlation. Summing up, with the obtained negative correlation, in Mathematics Ratings and Grade Weighted Average, it could be inferred the academic performance of pupils is not significantly dependent on teachers' teaching strategies.

Table 3. *Significant relationship between pupils' academic performance and teaching strategies of teachers*

Teaching Strategies	Mathematics Rating				Grade Weighted Average			
	1st Grading	Q1	2nd Grading	Q1	1st Grading	Q1	2nd Grading	Q1
Cooperative Learning	+0.2945	.3532 LC	+0.4187	MC	.3760	.4211 MC	+0.4661	MC
Questioning	-0.7536	-.7401 HNC	-0.7266	HNC	-0.8500	-.8155 HNC	-0.7809	HNC
Active Listening	-0.5442	-.5169 MNC	-0.4895	MNC	-0.4938	-.4600 MNC	-0.4261	MNC
Demonstration	-0.3385	-.2964 LNC	-0.2543	LNC	-0.2587	-.2483 LNC	-0.2379	LNC
Using Textbook	-0.1112	+.0962 NNC	+0.3035	LC	0.1065	+.2047 NNC	+0.3028	LPC
	Average: -.2593 LNC				Average: -.1796 or -.18 NNC			

Implications to instructional supervision for improvement of teaching strategies of Mathematics teachers. The different indicators were generally perceived under the qualitative index of "Often". This means that the teachers were not significant in manifesting the use of the given strategies in the questionnaire. In the correlation matrix, pupils' mathematics ratings and grade weighted average for the first and second grading periods were not significantly related to the teaching strategies of teachers. This means that teachers should use effective teaching strategies in all grading periods and adopt other strategies appropriate to the spirally developed lessons and key concepts in Mathematics as the grading period progresses from the first to the fourth grading period. Teachers must be able to have a full grasp of the strategies they are using in the classroom in order to facilitate the learning of key concepts in Mathematics. Mathematics is a difficult subject, therefore it is imperative that teachers improve the

teaching strategies they are currently using in the classroom and strengthen the use of other strategies to ensure quality academic performance from the pupils. In-service trainings and further education in Mathematics to equip them with the trends in Mathematics. Funding is one concern in implementing the training programs effectively. Research on how to improve mathematics instruction through the utilization of appropriate teaching strategies be also conducted. In a nutshell, this will boil down to the teachers. As the facilitators in the classroom, therefore, they must be equipped with the necessary knowledge, skills and competencies in teaching the concepts and process skills in Mathematics.

Conclusion

The academic performance of the pupils in terms of Mathematics Ratings and Grade Weighted Average were generally Very Satisfactory and Satisfactory, respectively. The teaching strategies of teachers as perceived by the participants were under the qualitative index of "Always". Only the second grading in Mathematics Rating and second grading in Grade Weighted Average were significantly related to teaching strategies of Teachers. No significant relationship was noted between the perceptions of grade 6 pupils instructional strategies used by their teachers in Mathematics and their academic performance.

Pupils' academic performance in mathematics must be sustained and improved in order to achieve or maintain a high Grade Weighted Average per grading period. Teachers' teaching strategies in Mathematics must be enhanced or strengthened through in-service trainings to achieve pupils' high academic performance. The reward or incentive awarded to pupils/group with outstanding performance must be improved to elicit interest from pupils for better performance in mathematics. Further studies similar to this study be undertaken using other teaching strategies in mathematics to further determine what teaching strategies are effective in raising pupils' academic performance.

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