IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

PERFORMANCE IN MATHEMATICS OF GRADE 8 STUDENTS: BASIS FOR INTERVENTIONS TO IMPROVE NUMERACY SKILLS

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Abstract :

This study assessed the level of performance in Mathematics of the Grade 8 students of Camachiles National High School, Division of Mabalacat City during the school year 2023 - 2024 through quantitative-descriptive research design. Quantitative-descriptive research design was employed to determine the level of performance in Mathematics of the Grade 8 students based on their performance during the school year 2023-2024. It was also utilized to look into the different strategies used by teachers to develop numeracy skills of learners. Based on the findings, interventions were proposed to enhance the level of performance in Mathematics of the Grade 8 students. The sources of data in this study were 14 Mathematics teachers in Camachiles National High School who provided data to answer the sub-problems raised in the study with 524 Grade 8 students as subjects of the study. Weighted mean was utilized in the study to treat the data statistically.

Summary of Findings: 1.0 Level of Performance in Mathematics of the Grade 8 Students Out of 524 Grade 8 students in Camachiles National High School, 158 or 30.15% are numerates; 353 or 67.37% are nearly numerates; and 13 or 2.48% are non-numerates. 2.0 Strategies Used by Teachers to Develop Numeracy Skills The strategies used by teachers to develop numeracy skills of Grade 8 students are as follows: Use of locally-made materials or objects found in the community; Exposing learners to more drills and exercises; Differentiated instruction; Using manipulatives, realia and tangible object as instructional materials; Translation; Using collaborative approach teaching; and Attractive and purposeful instructional materials through ICT. 3.0 Proposed Interventions to Improve Numeracy Skills Interventions were proposed to improve numeracy skills of Grade 8 students.

Based on the findings of the study, the following conclusions were drawn: 1. Most the Grade 8 students are categorized as nearly numerates which indicates they still need to understand Mathematics concepts and skills. 2. Strategies used by teachers to a great extent to develop numeracy skills of students include attractive and purposeful instructional materials through ICT, exposing learners to more drills and exercises and use of locally-made materials or objects found in the community. 3. Interventions were proposed for the Grade 8 students to improve numeracy skills of Grade 8 students which include conference with parent and learners, one-on-one tutorial, redo activities with low scores, home visitation, supplementary materials and activities, less items of activities, remedial class, and referral to guidance counselors.

Based on the conclusions drawn as a result of the findings of the study, the following recommendations were offered: 1. The proposed interventions should be considered for implementation by Grade 8 students to improve numeracy skills for enhancement of their level of academic performance. 2. More innovative interventions should be encouraged to make a significant difference in the level of numeracy skills of learners. 3. Other learning activities should be developed using contextualization, translation, indigenization, and localization. 4. Relevant information, knowledge and skills be equipped to the teachers so that they may address the existing gaps and issues encountered in developing numeracy skills of learners. 5. Other researchers may conduct similar studies on a wider scope to validate the findings of the study.

Keywords: intervention, numeracy skills

INTRODUCTION

Global educational policies and programs have brought significant challenges to many education systems in the world through educational policy in the twenty-first century as the key to global security, sustainability and survival. The effect of globalization on education has called for survival measures of education the world over, and all organizations continuously strive

for sustainable development and survival with no let up. Improving the quality in elementary education has a high priority on the educational agenda of many countries. Public education, the cornerstone of our nation's economic vitality, national security, and social and political institutions must provide our children with the knowledge, skills, and habits of mind and body needed to prepare them to become active and productive.

Mathematics is one subject that pervades life at any age and in any circumstance. Thus, its value goes beyond the classroom and the school. Mathematics as a school subject must be learned comprehensively and with much depth (Capate & Lapinid, 2015).

One of the key abilities that a learner must achieve is numeracy. From their elementary years, learners were taught by their teachers the basic procedures in problem solving and how to apply it as a living skill in daily life. Being numerate entails being able to identify numbers with confidence, having counting abilities, being able to recognize numbers, being able to use simple operations and problem-solving, and being able to apply these techniques to understand complex concepts. The key to understanding and developing in Mathematics is mastering them (Pitogo and Oco, 2023).

Numeracy is one prerequisite fundamental skill learners need to study and develop at an early age to succeed in their higher levels of learning. According to Department of Education (DepEd0 Order No. 12, s. 2015, one of the predictors of a school's success is the level of a child's progress in the foundational skills, which include numeracy skills. Numeracy, the ability to understand and work with numbers, is broadly explained as the comprehensive understanding, abilities, actions, and attitudes that students must possess to effectively apply mathematical concepts in many contexts (Munda, et. al., 2024).

Mathematics literacy is a wide range of knowledge, understanding and appreciation of what Mathematics can accomplish rather than implying knowledge of various branches of Mathematics or complex mathematical formulas. Mathematics literacy is the ability to understand and apply basic knowledge of Mathematics in everyday life, which means, it entails comprehending and combining mathematical core concepts, terminologies, facts, and skills in response to the external situation's requirement of the real world.

Mathematics has a vital part in the lives of students according to Layug, et.al., (2021). It offers students job choices across many content areas of sciences, technologies, engineering and Mathematics. It helps to promote critical thinking and address student difficulties. This makes them successful in the future in various ways.

Mathematics has been one of the vital components of the educational system. Its objectives and goals are practical and useful to daily life. Thus, learners who undertake formal education are required to pass the subject to achieve higher level of understanding and application. In the elementary grades, convincing learners that they can do Mathematics and helping them enjoy it are important goals. Elementary school learners need at least on how Mathematics instruction each day.

Mathematics as a discipline requires constant practice and study to have full understanding of the subject. However, it has been considered a rational discipline of excellence and one of the most useful and fascinating discussions of human knowledge. Every individual has his own strengths and weaknesses, so it is necessary for Mathematics teachers to provide learning materials which can be used by the learners for a better learning of the subject.

A strong foundation in numeracy is vital for every child and young person since it strengthens their ability to engage in education, attain their full potential, and fully participate in society. Hence, the Department of Education (DepEd) reiterated that numeracy skills are the cornerstone of lifelong learning (DepEd Order No. 12, Series of 2015). These skills do not develop naturally, necessitating careful planning and instruction. For this matter, the management of instruction along this discipline is guided by goals that are set to be realized.

Numeracy enables the development of mathematical knowledge and skills required for integrated and active involvement in any community, as well as adaptation to expected changes. It entails recognizing and comprehending Mathematics' function in the world, as well as possessing the attitudes and capacities to use mathematical knowledge and skills effectively (Alcantara, 2022).

In this changing world, those who understand and can do Mathematics will have significantly enhanced opportunities and options for shaping their futures. Numeracy skills are becoming increasingly important in the workplace due to rapid technological advancements. It is now recognized as a critical employability skill as more workers take on more complex tasks. To do meaningful work in a global and increasingly automated economy, all require a citizenry with higher levels of numeracy.

In a society that has become technically oriented, innumeracy has replaced illiteracy as the principal education gap. Based on the results of the Program for International Student Assessment (PISA, 2018) and Trends in International Mathematics and Science Study (TIMSS, 2019), Filipino students performed poorly, ranking near the bottom of the rankings in both scientific and mathematical literacy. The results pointed to a major crisis in the country's basic education system.

The international assessment results reflect the urgency of improving the quality of basic education in the Philippines. The battle for quality basic education will be fought and won inside the classroom by the teachers. With this, the K to 12 Reform has changed the landscape of teacher quality requirements in the Philippines. It also provides the general goal of basic education. This goal is to develop 21st century learners by providing them basic competencies and numeracy, critical thinking and learning skills, and desirable values to become productive, efficient, technologically wise, socially aware, patriotic, and responsible citizens. This is why Alestre (2016) emphasized that it is important for teachers to continue to professionalize themselves and one way of doing this is through proper training.

According to Capuyan (2019), along with training as means to cope up with the needs of learners for quality education, fully competent teachers must develop strong mathematical content knowledge and be armed with mathematical pedagogical knowledge and management skills. As a result, Elementary Mathematics teachers are expected to possess sound numeracy key skills. They must display an appropriate mathematical disposition and value their professional development.

Numeracy is the knowledge, skills, behaviors and dispositions that students need in order to use Mathematics in a wide range of situations. It involves recognizing and understanding the role of Mathematics in the world and having the dispositions and capacities to use mathematical knowledge and skills purposefully. While much of the teaching of concepts and skills to support numeracy happens in the Mathematics learning area, it is strengthened as students take part in activities that connect their learning in the Mathematics classroom within the context of other curriculum areas.

Teachers who can effectively demonstrate management skills such as planning and creating an effective strategy, good communication skills, decision making, leadership skills, problem-solving skills, time management, conceptual skills, controlling, motivating, and leading, whether consciously or unconsciously, appear to be better teachers. They encourage learners' creativity and curiosity, reward perseverance, intellectual honesty, objectivity, and independent thinking (Mendoza, 2021).

Teachers' management skills strengthen their numeracy skills such as knowing and understanding, estimating, computing and solving, visualizing and modeling, representing and communicating, conjecturing, reasoning, proving, applying, and connecting. With this, mathematical difficulties can be predicted and their impact reduced through effective intervention measures such as in-service training, LAC session, coaching, and mentoring.

In view of the low performance, further studies in numeracy are urgent and imperative. In order to succeed in Mathematics, teachers and learners have to develop numeracy skills. As an advantage, they will demonstrate confidence and competence in using a number which will allow them to solve problems, analyze information and make informed decisions based on calculations.

Cognizant of the importance of Mathematics as a basic subject and alarmed by the prevailing situation as far as students' performance in this subject is concerned, the researcher proposed interventions to improve numeracy skills of Grade 8 students in Camachiles National High School, Division of Mabalacat City during the school year 2023-2024.

Statement of the Problem

This study assessed the level of performance of the Grade 8 students in Mathematics in Camachiles National High School, Division of Mabalacat City during the school year 2023-2024.

Specifically, it sought to answer the following sub-problems:

1. How is the level of performance in Mathematics of the Grade 8 students described?
2. What strategies do teachers use to develop numeracy skills of learners and to what extent are they used?
3. What interventions may be proposed to improve numeracy skills of Grade 8 learners?

METHODOLOGY

This chapter presents the research design, the sources of data, instrumentation and data collection, and the tools for data analysis in this study.

Research Design

This study assessed the level of performance in Mathematics of the Grade 8 students of Camachiles National High School, Division of Mabalacat City during the school year 2023-2024 through quantitative-descriptive research design.

Quantitative-descriptive research design was employed to determine the level of performance in Mathematics of the Grade 8 students for school year 2023-2024. It was also utilized to look into the different strategies implemented to develop numeracy skills of learners. Based on the findings, interventions were proposed to enhance the level of performance in Mathematics of the Grade 8 students.

Sources of Data

The sources of data in this study were 14 Mathematics teachers in Camachiles National High School who provided data to answer the sub-problems raised in the study with 524 Grade 8 students as subjects of the study.

Instrumentation and Data Collection

To gather the data needed in this study, the researcher used the performance in Mathematics of the Grade 8 students for school year 2023-2024 to determine their level of performance. A constructed questionnaire was employed to look into the different strategies implemented to develop numeracy skills of learners.

Upon completion of the questionnaire, it was presented to the researcher's adviser and members of the defense panel. Suggestions were incorporated to improve the instrument.

Data gathered were tabulated and interpreted through appropriate statistical tools.

Tool for Data Analysis

Weighted mean was utilized to treat the data statistically.

The formula is:

$$WM = \frac{\Sigma fx}{N}$$

Where:

WM = Weighted Mean

Σfx = the sum of the products per column

N = the number of respondents

To interpret the data, the following reference was used:

Point Values	Statistical Limits	Descriptive Equivalent (DE)
5	4.50-5.00	Full Extent (FE)
4	3.50-4.49	Great Extent (GE)
3	2.50-3.49	Moderate Extent (ME)
2	1.50-2.49	Slight Extent (SE)
1	1.00-1.49	Not At All (NAA)

RESULTS AND DISCUSSION

This chapter presents the data gathered and their analysis and interpretation to answer the sub-problems raised in the study.

Level of Performance in Mathematics of the Grade 8 Students

This section presents the level of performance in Mathematics of the Grade 8 students in Camachiles National High School, Division of Mabalacat City based on their assessment in Mathematics during the school year 2023-2024 to answer sub-problem number 1. In line with this, Table 1 presents the level of performance of the Grade 8 students based on their performance in Mathematics during the school year 2023-2024.

TABLE 1
Level of Performance in Mathematics of the Grade 8 Students

Performance Rating	*f*	%
• Numerates	158	30.15
• Nearly numerates	353	67.37
• Non-numerates	13	2.48
TOTAL	**524**	**100%**

In this study, the numeracy level referred to was the result of pre-numeracy test. It was categorized as numerates (75-100 points); nearly numerates (50-74 points); and non-numerates (0-49 points).

As shown in Table 1, out of 524 Grade 8 students, 158 or 30.15% are numerates; 353 or 67.37% are nearly numerates and 13 or 2.48% are non-numerates. Numerates are able to understand and work with numbers and other mathematical concepts and apply these to solve a variety of problems. Nearly numerates still need to understand numbers while non-numerates are unfamiliar with mathematical concepts and methods. They are unable to use mathematics.

These results revealed that many of the students are in need of intervention or programs in order to develop their skills and improve their numeracy level.

These results imply the need to develop the numeracy skills of the Grade 8 students for them to enhance their level of performance in Mathematics. A strong foundation in numeracy is vital for students since it strengthens their ability to engage in education, attain their full potential, and fully participate in society. The Department of Education (DepEd) reiterated that numeracy skills are the cornerstone of lifelong learning (DepEd Order No. 12, Series of 2015). To succeed in Mathematics, teachers and studnets have to develop numeracy skills. As an advantage, they will demonstrate confidence and competence in using a number which will allow them to solve mathematical problems, analyze information and make informed decisions based on calculations.

Strategies Used by Teachers to Develop Numeracy Skills of Grade 8 Students

This section presents the different strategies teachers used to develop numeracy skills of Grade 8 students in Camachiles National High School to answer sub-problem number 2.

Table 2 presents the data.

TABLE 2
Strategies Used by Teachers to Develop Numeracy Skills

Indicators	WM	DE
• Use of locally-made materials or objects found in the community	3.53	GE
• Exposing learners to more drills and exercises	3.87	GE
• Differentiated instruction	3.20	ME
• Using manipulatives, realia and tangible object as instructional materials	3.33	ME
• Translation	2.87	ME
• Using collaborative approach teaching	3.07	ME
• Attractive and purposeful instructional materials through ICT	3.93	GE
OVERALL WM	**3.40**	**ME**

Legend: WM=Weighted Mean

Point Values	Statistical Limits	Descriptive Equivalent (DE)
5	4.50-5.00	Full Extent (FE)
4	3.50-4.49	Great Extent (GE)
3	2.50-3.49	Moderate Extent (ME)
2	1.50-2.49	Slight Extent (SE)
1	1.00-1.49	Not At All (NAA)

As presented in Table 2, exposing learners to more drills and exercises was a strategy that teachers use to a "great extent" to develop numeracy skills of learners with weighted mean of 3.87. Whenever new Mathematics concepts are taught, teachers make sure that there will be plenty of activities or exercises where they can apply what they just learn. Learners are given quizzes, board activities, and assignments where they can apply the new concepts they learned in Mathematics. This strategy can be attributed to the behaviorist aligned techniques in which learners are given the same materials repeatedly until mastery is achieved. Teachers iterate lessons through giving similar questions or activities to answer and perform, with a certain percentage of correct responses or actions elevating the learners to the next level of difficulty. Every mathematical concept that a teacher teaches is followed up with ample drills and exercises to practice the new skills that they acquire. This habit may lead learners to mastery and ease of practice of the new skills learned.

Another strategy that teachers use is using attractive and purposeful instructional materials through Information and Communication Technology (ICT) to a "great extent" with weighted mean of 3.93. The use of gadgets may be interesting to learners to learn Mathematics. The use of laptop by teachers during lesson presentation is attractive to learners and doing so could keep the learners engaged to learning. With ICT, teachers can present video lessons downloaded from the Internet. With ICT, learning can be fun, exciting and purposeful.

Another strategy which teachers use to a "great extent" is the use of locally-made materials or objects found in the community (WM=3.53). Using locally-made materials or objects that are found in the learners' own communities can be in the form of stones, plants, fruits, vegetables, local products, and others which learners are familiar with. Starting where the learners are can help them connect what they know with what they should be learning. Reyes and Insorio (2019) stated that in order to gain interest in Mathematics and make meaning out of what children are learning, their culture needs to be embedded in Mathematics. They emphasized that materials from children's cultural background need to be used as teaching aids to make more meaning to

Mathematics concepts and ideas taught. They also highlighted that contextual meaning to abstract ideas needs to be provided in Mathematics through culturally inclusive curriculum.

Differentiated instruction (WM=3.20); using manipulatives, realia and tangible object as instructional materials (WM=3.33); translation (WM=2.87); and using collaborative approach teaching (WM=3.07) are strategies used by teachers to a "moderate extent" to develop numeracy skills of Grade 8 students.

Differentiated instruction is a pedagogical philosophy that is anchored on the belief that every learner is a unique learner, and came to school with his innate ability in which school has to discover and improve (Mendoza, 2021). Every classroom is diverse with different learners, and teachers need to understand this diversity. Teachers identify their learners in terms of their abilities. They needed first to observe them and conduct different activities that can show their talents and abilities. Their former teacher from previous years can also attest to the ability each learner possesses. From this, the present teacher can already have background knowledge about his/her learners. Tambaoan (2019) stated that differentiated instruction is a teaching approach that tailors instruction to all learners' learning needs. All the learners have the same learning goal, but the instruction varies based on learners' interests, preferences, strengths, and struggles. Instead of teaching the whole group in one way, like a lecture, a teacher uses a bunch of different methods. This can include teaching learners in small groups or in one-on-one sessions.

Another strategy to develop numeracy skills is the use of manipulatives, real and tangible objects as instructional materials. Most of the teachers structured their classrooms in such a way that they become attractive to learners. They use different materials in reality, in pictures, in models and prototypes so that learners may have a vast idea and experiences of the different learning avenues. On the other hand, teachers strived to use instructional materials that are familiar to the learners so that it would not be hard for them to relate these instructional materials to the lesson that thye would be learning.

Using collaborative approach teaching is also known as team teaching, co-teaching or cooperative teaching. Teachers belonging to one school are accustomed to collaborative approach to teaching. They shared with their colleagues any teaching insights, initiative and materials that they gathered from seminars, online resources, library, and others. They help one another in collaborative approach to teaching. They also communicate with each other to reflect on the learning progress of their learners and what they can do with slow ones. This way, they come up with uniform teaching styles whenever they thought that such strategy or initiative is appropriate to apply to their learners. Such approach can also help one another in establishing for school culture and traditions they need to contribute to the total development and learning of their learners. Learners can spend more time with the teachers and get more individual attention. With more than one teacher, it is easier to teach learners in smaller groups or one-on-one. Learners have the opportunity to learn from teachers who may have different teaching styles, ideas, perspectives, and experience.

Translation has weighted mean of 2.87. Because of the complicated use of language of the learners and the differences of their language use at home, in their communities and in school, teachers have to make themselves familiar to these languages that their learners use. This is an avenue for teachers to relate with their learners and do necessary strategies to make them learn. Teachers also resort to translation when they can sense that learners cannot understand the term. This is done so that learners can have active participation in the process of teaching and learning. Translation can be an effective communication strategy between and among learners and teachers.

Interventions to Improve Numeracy Skills of Grade 8 Students

This section presents the proposed interventions to improve numeracy skills of Grade 8 students in Camachiles National High School, Division of Mabalacat City. Teachers should continue to employ interventions to improve learners' numeracy skills.

SUMMARY

This study assessed the level of performance in Mathematics of the Grade 8 students of Camachiles National High School, Division of Mabalacat City during the school year 2023 - 2024 through quantitative-descriptive research design.

Quantitative-descriptive research design was employed to determine the level of performance in Mathematics of the Grade 8 students based on their performance during the school year 2023-2024. It was also utilized to look into the different strategies used by teachers to develop numeracy skills of learners. Based on the findings, interventions were proposed to enhance the level of performance in Mathematics of the Grade 8 students.

The sources of data in this study were 14 Mathematics teachers in Camachiles National High School who provided data to answer the sub-problems raised in the study with 524 Grade 8 students as subjects of the study.

Weighted mean was utilized in the study to treat the data statistically.

Summary of Findings:

1.0 Level of Performance in Mathematics of the Grade 8 Students

Out of 524 Grade 8 students in Camachiles National High School, 158 or 30.15% are numerates; 353 or 67.37% are nearly numerates; and 13 or 2.48% are non-numerates.

2. 0 Strategies Used by Teachers to Develop Numeracy Skills

The strategies used by teachers to develop numeracy skills of Grade 8 students are as follows:

2.1 Use of locally-made materials or objects found in the community;
2.2 Exposing learners to more drills and exercises;
2.3 Differentiated instruction;
2.4 Using manipulatives, realia and tangible object as instructional materials;
2.5 Translation;
2.6 Using collaborative approach teaching; and
2.7 Attractive and purposeful instructional materials through ICT.

3.0 Proposed Interventions to Improve Numeracy Skills

Interventions were proposed to improve numeracy skills of Grade 8 students.

CONCLUSIONS

Based on the findings of the study, the following conclusions were drawn:

1. Most the Grade 8 students are categorized as nearly numerates which indicates they still need to understand Mathematics concepts and skills.

2. Strategies used by teachers to a great extent to develop numeracy skills of students include attractive and purposeful instructional materials through ICT, exposing learners to more drills and exercises and use of locally-made materials or objects found in the community.
3. Interventions were proposed for the Grade 8 students to improve numeracy skills of Grade 8 students which include conference with parent and learners, one-on-one tutorial, redo activities with low scores, home visitation, supplementary materials and activities, less items of activities, remedial class, and referral to guidance counselors.

RECOMMENDATIONS

Based on the conclusions drawn as a result of the findings of the study, the following recommendations were offered:

1. The proposed interventions should be considered for implementation by Grade 8 students to improve numeracy skills for enhancement of their level of academic performance.
2. More innovative interventions should be encouraged to make a significant difference in the level of numeracy skills of learners.
3. Other learning activities should be developed using contextualization, translation, indigenization, and localization.
4. Relevant information, knowledge and skills be equipped to the teachers so that they may address the existing gaps and issues encountered in developing numeracy skills of learners.
5. Other researchers may conduct similar studies on a wider scope to validate the findings of the study.

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