Mathematics Proficiency Level Among the Grade Three Pupils in Cagayan de Oro City Division

Atriah Fascia H. Dy, LPT, Conniebel C. Nistal, PhD

atriahfascia.dy@deped.gov.ph

PHINMA Cagayan de Oro College, Cagayan de Oro City, 9000, Philippines

Abstract

Mathematics is an important subject taught in primary and secondary schools that equips students with foundational knowledge and skills for organizing their lives. This study determined the Mathematics proficiency level among the Grade Three pupils in Cagayan de Oro City in School Year 2022-2023. Specifically, it sought to determine the respondents' profile in terms of language used at home, study habits, parental involvement, and attitude towards Mathematics; find out the proficiency level in Mathematics; and determine the significant relationship between the respondents' proficiency level in Mathematics when grouped according to their profile. Data were gathered from one hundred fifty (150) respondents. The researcher-made questionnaire and Mathematics Test patterned from the Division of Cagayan de Oro Periodical Tests for the School Year 2022-2023 were utilized in the study. It used a descriptive research design to analyze the data using frequency, mean, standard deviation, correlation analysis, and P-value.
Findings revealed a significant relationship between respondents' proficiency level in Mathematics and their study habits, parental involvement, and attitude towards Mathematics. In contrast, no significant relationship exists between the language used at home. It is recommended that teachers incorporate literacy in teaching Mathematics, use game-based strategies, and review Mathematics lessons to increase the chances of obtaining high scores.

Keywords: language used at home; study habits; parental involvement; Mathematics Proficiency Level

1. Introduction

Mathematics is an important subject taught in primary and secondary schools that equips students with foundational knowledge and skills for organizing their lives. It is also an essential component of human intellect, logic, and any endeavor to understand the world. In addition, it is an efficient approach to developing mental discipline and promotes logical reasoning and mental rigor. Furthermore, mathematical knowledge is essential for understanding the content of other academic courses such as Science, Social Studies, Music, and art.

Thus, Mathematics is indispensable in helping children improve their logical thinking skills. Teachers must consider different elements to encourage effective mathematical learning, such as pupils' trust in Mathematics. However, capturing the essential type of confidence in Mathematics is difficult because students' overall ratings of their confidence in Mathematics or individual themes within the Mathematics curriculum may not accurately reflect their true confidence (Ciftci et al., 2019).

Unfortunately, the pandemic has aggravated the existing education crisis and increased the learning gap in Mathematics among young children. The issue has led to a deterioration in Mathematics learning since pupils may require more remediation to move to new classes, resulting in learning gaps. Several causes, have contributed to increased learning losses, which must be addressed. As a result, targeted treatments have been developed to assist pupils in overcoming academic obstacles and improving their mathematical confidence.

However, schools and teachers are taking initiatives to solve this issue, such as creating tailored education, offering additional help to struggling children, and harnessing technology to facilitate remote learning. Regardless of the hurdles, it is critical to prioritize efforts to reduce the Mathematics learning gap, ensuring that students have the necessary knowledge and understanding for their academic and future employment (Aguhayon et al., 2023).

The Philippines faced issues in Mathematics instruction, ranking last in international assessments (San Juan, 2019). According to the PISA 2018 International Report, Filipino students' average mathematical literacy score was 353 points, significantly lower than the Organization for Economic Cooperation and Development average of 489 points, signifying below Level 1 competency (OECD, 2019). It also received a Mathematics score of 297 in the 2019 Trends in International Mathematics and Science Study conducted by the International Association for the Evaluation of Educational Achievement. It is vital to address the issue of student confidence in Mathematics and devise effective solutions to improve Mathematics education in the Philippines. This allows pupils to strengthen their mathematical thinking and problem-solving skills, resulting in higher performance in Mathematics and other academic subjects (Mullis et al., 2019).

When the school year resumed in October 2020, the education department offered various remote learning options, including internet platforms, instructional TV and radio-based instruction, and printed modules. However, societal inequities and a lack of resources at home to support these techniques have significantly impacted many students and teachers. Instructors can give lessons over video conferencing platforms or Facebook Live, but 52.6% of the Philippines' 110 million live in rural areas with unreliable connectivity. This is a huge challenge, especially for those who live in the hinterlands (De Guzman, 2021).

Therefore, the current pandemic forced the country to adapt to the different learning modalities. With these factors, issues such as readiness, technology resources, and geographical situation needed to be considered for the delivery of online and modular education to be effective as this is not a simple shift from the traditional, face-to-face classroom setting to a virtual environment.

With the conditions mentioned earlier, declining Mathematics test results increased. The school explored additional interventions to bridge the gap and accomplish students' learning outcomes, particularly in Mathematics during the transition to face-to-face classrooms, by detecting learning gaps and profiling and clustering learners based on learning needs.

In City Central School, the Curriculum Management Support System (CMSS) result in the Grade Three level during the First Quarter of the School Year 2022-2023 revealed that Mathematics received the highest percentage of 20.40 % or 161 out of 789 pupils who obtained the grades ranging from 75-79. This means that one-fourth of the overall population in Grade three performed poorly in Mathematics, which is an issue of great concern.

Thus, this study aims to identify the factors that affect the respondents' poor proficiency level in Mathematics among the Grade Three pupils in City Central School, Cagayan de Oro City Division.

Background of the Study

Mathematics is an important subject taught in primary and secondary schools that equips students with foundational knowledge and skills for organizing their lives. It is also an essential component of human intellect, logic, and any endeavor to understand the world. In addition, it is an efficient approach to developing mental discipline and promotes logical reasoning and mental rigor. Furthermore, mathematical knowledge is essential for understanding the content of other academic courses such as Science, Social Studies, Music, and art.

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Unfortunately, the pandemic has aggravated the existing education crisis and increased the learning gap in Mathematics among young children. The issue has led to a deterioration in Mathematics learning since pupils may require more remediation to move to new classes, resulting in learning gaps. Several causes, have contributed to increased learning losses, which must be addressed. As a result, targeted treatments have been developed to assist pupils in overcoming academic obstacles and improving their mathematical confidence.

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Thus, this study aims to identify the factors that affect the respondents' poor proficiency level in Mathematics among the Grade Three pupils in City Central School, Cagayan de Oro City Division.

Statement of the Problem

The purpose of this study is to evaluate the learner's proficiency level in Mathematics of Grade Three learners at City Central School, Division of Cagayan de Oro City, during the School Year 2022-2023. Specifically, it sought to answer the following questions:

1. What is the profile of the respondents in terms of language used at home, study habits, parental involvement, and attitude toward Mathematics?
2. What is the respondent's proficiency level in Mathematics during the achievement test of the School Year 2022-2023?
3. Is there a significant relationship in the respondent's proficiency level in Mathematics when grouped according to the language used at home, study habits, parental involvement, and attitude towards Mathematics?

Scope and Limitations

Respondents' proficiency level in Mathematics of the Grade Three pupils is the main emphasis of this study. The study was conducted at City Central School during the School Year 2022–2023. One hundred fifty (150) pupils were involved in this study as respondents.

The two least mastered competencies in each quarter were selected from the Most Essential Learning Competencies (MELC) in Mathematics under the curriculum guide of DepEd. This includes rounding off numbers to the nearest tens, hundreds, and thousands; solving two-step word problems involving addition and subtraction; multiplying 2-digit numbers by 2-digit numbers with regrouping; dividing 2-3-digit numbers with and without remainder; comparing dissimilar fractions; arranging dissimilar fractions; converts time measurement; and solving routine and non-routine problems involving area.

Only the respondents' language used at home, study habits, parents' follow-up, and attitude toward Mathematics were included in the demographic profiles.

Significance of the Study

The study's findings would be useful in contributing to the awareness and understanding of the respondents' proficiency level in Mathematics. The results of this study would be beneficial to the following sectors and groups of individuals.

Essential comments on the result of the respondents' achievement test in Mathematics would be given to DepEd authorities to offer the assistance needed to develop and expand the program. The school administrators would benefit from suggestions on how they may help the respondents' proficiency level in Mathematics in an efficient manner. This would be the foundation for organizing, creating, and improving the Mathematics subject.

Teachers in Grade Three would then shed light on interventions and activities to help improve the respondents' proficiency level in Mathematics. In addition, this study's findings would give parents and guardians a foundational understanding of how to help their children in the most effective manner and inspire learning interests in them in relation to the implementation.

In this study, the result may directly benefit the Grade Three pupils. Basic Mathematics skills are necessary for everyday life, and proficiency in the subject is linked to future academic and financial success. It also creates active participation because pupils understand what is being discussed, promoting lifelong learning.

Lastly, the result of this study would serve as a springboard for future researchers to conduct further studies considering other relevant variables.

2. Methods

Research Design

This study used a descriptive research design. It examined the respondents' profiles and their proficiency level in Mathematics for School Year 2022-2023. A descriptive research design is useful for collecting data on a specific group or topic. This form of research paints a thorough and precise representation of the traits and behaviors of a specific community or subject. By observing and collecting data on a given topic, descriptive research helps the researchers gain a deeper understanding of a detailed issue and provides valuable insights that can inform future studies (Sirisilla, 2023).

The researcher utilized a survey questionnaire and a Mathematics Proficiency Test in this study. It is a researcher-made, patterned after the Division of Cagayan de Oro Periodical Test in School Year 2022-2023. The one hundred fifty (150) Grade Three pupils of City Central School served as the respondents of the study where the Mathematics Proficiency 40-item Test was administered. The test covered the two least mastered competencies in each quarter (1st to 4th Quarter) in Mathematics from the Sub-task MELC in the DepEd Curriculum, namely: rounding off numbers to the nearest tens, hundreds, and thousands; solving two-step word problems involving addition and subtraction; multiplying 2-digit numbers by 2-digit numbers with regrouping; dividing 2-3digit numbers with and without remainder; comparing dissimilar fractions; arranging dissimilar fractions; converting time measurement; and solving routine and non-routine problems involving area.

Study Setting

This study was conducted in Cagayan de Oro (CDO), officially the City of Cagayan de Oro, a 1st class, highly urbanized city in the region of Northern Mindanao, Philippines. It is the capital of the province of Misamis Oriental, where it is geographically situated but governed administratively independent from the provincial government. According to the 2020 census, it has a population of 728,402 people. Cagayan de Oro is located along the north-central coast of Mindanao island facing Macajalar Bay and is bordered by the municipalities of Opol to the west, Tagoloan to the east, and the provinces of Bukidnon and Lanao del Norte to the south of the city. Cagayan de Oro is also famous for its white water rafting or kayaking adventures, one of the tourism activities being promoted along the Cagayan de Oro River.

Research Respondents

The study involved one hundred fifty (150) Grade Three pupils of City Central School, Division of Cagayan de Oro City, for the School Year 2022-2023. The table below shows the distribution of respondents by section.

Sampling Technique

The researcher used Slovin's formula to get the sample size of one hundred fifty (150) respondents, which is necessary to achieve a certain confidence interval in the sampling procedure.

In the study, the simple random sampling technique was applied. It is a randomly selected subset of a population. In this sampling method, each member of the population has an exactly equal chance of being selected (Thomas, 2020). The researcher chose a simple random sampling to make generalizations from the Grade Three pupils from City Central School, Division of Cagayan de Oro City.

Research Instrument

The researcher utilized a survey questionnaire and a Mathematics Proficiency Test in this study. It is a researcher-made, patterned after the Division of Cagayan de Oro Periodical Test in 2022-2023.

The questionnaire has two parts:

Part I, which is the independent variable, is the learner's profile consisting of questions about the respondents' language used at home, study habits, parental involvement, and attitudes toward Mathematics.

The second part of the questionnaire, which is the dependent variable, deals with the Proficiency Test in Mathematics consisting of least mastered competencies in Mathematics, namely rounding off numbers to the nearest tens, hundreds, and thousands; solving two-step word problems involving addition and subtraction; multiplying 2-digit number by 2-digit numbers with regrouping; dividing 2-3digit numbers with and without remainder; comparing dissimilar fractions; arranging dissimilar fractions; converting time measurement; and solve routine and non-routine problems involving area.

The 40-item Mathematics Proficiency Test was administered to the respondents of the study. The test covered the two least mastered competencies in each quarter (1st to 4th Quarter) in Mathematics from the Sub-tasked of MELCs in the K to 12 program of DepEd Curriculum guide.

Data Gathering Procedure

The letter-request to conduct a study was given from the Graduate School of COC-PHINMA and is addressed to the Division Schools Superintendent and to the School Principal. After these were approved, the researcher requested and made a local arrangement from the advisers of the Grade Three pupils to hold the Mathematics Proficiency Test Pilot Testing with the presence of the researcher as approved by the Grade Three monitoring principal.

After it was granted, a letter of request to the respondents, attached to the survey questionnaire, was distributed, asking for their cooperation regarding the study. The researcher assisted the pupils in accomplishing the survey questions. The researcher read every item and explained them thoroughly. Queries from the pupils regarding the survey were also addressed properly. The questionnaire was distributed and explained to the respondents. The pupils answered all of the 40-item Tests in a multiple-choice set of questions without any assistance from the teacher-researcher. All sets of questions were patterned after the Periodical Test in each quarter for the School Year 2022-2023. The test covered the two most difficult topics/lessons in each quarter (1st to 4th Quarter) in Mathematics from the sub-tasked of MELCs in the K to 12 program of DepEd Curriculum Guide.

The researcher consistently followed up with the respondents who were absent during the survey question and Mathematics proficiency test. Test papers with unanswered items were returned to pupils on the same day it was administered so they could finish answering the test completely. Right after, test papers were gathered and personally checked and recorded by the researcher.

Statistical Treatment of Data

This study made use of the following statistical treatment and interpreted the results that were gathered from the respondents.

Descriptive statistics such as mean, standard deviation, frequency and percentage were used to describe the profile of the respondents in terms of language used at home, study habits, parents' involvement, and attitude of pupils towards Mathematics to determine the significant relationship in respondents' proficiency level in Mathematics when grouped according to their profile, P-value and correlation coefficient were utilized.

3. Results and Discussion

This section presents the results, discussions, conclusions, and recommendations to form the critical components of a comprehensive research or academic document. Furthermore, it provides an opportunity to interpret and analyze the findings, exploring their implications and significance in the context of existing literature. It synthesizes the key takeaways and summarizes the overall implications of the study. This offers practical suggestions for future research or applications based on the insights gained, contributing to the broader advancement of knowledge in the field. Together, sections provide a comprehensive framework for presenting, interpreting, and applying the outcomes of a research endeavor.

Results

Problem 1. What is the profile of the respondents in terms of language used at home, study habits, parental involvement, and attitude toward Mathematics?

Table 1
Distribution of the Respondents' According to Language Used at Home

Language Used at Home	Frequency *(n = 150)*	Percentage (%)
Binisaya / Cebuano	131	87.3
Maranao	6	4.0
Boholano	0	0
Tagalog	4	2.7
English	9	6.0
	Total 150	**100**

Table 1 shows the profile of the respondents in terms of their language used at home. Data revealed that the highest frequency, 131 (87.3%), is among Bisaya/Cebuano speaking pupils. The lowest frequency is Tagalog with only 2.7%. This means that the majority of the respondents grew up in Cagayan de Oro City, where the common language used is Visayan or Sinugbuanong Binisaya. According to the Philippine Statistics Authority report, one-fourth of the Mindanawans were Cebuanos. Around 25.8 percent of the household population in Mindanao classified themselves as Cebuanos. None of the pupils come from Bohol and use this language at home or as their native language.

Table 2
Distribution of the Respondents' Study Habits

Indicators	Mean	SD	Description
I see to it that my homework in Mathematics is prepared before I come to class.	3.22	0.86	Most of the Time
I make a follow-up study of my lessons in Mathematics.	2.97	0.81	Most of the Time
I proactively study Mathematics without being told at home.	2.66	1.02	Most of the Time
I study my lessons in Mathematics even if I am absent from the class.	2.63	0.90	Most of the Time
I do my assignments in Mathematics first before doing any other things.	3.02	0.90	Most of the Time
I practice solving difficult Mathematics lesson/topic.	2.78	0.87	Most of the Time
I feel good when I independently solve Mathematics problem.	2.93	0.90	Most of the Time
I study Mathematics for about 50 minutes and then take a break before starting again.	2.61	0.90	Most of the Time
I like to study Mathematics with my friends/classmates, test one another, and compare notes.	2.85	1.00	Most of the Time
I study Mathematics with focus and concentration.	3.00	0.90	Most of the Time
Overall	**2.87**	**0.55**	**Most of the Time**

Legend: 3.26-4.00 At All Times/Very High; 2.51-3.25 Most of the Time/High; 1.76-2.50 Sometimes/Low; 1.00-1.75 Never/Very Low

Table 2 shows the profile of the participants in terms of their study habits. The result shows an overall mean of 2.87, which is described as Most of the Time and interpreted as High. This means that most of the participants are used to having a regular routine of studying their lessons in Mathematics. In other words, Mathematics routines are vital because they regulate time and interactions, inform students about what to expect in terms of participation, promote classroom administration and organization, and foster constructive classroom connections for teaching and learning.

Table 3
Distribution of the Respondents' Parental Involvement

Indicators	Mean	SD	Description
My parents ask me about our daily activities in Mathematics.	3.15	0.97	Most of the Time
My parents meet my teacher and follow-up my performance in school particularly in Mathematics.	2.86	0.90	Most of the Time
My parents guide and assist me in making my assignments and projects in Mathematics.	3.05	0.93	Most of the Time
My parents participate/attend in every school activity.	2.83	1.01	Most of the Time
My parents encourage me to do my best in Mathematics.	3.19	0.84	Most of the Time
My parents check my Mathematics notebook regularly.	2.65	1.00	Most of the Time
My parents are always available whenever I need assistance with challenging Mathematics concepts.	2.84	0.93	Most of the Time
My parents provide me with materials and any other resources such as workbook that could help me improve my Mathematics skills.	2.70	1.01	Most of the Time
My parents allow me to join Mathematics enhancement activities.	2.73	0.95	Most of the Time
Everyday, my parents give me enough time to sit next to me and study Mathematics.	2.88	1.02	Most of the Time
Overall	**2.88**	**0.50**	**Most of the Time**

Legend: 3.26-4.00 At All Times/Very High; 2.51-3.25 Most of the Time/High; 1.76-2.50 Sometimes/Low; 1.00-1.75 Never/Very Low

Table 3 shows the respondents in terms of parental involvement. Data shows the overall mean of 2.88 (SD=0.50), described as Most of the Time. This means that most of the parents are involved in their child's activity in school. This implies that parents are giving full attention to their child's academic performance in school. Parental involvement stimulates children to learn, which leads to better grades. Positive Action (2023) cited that the amount of participation is critical for significantly impacting the student's performance. The higher the level of parental participation, the greater the impact on the child's academic accomplishment.

Table 4
Distribution of the Respondents' Attitude Toward Mathematics

Indicators	Mean	SD	Description
I enjoyed reading Mathematics related books.	2.83	0.93	Most of the Time
What I learned in Mathematics has helped me understand the things happening around me.	3.24	0.93	Most of the Time
Mathematics subject allows me to think creatively and critically.	2.94	0.78	Most of the Time
Mathematics is one of the most interesting subjects in school.	3.25	2.52	Most of the Time
Mathematics is my favorite subject.	2.80	1.02	Most of the Time
I always read Mathematics books even if there is no exam.	2.35	0.90	Most of the Time
When it is Mathematics time, I don't let my friends or classmates distract me.	3.07	0.97	Most of the Time
I make an effort to read other materials to learn more about the topics/lessons taught in Mathematics.	2.73	0.86	Most of the Time
I read my class work in Mathematics during holiday period.	2.50	0.98	Most of the Time
In Mathematics, if I copy my notes incorrectly, I strive to fix it as soon as possible after class.	2.68	1.03	Most of the Time
Overall	**2.84**	**0.56**	**Most of the Time**

Legend: 3.26-4.00 At All Times/Very High; 2.51-3.25 Most of the Time/High; 1.76-2.50 Sometimes/Low; 1.00-1.75 Never/Very Low

Table 4 shows the respondents in terms of the level of attitude towards Mathematics with an overall mean of 2.844 (SD=.5632), described as Most of the Time. This means that they have shown considerable emotions toward the subject of Mathematics. Whakatane et al. (2022) found that the students' good attitudes toward Mathematics lead to improved performance and may have an impact on their overall achievement and application of maths in everyday life.

Problem 2. What is the proficiency level in Mathematics of the respondents based on the achievement test?

Table 5

Summary of Respondents' Level of Proficiency in Mathematics

QUARTER	COMPETENCY	Advance 5	Proficient 4	Developing 2-3	Beginning 0-1	MEAN	SD	Description
1ST QUARTER	•Rounding off numbers to the nearest tens, hundreds, and thousands	6	28	74	42	2.387	1.2890	Developing
	• Solve two-step word problems involving addition and subtraction	3	23	83	41	2.313	1.2432	Developing
2nd QUARTER	• Multiply 2-digit number by 2-digit numbers with regrouping	1	21	77	51	2.087	1.2312	Developing
	• Divide 2-3digit numbers with and without	0	18	87	45	2.087	1.1640	Developing

	remainder							
3rd QUARTER	• Compares dissimilar fractions	0	25	83	42	2.187	1.1256	Developing
	• Arranging dissimilar fractions	1	24	92	33	2.420	1.0380	Developing
4th QUARTER	• Converts time measurement	15	22	81	32	2.640	1.2811	Developing
	• Solve routine and non-routine problems involving area	15	26	59	50	2.407	1.4613	Developing
	Overall Mean: 18.66 **Description:** Developing					**SD**: 7.394		

Legend: *5-Advance*; 4-Proficient; 2-3-Developing; 0-1-Beginning

Table 5 shows the respondents' level of proficiency in Mathematics in test given to them. It can be gleaned from the table that the pupils' performance as indicated in the mean of 18.660 (SD=7.394) described as Developing. This means that most of the pupils need to improve their performance in Mathematics. Although, there were 43.3% of the pupils described as proficient, the overall performance is still low. This poor performance of the pupils may have been attributed to the level of difficulty in Mathematics Proficiency Test considering that the test conducted on them is the least mastered competency and is labeled as the most difficult topic in Mathematics 3.

Problem 3. Is there a significant relationship in the respondent's proficiency level in Mathematics when grouped according to the language used at home, study habits, parental involvement, and attitude towards Mathematics?

Table 6
Correlation Analysis Between Learners' Characteristics and Mathematics Proficiency

Variables	Correlation Coefficient	P-value	Interpretation
Language Used at Home	-.010	.903	Not Significant
Study Habit	.251**	.002	Significant
Parental Involvement	.324**	.000	Significant
Attitude Towards Mathematics	.306**	.000	Significant

Table 6 shows the correlation analysis of the respondents' profile and Mathematics proficiency. Data shows that there is no significant relationship between the language used at home and the pupils' proficiency level in Mathematics, as revealed by their P-value of .903; therefore, Ho is accepted. This means that no significant relationship existed between the proficiency levels of the respondents. In other words, pupils perform almost the same way regardless of the language used at home.

Discussion

Carey and Jacobson (2020) opined that language and symbolic representations are interconnected in understanding math problems. Using a language that pupils are familiar with helps to enhance and improve the learning experience.

On the other hand, a significant relationship exists between pupils' study habits, parental involvement, and attitude towards Mathematics and pupils' Math proficiency level. From this perspective, study habits, parental involvement, and attitude towards Mathematics are great factors in pupils' achievement in Mathematics. It contributes significantly to school effectiveness and to students' success. Especially parental involvement has been one of the most significant indicators of school effectiveness.

The pupils' Mathematics Proficiency Test was described as Developing. This poor performance of the pupils may have been attributed to the level of difficulty in the Mathematics Proficiency Test, considering that the test conducted on them is the least mastered competency and is labeled as the most difficult topic in Mathematics.

4. Conclusion

Based on the results and discussions presented, it can be inferred that most of the pupils need to improve their performance in Mathematics. Although almost half of the pupils were described as proficient, the overall performance is still low.

There is no significant relationship between the language used at home and the pupils' Mathematics proficiency level. On the other hand, there is a significant relationship between study habits, parental involvement, and attitude towards Mathematics and pupils' proficiency level.

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