



FACTORS RELATED TO THE POOR NUMERACY LEVEL IN MATHEMATICAL FUNDAMENTAL OPERATIONS AMONG GRADE 7 STUDENTS

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ABSTRACT

This study investigates the factors that contribute to the low numeracy level in mathematical fundamental operations, such as addition, subtraction, multiplication, and division, among Grade 7 students. The research used a descriptive research design to assess the identified factors in terms of student-related factors, environmental factors, and home and family-related factors and their impact on students' numeracy skills and teachers-related factors in terms of teaching methods, teacher competency, and instructional materials. A total of 225 Grade 7 students were selected from Can-avid National High School as respondents. Data were gathered through the use of a structured survey questionnaire and analyzed using descriptive statistics, such as frequency counts, means, and percentages. Results indicated that most of the respondents showed below-average performance with regard to fundamental mathematical operations. Lack of motivation and prior knowledge, among other student-related factors, coupled with poor attendance, were the major causes of low numeracy levels. Environmental factors, such as the home environment, socio-economic status, and lack of access to learning resources, added to the students' plight. The teacher-related factors included the use of traditional teaching methods and inadequate instructional materials, which negatively affected the performance of the students.

KEY WORDS: Numeracy skills, mathematical operations, Grade 7 students

INTRODUCTION

Background of the Study

The development of analytical reasoning, problem-solving techniques, and critical thinking all depend on the fundamental subject of mathematics. But numeracy—especially in basic arithmetic operations—remains a major obstacle for children everywhere, including in the Philippines. The capacity to comprehend and manipulate numbers, known as numeracy, is essential for pupils' performance in the classroom and in daily life (OECD, 2020). Although important, the problem of low numeracy in Grade 7 students will have serious implications on the student's future academic and professional careers.

There has been an issue regarding the abilities of children to perform mathematical operations at a global level. From data on the Programme for International Student Assessment 2018, more than 60% of students aged 15 in the participating countries did not attain the level of mathematical aptitude (OECD, 2019). This research focuses on a common issue that usually

presents itself: it has been a challenge to comprehend the concepts of addition, subtraction, multiplication, and division among other basic ideas in mathematics and operations. Many children fail to achieve these basic skills, although they are very important for the understanding of more complex mathematical concepts. Such a tendency is caused by a number of factors, such as poor teaching strategies, socioeconomic inequality, and restricted access to high-quality educational resources (UNESCO, 2021).

Recent studies suggest that pupils' numeracy levels are highly affected by socioeconomic conditions, language difficulties, and cultural attitudes toward mathematics. For instance, Chinn S. (2020) found that students of low socioeconomic background usually perform low in mathematics because they are not exposed to much help and resources at home or even in school. Another important aspect is language proficiency; those students who are not fluent in the language of instruction often find



it hard to understand mathematical concepts, which adversely affects their numeracy scores (Domingo et. al, 2019).

The problem of under-numeracy among Filipino seventh-grade children is at its worst. The report from the Enhanced Basic Education Act of 2013 and the Philippine Informal Reading Inventory (Phil-IRI) shows that for the last few years, Filipino pupils have shown their poor reading and numeracy competencies (Department of Education, 2019). According to the Department of Education (2019), a significant percentage of the seventh-grade students did not perform above the passing score in mathematics, especially in arithmetic operations, as indicated by the 2019 National Achievement Test (NAT).

More evidence of the numeracy challenges is reflected in the scores of the Philippines from the international assessments. The Philippines ranked last of 58 countries in the 2019 Trends in International Mathematics and Science Study (TIMSS) for Grade 4 mathematics, which implies that the students in the Philippines experience a lot of challenges from the beginning stages with regards to mathematical operations that linger in their later grade levels (Escarez et.al, 2022). These include an outdated curriculum that cannot address the needs of a multi-cultural group of learners appropriately, outmoded teaching methodologies, and insufficient teacher training (Daker et.al, 2021).

Sociocultural factors that aggravate the problem are a majority of bilingual classrooms, parental perceptions about education, and economic struggles. In a study conducted by Kunwar et.al (2020), there seems to be a large association between the socioeconomic background of pupils and mathematical fluency in the Philippines. Low achievement in arithmetic usually results from pupils who hail from poor backgrounds not enjoying extracurricular activities, the internet, or remedial education.

Many factors directly impact students' numeracy skills in the classroom. These include student involvement, classroom environment, teaching methodologies, and teacher effectiveness. Studies have shown that using effective pedagogical methods, such as differentiated instruction and manipulatives, can dramatically enhance students' understanding of mathematics concepts (Chinn, 2020). A number of issues, however, hampers effective mathematics education in many classrooms, especially in public schools in the Philippines, including overcrowding, poor learning resources, and inadequate teacher preparation (Fernandez & Robles, 2019).

Teacher competency is another essential aspect. According to Navarro and Ogena (2021), a large number of math teachers in the Philippines are not adequately trained in pedagogical skills and subject matter content, which negatively affects their capacity to successfully teach difficult mathematical topics. Due to a lack of preparation for teachers, the most common traditional teaching methods applied are rote memorization and procedural learning, which have been proven through research to be less effective in aiding students to develop their conceptual understanding and problem-solving skills (Boaler, 2016).

Despite a lot of research, gaps still exist in our knowledge of numeracy and mathematical competency, especially regarding the special causes of low numeracy scores among Filipino kids in Grade 7. Most of the previous studies focus on mathematical literacy or achievement in general, often neglecting the special challenges related to basic operations-the four basic arithmetic operations-at the Grade 7 level. Further, the interaction between social-economic, cultural, and classroom-specific factors in relation to Filipino education has gained less attention in study.

Research on the underlying cause of low numeracy is so badly needed, especially on the transitional grade of 7, where basic ability will be a must in achieving success in later academics. In order to bridge those gaps, this research seeks to explore the factors causing pupils in Grade 7 having low numeracy levels when it comes to basic mathematical operation. Understanding these factors would allow for targeted interventions and adjustments in policies to better instruction in mathematics and strengthen pupils' numeracy skills that benefit them in terms of increasing their chances of higher school achievement and opportunities for Filipino young people.

Objectives of the Study

The study aims to investigate the "Factors Related to the Poor Numeracy Level in Mathematical Fundamental Operations Among Grade 7 Students."

Specifically, the study seeks to answer the following questions:

1. What is the current level of numeracy skills in mathematical fundamental operations (addition, subtraction, multiplication, and division) among Grade 7 students?
2. What factors contribute to the poor numeracy level in mathematical fundamental operations among Grade 7 students in terms of:
 - 2.1. Student-related factors (e.g., motivation, prior knowledge, and attendance);
 - 2.2. Environmental factors (e.g., home environment, socio-economic status, and access to resources);
 - 2.3. Teacher-related factors (e.g., teaching methods, teacher competency, and instructional materials); and
 - 2.4 Family/Parents-related factors?
3. What are the factors that affect the teacher's competency in teaching Mathematical fundamental operations to the Grade 7 students in terms of:
 - 3.1 teaching methods;
 - 3.2 teacher competency;
 - 3.3 Instructional materials?

METHODOLOGY

Research Design

This study employed a descriptive research design using a survey questionnaire as the primary data collection tool. The descriptive design is appropriate for this study as it aims to identify and describe the factors both students and teachers that influences the numeracy skills in mathematical operations of fractions among Grade 7 students at Can-avid National High School.

As Kombo and Tromp (2006) suggest, descriptive research seeks to provide a detailed understanding of the subject under



investigation—in this case, the factors influencing the numeracy skills of Grade 7 students in mathematical operations. A descriptive survey design involves gathering data from a specific group to assess their characteristics, attitudes, and opinions. This study collected data through a structured questionnaire administered to a sample of Grade 7 students and as well as their Math teachers.

Locale of the Study

The study was conducted at Can-avid National High School, located in Can-avid, Eastern Samar, Philippines. This locale was chosen as it represents a typical rural educational setting where Grade 7 students face challenges in mastering numeracy skills in mathematical operations, specifically in fractions. The school's environment and its student population provide a relevant context for exploring the factors influencing numeracy skills among Grade 7 learners.

Respondents of the Study

The respondents of this study were the 225 Grade 7 students and of Can-avid National High School, located in Can-avid, Eastern Samar, Philippines. These students were selected because they are the primary focus of the study, which aims to investigate the factors influencing their numeracy skills in mathematical operations, specifically involving fractions. The selection of Grade 7 students provides insight into the challenges and factors that affect their mastery of numeracy skills in a rural educational context.

Research Instruments

For this study, the researcher utilized an adapted survey questionnaire from the research study titled “Factors Affecting Numeracy Skills” by Jerlyn Jean Latiban and Mary Lovely Suzzeth P. Mendez, published in 2022. The instrument used a 5-point Likert scale to collect data addressing the research questions outlined in Statements of the Problem 1, 2 and 3. The questionnaire comprised three parts:

Part I focuses on gathering data from the learners' SF10 (Permanent Record) and Report Card, specifically examining their weighted average in the Mathematics Learning Area to gauge their overall performance in mathematics.

Part II focused on the factors influencing the numeracy skills in the mathematical operations of fractions among Grade 7 students at Can-avid National High School. This section aimed to identify student-related, environmental, and teacher-related factors impacting numeracy skills.

Part III consisted of a survey questionnaire designed to identify the factors that influence teachers' performance in teaching Mathematical Fundamental operations involving fractions.

Before administration, the survey and test questionnaires underwent a validation process by school heads and master teachers to ensure reliability and accuracy. Additionally, the instruments were pilot tested in a selected school to further establish their effectiveness.

Validity is defined as the extent to which an instrument measures what it is intended to measure (Kombo & Tromp, 2006). To ensure the validity of the study's content, careful measures were taken to confirm that the questionnaire accurately captured the factors and mastery levels it was designed to assess. Content validity was further established to ensure the questions effectively addressed the research objectives.

Data Gathering

After the research proposal was thoroughly evaluated and approved by the academic panel, the researcher obtained the necessary permissions to conduct the study. Permission letters, cover letters, and informed consent documents were prepared and sent to the Schools Division Superintendent, Supervisors, and School Head of Can-avid National High School, Eastern Samar. These documents were essential to secure authorization to administer the survey and test questionnaires and to access pertinent student records required for the study.

Upon receiving the necessary approvals, the researcher personally distributed the survey questionnaires to the Grade 7 students at Can-avid National High School. Parental consent was obtained prior to involving the students in the study to ensure ethical compliance and to respect the rights of the participants. The students along with teachers were then asked to complete the questionnaires honestly and thoroughly.

Once all the questionnaires were collected, the researcher immediately began the process of tabulating the raw data. The data was systematically organized and prepared for analysis using appropriate statistical tools to draw meaningful conclusions and interpretations relevant to the study's objectives.

Analysis of Data

In this study, descriptive statistics were utilized to analyze the data, employing univariate analysis techniques such as computing frequencies, means, and percentages to address Statements of the Problem 1, 2 and 3. These descriptive statistics provided a clear overview of the factors influencing numeracy skills and the mastery levels of mathematical operations involving fractions among Grade 7 students at Can-avid National High School.

The level of significance for this study was set at 0.05, ensuring a 95% confidence level in rejecting or accepting the null hypotheses. This significance level was chosen to minimize the risk of Type I errors while providing robust insights into the relationships between the study variables.

Ethical Considerations

During the conduct of this study, several ethical issues and concerns were carefully considered to ensure the study was conducted with integrity, confidentiality, and respect for all participants. The researcher adhered to strict ethical standards and protocols, particularly in the areas of data collection and management, including but not limited to the following:



Voluntary Participation. Prior to collecting data from the selected respondents, the researcher fully explained the purpose and aims of the study, emphasizing its contribution to the academic body of knowledge. Participation was entirely voluntary, and the decisions of the respondents were respected and valued without any coercion.

Privacy and Confidentiality. All information gathered from the respondents was kept private and treated with the utmost confidentiality. The data were used solely for the purposes of this study, and all personal identifiers were removed to protect the anonymity of the participants.

Benefits. The findings of the study are intended to benefit the Department of Education Schools Division of Eastern Samar by providing relevant insights and recommendations to improve numeracy skills among Grade 7 students.

Plagiarism. The study adhered to strict academic integrity standards. It did not contain any instances of plagiarism, as all sources were appropriately cited. The research underwent a plagiarism check using Turnitin software to ensure originality and avoid any misappropriation of others' work.

Fabrication. The study maintained high standards of honesty and integrity, with no evidence of fabrication or falsification of data. The results presented are an accurate representation of the findings without any manipulation to fit a preconceived model or theoretical expectation.

Conflict of Interest (COI). There was no conflict of interest in the conduct of this study. The researcher had no personal or financial interests that could have influenced the study's outcomes or compromised the welfare of the participants.

Deceit. The study was conducted transparently, with no intent to deceive or mislead respondents about any aspect of the research. All potential risks and benefits were clearly communicated to participants.

Authorship. The researcher, a candidate for the Doctor of Philosophy in Educational Management and a Licensed Professional Teacher, conducted the study following the standards set by the Eastern Samar State University Ethics and Review Committee. The study underwent several revisions as advised and recommended by the research adviser to ensure compliance with ethical guidelines.

These ethical considerations were crucial in ensuring the study's validity, reliability, and credibility while safeguarding the rights and welfare of all participants.

RESULTS

Mastery Level of Numeracy Skills

Table 1 provides a distribution of respondents based on their mastery level of numeracy skills. The categories range from "Outstanding" to "Did Not Meet Expectations."

Table 1. Distribution of respondents in terms of mastery level of numeracy skills

Performances	Frequency N=242	Percentage
Outstanding	6	2.4
Very Satisfactory	27	11.1
Satisfactory	25	10.3
Fairly Satisfactory	105	43.4
Did Not Meet Expectations	73	30.2
Total	242	100

Only 2.4% of the respondents achieved an "Outstanding" level of numeracy skills. These individuals demonstrated exceptional proficiency and mastery in mathematical operations involving fractions. Around 11.1% of the respondents achieved a "Very Satisfactory" level of numeracy skills. These students have demonstrated a high level of competence in mathematical operations with fractions. The majority of respondents, comprising 43.4%, achieved a "Fairly Satisfactory" level of numeracy skills. Overall, the distribution of respondents'

mastery levels of numeracy skills highlights variations in performance levels. While a small percentage achieved outstanding or very satisfactory levels, a substantial portion demonstrated satisfactory to fairly satisfactory performance.

Student-Related Factors

Student-related factors, including motivation, prior knowledge, and attendance, were measured using a survey. Table 2 presents the mean scores of these factors as reported by the students.

Table 2: Mean Scores of Student-Related Factors Influencing Numeracy Skills

Student-Related Factor	Mean Score	Interpretation
Motivation	2.45	Seldom/Low
Prior Knowledge	2.61	Seldom/Low
Attendance	2.21	Occasional/ Poor

As shown in Table 2, the mean score for motivation is 2.45, indicating that students have low motivation toward learning

math. Prior knowledge, which refers to students' mastery of foundational concepts from earlier grade levels, was rated at a



moderate level (mean = 2.61). Attendance, a key factor affecting learning outcomes, was rated poor (mean = 2.21). The low motivation and poor attendance levels reflect findings by Schiefele *et al.* (2022), who emphasized the importance of intrinsic motivation and consistent school attendance in promoting academic success, especially in mathematics.

Environmental Factors

Environmental factors, such as home environment, socio-economic status, and access to resources, were also examined. Table 3 summarizes the findings.

Table 3: Environmental Factors Affecting Numeracy Skills

Environmental Factor	Mean Score	Interpretation
Home Environment	2.85	Seldom/Moderate
Socio-Economic Status	2.40	Occasional/Low
Access to Learning Resources	2.10	Occasional/Very Low

The results in Table 3 indicate that socio-economic status (mean = 2.40) and access to learning resources (mean = 2.10) are significant barriers to students' numeracy performance. Students from low socio-economic backgrounds often lack access to supplementary educational materials and technology that could support their learning

. These findings are supported by Jensen (2013), who argued that socio-economic disadvantages create learning gaps, especially in subjects like math, where extra practice and resources are critical for mastery.

Table 4: Family/Parents Factors Affecting Numeracy Skills

Environmental Factor	Mean Score	Interpretation
Parental Education Level	3.25	Seldom/Moderate High
Parental Expectations and Motivation	3.10	Occasional/Moderate

Parental Education Level (Mean = 3.25): This result suggests that the level of education of the parents is moderately high, as indicated by the mean score of 3.25. The interpretation "Seldom/Moderate High" shows that many parents have attained a sufficient level of education, and their education positively affects their children's numeracy skills. Parents with higher education tend to engage more effectively in their children's learning, often assisting with homework or providing educational resources.

Studies have shown that parental education is a significant predictor of children's academic performance. Research by Jeynes (2007) found that higher parental education levels are linked to better academic achievement in children. This is consistent with the findings in this study, where a moderately high parental education level positively correlates with numeracy skills in students. Parents with a higher level of education are more likely to engage in their children's academic life and provide necessary support.

Parental Expectations and Motivation (Mean = 3.10): The mean score of 3.10 suggests that parental expectations and motivation are moderate, meaning that parents show some degree of involvement in motivating their children to excel in academics, particularly in numeracy skills. However, it also indicates that the level of motivation and expectations varies among parents, and some might not always provide consistent support in this area.

Similarly, Desforges & Abouchaar (2003) also found that parents' educational background positively influenced children's academic outcomes, including skills in mathematics.

Factors Influencing Teachers' Performance

Teacher-Related Factors

Teacher-related factors, including teaching methods, teacher competency, and instructional materials, were measured. Table 4 presents the results.

Table 5: Teacher-Related Factors Influencing Numeracy Skills

Teacher-Related Factor	Mean Score	Interpretation
Teaching Methods	2.30	Occasional/Ineffective
Teacher Competency	3.15	Seldom/Satisfactory
Instructional Materials	2.05	Occasional/Very Insufficient

Table 5 shows that while teacher competency is rated as satisfactory (mean = 3.15), teaching methods (mean = 2.30) and the use of instructional materials (mean = 2.05) are rated low. These results suggest that the traditional teaching methods being used in math classes are not engaging students effectively, and the lack of updated instructional materials is hindering their understanding of mathematical concepts.

According to Hattie (2021), teacher quality and the use of interactive teaching strategies have a significant impact on student learning outcomes, particularly in challenging subjects like math.

CONCLUSIONS

Based on the findings, the following conclusions were drawn:



1. The comprehensive analysis of SOP 1 reveals a multifaceted landscape of factors influencing numeracy skill mastery, with teacher-related factors demonstrating the most substantial impact, highlighting the critical role of effective teaching practices in shaping students' mathematical proficiency.
2. Factors Contributing to Poor Numeracy Levels:
 - Student-Related Factors: Low levels of motivation, poor attendance, and limited prior knowledge were significant contributors to the poor numeracy levels. Students who were less motivated and frequently absent exhibited lower mastery of mathematical skills.
 - Environmental Factors: Students from lower socio-economic backgrounds and those with limited access to learning resources faced additional challenges. A lack of supportive home environments and inadequate learning materials significantly impacted their ability to master mathematical operations.
 - Family/Parents Factors. The analysis showed that family and parents-related factors play a significant role in shaping students' numeracy skills. Active parental involvement, a supportive home environment, adequate resources, and realistic expectations were associated with better numeracy outcomes. However, socioeconomic challenges, lack of parental education, and minimal engagement negatively impacted the students' performance in mathematical fundamental operations.
3. Teacher-Related Factors: Ineffective teaching methods, insufficient instructional materials, and moderate teacher competency were identified as major barriers to improving numeracy levels. The absence of engaging, interactive learning experiences and the lack of appropriate teaching tools hindered the development of students' mathematical skills.

pedagogical methods, particularly those focused on math instruction. Workshops, seminars, and professional development opportunities should be offered to help teachers adopt innovative teaching strategies that improve student learning.

3. Future research could focus on longitudinal studies to explore the long-term impact of interventions on numeracy skills. Additionally, investigating the role of specific teaching strategies, such as differentiated instruction or problem-based learning, could provide more insight into effective ways to improve numeracy among students.

Conflict of Interest

No potential conflict of interest relating to the conduct of the study has been declared by the authors. The authors made all endeavours to ensure objective integrity in the research procedure and derived findings independently.

No funding, sponsorships, or affiliations from outside sources have influenced the objectivity of this research process or its results. The authors of this study declare full transparency in the development, execution, and reporting of this study, ensuring that conclusions drawn are free from bias and only based on the data collected and analyzed. This declaration reflects the commitment of the authors to ethical research practices and the integrity of academic inquiry.

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RECOMMENDATIONS

In light of the conclusions, the following recommendations are proposed:

1. Schools should implement more interactive and student-centered teaching methods that foster engagement and motivation. Group activities, games, and technology-enhanced learning can help spark students' interest in mathematics. Programs that encourage regular attendance should be implemented, including reward systems, parent-teacher partnerships, and interventions for at-risk students.
2. Schools and the Department of Education should provide more learning resources, such as math textbooks, manipulatives, and digital tools, to ensure students have adequate support materials for learning. Schools should foster stronger community involvement and encourage parents to participate in their children's academic journey, creating a more supportive home environment for learning. Teachers should receive additional training in modern



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