# Correlates of Numeracy Skills of Grade 7 Students in Dominador Narido High School: Basis for Intervention

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***Abstract*** *- This study was undertaken to determine the correlates of the numeracy skills of Grade 7 students in Dominador Narido High School as a basis for formulating an intervention. A descriptive correlation survey was used to gather data from 83 students. The following statistical tools were employed to treat the data gathered: frequency count and percentage to describe the profile of the respondents; Somer's Delta Coefficient to test the significant relationship between the numeracy skills and the profile of the respondents in terms of age, parent's educational attainment, parent's monthly income, number of children in the family, and geographical location; Contingency Coefficient (C) to test the significant relationship between the numeracy skills and the profile in terms of sex and parent's occupation; and Pearson Product correlation to test the significant relationship between the numeracy skills and the academic performance. The study concluded that the majority of the respondents were 13 to 14 years old and male with 47 while 36 respondents were female. Male parents were elementary school graduates while the female parents of the respondents were high school graduates. Forty of the parents' respondents had a monthly income of 1,000 to 5,000. Twenty-six of male parents were farmers; however, the mothers of the respondents were housewives. As to the number of children in the family, 35 had 3 to 4 children. Respondents were residing below one kilometer from the school. The level of numeracy skills of the respondents along knowing and understanding, computing and solving, estimating, visualizing and modeling, representing and communicating, conjecturing and reasoning, proving and decision-making, and applying and connecting was 74% and below. The majority of the respondents' first-quarter Mathematics grades were in the range of 75% to 79%. For the test of the significant relationship between the profiles of the respondents and the numeracy skills, the age profile of the respondents had no significant relationship with the numeracy skills of the respondents except for conjecturing and reasoning with a weak relationship. In terms of sex, there was no significant relationship between sex and numeracy skills. Parental educational attainment had no significant relationship in terms of the numeracy skills of the students except for the mother's educational attainment, which had a weak significant relationship between applying and connecting. Parents' monthly income and their numeracy skills had no significant relationship except for computing and solving which had a weak significant relationship. The parents' occupations had no significant relationship except for computing and solving specifically the father's occupation. The profile on the number of children in the family and the numeracy skills had no significant relationship with the variables considered except for visualizing and modeling with a weak relationship. The geographical location of the students had no significant relationship with any of the numeracy skills. For the test of the significant relationship between the numeracy skills and the academic performance in Mathematics, there was no significant relationship between knowing and understanding, computing and solving, estimating, representing and communicating, conjecturing and reasoning, and applying and connecting. But there was a significant relationship between visualizing and modeling and proving and decision-making. The proposed intervention plan was designed to serve as the basis for improvement. The basis in formulating the intervention plan was based on the first quarter Mathematics grades and the level of numeracy skills of the students.*

***Indexed Terms-*** *Academic Performance, Correlates of Numeracy Skills, Intervention Plan*

## I. INTRODUCTION

Numeracy is the knowledge, skills, behaviors, and dispositions that students need 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. A person is said to be numerate if he understands the essence of numbers and has the skills to use mathematical approaches in all aspects of life. The skills needed to show high numeracy in a person are being able to interpret data, charts, and diagrams, process information, solve problems, check answers, understand, and explain solutions, and make decisions based on logical thinking and reasoning. Numeracy skills have been widely recognized during the last two decades as essential for a person's educational achievements and ability to live a successful life in modern society, including employment opportunities and public health outcomes (Marcos, 2017).

Furthermore, in the 2018 Program for International Student Assessment (PISA) report in the worldwide study by the Organization for Economic Cooperation and Development (OECD) of 15-year-old students' scholastic performance in mathematics in nearly 80 nations, the Philippines ranked 76th with an average score of 353. This result means that Filipinos performed academically poorly in mathematics, which is below the lowest proficiency level. The deteriorating performance of Filipino students in mathematics has become a major challenge to Philippine education.

In this connection, the Schools Division Office of Camarines Norte adopted the Albay Numeracy Assessment Tool (ALNAT) to assess the numeracy skills of Grades 4–10 learners. Thus, at the beginning of the school year, a profile of the learners and prior assessment is necessary to determine the level of skills of the learners and provide appropriate lessons suited to their needs. Numeracy skills include knowing and understanding, computing, and solving, estimating, visualizing and modeling, representing and communicating, conjecturing and reasoning, proving and making decisions, and applying and connecting. Each skill is composed of the Most Essential Learning Competencies (MELC) that were rephrased and deemed necessary for the achievement of content and performance standards. These are essential skills for a successful daily life.

Moreover, one of the goals of the Sustainable Development 2030 Agenda is to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. This study provides background for educators to understand the nature of learners after the pandemic. Although educational institutions worldwide responded to the pandemic, the students' learning depended on the available resources of the community. The Department of Education provided tools to ensure that learners could acquire necessary concepts amidst pandemics. As part of routine activities, the numeracy skills of learners help the teachers assess the child's development. It may address the need to provide additional learning activities suited to the needs of the learners.

The teachers' anecdotal observations have led them to believe that assessing the numeracy abilities of Grade 7 pupils is crucial for developing the appropriate interventions to enhance their knowledge and determine how well they perform in mathematics. Students from 11 nearby barangays, including Catandungon of Mercedes, Pinagwarasan, Mocong, Angas, Taba-Taba, Mangcamagong, Oliva, Tacad, Hinampacan, Lidong, Mandazo, and Taisan of Basud, where the school is located, attended Dominador Narido High School. Due to the non-availability of transportation from several barangays, the students were motivated to walk until they arrived at the school. They woke early to get to school in time for the flag ceremony or the morning's first class. Their performance in the classroom, particularly in mathematics, has suffered as a result. Throughout the discussion and other lesson-related activities, students could not take part. The fundamental mathematics ideas that students are meant to understand at the primary and intermediate levels proved to be challenging for them. It was observed that it is hard for them to express when doing the basics, thus it may be difficult for them to comprehend simple problems and read numbers with five digits or more, which has an impact on their academic achievement.

Numeracy proficiency is necessary for effective learning across all topic areas. It is crucial to increase numeracy learning and build math skills at a young age to succeed in school as well as face all of life's obstacles. For the children to be competent and proficient in mathematics, home and school should work together to strengthen the student's foundation in fundamental number concepts.

## II. METHOD OF RESEARCH

This study used a descriptive-correlation design to describe the profile of the respondents in terms of age, sex, parents' educational attainment, monthly income and occupation, number of children in the family, and geographical location. The profiles of the respondents were obtained using the survey questionnaire form given to the students. It also determined the significant relationship between the profile of the respondents and the numeracy skills of knowing and understanding, computing and solving, estimating, visualizing and modeling, representing and communicating, conjecturing and reasoning, proving and decision-making, and applying and connecting using Somer's Delta Coefficient d and Contingency Coefficient (C). The significant relationship of the numeracy skills and the academic performance of the students in mathematics was identified using Pearson Product correlation.

Population, Sample Size, and Sampling Technique This study was conducted at Dominador Narido High School, a barangay high school located in Taisan, Basud, Camarines Norte. This school is characterized as a medium school in the Basud Cluster. This study employed total enumeration. Eighty-three Grade 7 students who were enrolled for the first quarter were the respondents in the study. There were three homogeneous sections in Grade 7 based on the students' previous grade level average.

- Description of Respondents

Eighty-three Grade 7 students of Dominador Narido High School participated in the study as respondents. These respondents filled out the survey form to provide information about their age, sex, parents' educational attainment, monthly income and occupation, number of children in the family, and geographical location. Due to the outcomes of the standardized numeracy assessment that was given to all students, the researcher decided to only include Grade 7 students as respondents in this study. In addition to this finding, the researcher also drew from teachers' anecdotal reports that most of the students struggled with grasping and applying the fundamental ideas of mathematics, which led to poor performance in the classroom. Additionally, respondents were the outcome of a 2-year learning delivery gap following the pandemic and the shift from elementary to secondary school.

- Research Instrument

The study utilized the standardized test adopted by the Division of Camarines Norte from the Schools Division Office of Albay, named Project Numerals: Numeracy Assessment Tools for Grade 7. The assessment is composed of a 50-item multiple-choice test covering topics from the first quarter to the fourth quarter. It is composed of eight numeracy skills with a specific number of items, such as ten knowing and understanding questions; eighteen computing and solving; one estimating; four visualizing and modeling; five representing and communicating; four conjecturing and reasoning; one proving and decision-making, and seven applying and connecting. Questions are divided into five topics depending on the number allocated to each numeracy skill. These are numbers and number sense, geometry, patterns and algebra, measurement, statistics, and probability. Each numeracy skill was tabulated based on the individual scores obtained by the students in the assessment and interpreted using numerical value as presented in Table 1.

Table 1
Table of Interpretation for Level of Numeracy Skills

| Level of Numeracy Skills | Numerical Value | Abbreviation |
|---|---|---|
| Needs Major Support | 74% and below | NMS |
| Anchoring | 75% - 79% | A |
| Emerging | 80% - 84% | E |
| Developing | 85% - 89% | D |
| Transforming | 90% and above | T |

Moreover, as to the academic performance of the students, the respondents' mathematics grade was interpreted using the following: outstanding, 90% to 100%; very satisfactory, 85% to 89%; satisfactory, 80% to 84%; fairly satisfactory, 75% to 79%; and did not meet expectations, below 75%.

- Data Gathering Procedure

For the organized conduct of the study, the researcher observed a set of procedures to attain the accuracy of the research work. First, the researcher sought the necessary communication letters for data gathering and secured the approval of the Schools Division Superintendent of Camarines Norte and principal of Dominador Narido High School. Second, the researcher distributed the survey questionnaire to the respondents for the socio-demographic profile and to the mathematics teacher for the first quarter grades. Third, the researcher presented the results of the survey in tabular form. Finally, the researcher analyzed the findings and provide conclusions and recommendations based on the data presented using the statistical instrument.

- Statistical Treatment of Data

To interpret the date effectively, the study utilized the following statistical treatments:

Frequency Count. This was used to observe how often the data occur in the socio-demographic profiles of the respondents in terms of age, sex, parent's educational attainment, parent's occupation, parent's monthly income, number of children in the family, and geographical location.

Percentage. This was employed to determine the percentage distribution of the frequency in the socio-demographic profile of the respondents in terms of age, sex, parent's educational attainment, parent's occupation, parent's monthly income, number of children in the family, and geographical location.

Formula: $P = \frac{F}{N} X\ 100$

where: P is the percentage
F is the Frequency
N is the total number of respondents
100 is a constant value

Pearson Product Moment Correlation. This was used to determine the significant relationship between the numeracy skills and the academic performance of the respondents in mathematics.

$$r = \frac{n\,(\Sigma XY) - (\Sigma X)(\Sigma Y)}{\sqrt{[n(\Sigma X^2) - (\Sigma X)^2][n(\Sigma Y^2) - (\Sigma Y)^2]}}$$

where: r = Pearson's correlation coefficient
n = number of paired scores
X = score of the first variable
Y = score of the second variable
XY = the product of the two paired Scores

Somer's Delta Coefficient d was used to test the significant relationship between the numeracy skills and the profile of the students along age, parent's educational attainment, monthly income, number of children in the family, and geographical location.

The contingency coefficient (C) was used to test the significant relationship between the numeracy skills and profile in terms of sex and the parent's occupation.

## III. ANALYSIS AND INTERPRETATION OF DATA

This chapter presents the results, analyses, and interpretation of data gathered on the correlates of numeracy skills of grade 7 students at Dominador Narido High School. The data are analyzed and presented using frequency tables and percentages.

*Profile of the Respondents*

The profile of the respondents in terms of age, sex, parent's educational attainment, parent's occupation and monthly income, number of children in the family, and geographical location were gathered and analyzed to provide an accurate description of the respondents. The following tables present the frequency distribution on the profile of the respondents.

Table 2
Age Profile of the Respondents

| Age Group | Frequency | Percentage (%) |
|---|---|---|
| 11-12 | 30 | 36 |
| 13-14 | 52 | 63 |
| 15-16 | 1 | 1 |

| | | |
|---|---|---|
| Total | 83 | 100 |

As shown in the table, majority of the respondents were 13 to 14 years old, with a frequency of 52 that comprised 63 percent of the total number of respondents. The least number of students was 15 to 16 years old, with only one respondent, or 1 percent of the total population.

It implies that parents today are aware of the importance of education because majority of the student respondents belonged to the age bracket of 13 to 14, and this age is the appropriate age for 7th-grade learners based on the DepEd basic education age bracket.

According to Duffett (2017), generation Z, born from 1997 onward, has been dubbed "screen addicts or screenagers," who only know a world with continual and online access to the internet and social media. They have more information available at their fingertips than any of the prior generations. Adolescents have grown up in the epoch of computers, the Internet, instant messaging (WhatsApp, WeChat), mobile devices (cellphones, personalized digital assistants, smartphones, tablets, iPods, iPads, iPhones), interactive TV, wireless (Bluetooth), SNS (Facebook, Google, LinkedIn), picture sharing (Instagram, Pinterest, Flickr), micro-blogs (Twitter, Tumblr), video sharing (YouTube, Vine), and many other interactive ICT platforms that enable them to socialize online and assist them with the purchase decision process. Thus, majority of Young internet users also make use of one or more forms of online social media.

Table 3
Sex Profile of the Respondents

| Sex | Frequency | Percentage (%) |
|---|---|---|
| Male | 47 | 56.63 |
| Female | 36 | 43.37 |
| Total | 83 | 100 |

It could be seen from the table that majority of the respondents were male with a frequency of 47 or 56.63 percent while 36 or 43.37 percent were female.

It implies that more men are enrolled in 7th grade than women. Based on the data presented by the Department of Education Planning Service, Education Management Information System Division, dated May 2022, there were more male learners in junior high school than female learners. Male learners comprised 51%, while 49% was for female learners. These data are similar to the enrollment report of Dominador Narido High School for Grade 7 students. According to the 2022 Global Gender Gap Report of the World Economic Forum, gender parity decreased at the level of enrollment in primary education, with a notably larger share of boys than girls in growing enrollment numbers overall.

However, according to Duffet (2017), the gender demographic variable did not have a large influence on the attitude components, although female adolescents that use social media are also participants in a greater quantity of social media activities.

Table 4
Profile as to Highest Educational Attainment of Parents

| Educational Attainment | Father | | Mother | |
|---|---|---|---|---|
| | Frequency | Percentage (%) | Frequency | Percentage (%) |
| Elementary Level | 12 | 14.46 | 10 | 12.05 |
| Elementary Graduate | 25 | 30.12 | 14 | 16.87 |
| High School Level | 14 | 16.87 | 15 | 18.07 |
| High School Graduate | 21 | 25.30 | 30 | 36.1 |
| Vocational | 5 | 6.02 | 4 | 4.82 |
| College Level | 2 | 2.41 | 2 | 2.41 |
| College Graduate | 2 | 2.41 | 4 | 4.82 |
| Others | 2 | 2.41 | 4 | 4.82 |
| Total | 83 | 100 | 83 | 100 |

As indicated in the table, male parents were elementary school graduates with 25 or 30.12 percent, while female parents of the respondents were high school graduates with 30 or 36.1 percent of the total population. The least frequency of two or 2.41 percent for father's educational attainment was for college level and college graduates, while for mother's educational attainment the frequency of two or 2.41 percent was for college level also.

It implies that mothers have higher educational attainment than fathers and have the potential to teach their children in their everyday lessons. However, according to the Philippine Statistics Authority, Customer Satisfaction Survey Consolidated Results Metro Manila CRS Outlets Fourth Quarter 2021, dated January 18, 2022, educational attainment in the

Philippines shows that the majority of respondents were college graduates or higher (49.7%), 41.9 percent of the respondents were high school graduates, 2.3 percent were elementary graduates, and 6.1 percent of the respondents did not specify their educational attainment.

Furthermore, Davis-Kean et al. (2020) posited that parent educational attainment provides a foundation that supports children's academic success indirectly through parents' beliefs about and expectations for their children, as well as through the cognitive stimulation that parents provide in and outside of the home environment. However, Liu (2018) found that there is an intergenerational transfer of ability and knowledge through both biological and environmental pathways. Questionnaire surveys were carried out on 3670 children (aged 9–12 years) and their parents from 26 elementary schools in northeast China. Results showed that the interaction term was significant for the father's education, while there was no significant interaction for the mother's education.

Table 5.a
Profile of the Respondents as to Occupation of Father

| Occupation | Frequency | Percentage (%) |
|---|---|---|
| Engineer | 1 | 1.20 |
| Driver | 9 | 10.84 |
| Mechanic | 3 | 3.61 |
| Electrician | 1 | 1.20 |
| Farmer | 26 | 31.32 |
| Fisherman | 3 | 3.61 |
| Utility | 1 | 1.20 |
| Construction Worker | 13 | 15.66 |
| Vendor | 2 | 2.41 |
| Factory Worker | 1 | 1.20 |
| Baker | 1 | 1.20 |
| Miner | 1 | 1.20 |
| Piggery Work | 1 | 1.20 |
| Others | 20 | 24.1 |
| Total | 83 | 100 |

As evident in Table 5.a, the male parents of the respondents were farmers, comprising 26 or 31.32 percent of the population. Next, they belonged to different jobs with 20 or 24.1 percent. There were also construction workers composed of 13 or 15.66 percent, drivers with nine or 10.84 percent, mechanics with three or 3.61 percent, and fishermen with three or 3.61 percent. The least number of one or 1.20 percent belonged to engineer, electrician, utility worker, factory worker, baker, miner, and piggery worker.

This implies that farming is the primary occupation of the respondents' male parents, followed by skilled labor (construction, driving, and mechanic). According to the Philippine Statistics Authority, Employment Situation in March 2023, the male unemployment rate was 4.3%, and the employment rate was 95.7%. However, in October 2013, among the various occupation groups, laborers and unskilled workers comprised the largest proportion (32.2%) of the total employed population. Officials of the government and special-interest organizations, corporate executives, managers, managing proprietors, and supervisors were the second largest group, accounting for 16.5 percent of the total employed population. Farmers, forestry workers, and fishermen comprised the third largest group of workers, making up 13.1 percent of the total employed.

According to Khan et al. (2017), occupational prestige is the third most important variable in a family's socioeconomic status. It entails both education and income. It means that the occupational prestige of an individual is a reflection of the education he has acquired for that very occupation and the income he receives from that occupation. Job characteristics, decision-making ability, and the psychological demands of the job are the factors that determine the occupational status of an individual. However, they also cited that the occupational position of an individual in a profession is measured by the nature of the duty he performs, his authority and decision-making power, and the psychological demands required of him on the job. Doctors, surgeons, lawyers, engineers, and university professors are some of the most prestigious occupations. They are termed as high socioeconomic status occupations. In these jobs, one has greater control over working conditions, but at the same time, he/she has to have high ability. Contrary to that, lower socioeconomic status jobs include workers, counter attendants, helpers, dishwashers, maids, housekeepers, and vehicle cleaners. These jobs require less ability, are low paying, more laborious, hazardous, and have no independence.

Table 5.b
Profile of the Respondents as to Occupation of Mother

| Occupation | Frequency | Percentage (%) |
|---|---|---|
| Teacher | 1 | 1.20 |
| Sewer | 2 | 2.41 |
| Technician | 2 | 2.41 |
| Maid | 13 | 15.66 |
| Vendor | 4 | 4.82 |
| Businesswoman | 3 | 3.61 |
| Housewives | 58 | 69.88 |
| Total | 83 | 100 |

As shown in Table 5.b, 58 female parents or 69.88 percent of the population were housewives and 13 or 15.66 percent were working as maid. There were sewers and technicians, comprising two or 2.41 percent. Only one of the female parents was a teacher, representing 1.20 percent of the population.

This implies that majority of mothers focused on taking care of their families and serve as the managers of their own homes. Thus, the source of students' knowledge come from their mother, who teach them about the lesson and encourage them to active participate in class. According to the Philippine Statistics Authority, in March 2023, the female unemployment rate was 5.4% while the employment rate was 94.6%. However, in October 2013 Labor Force Survey, out of the 8.3 million female wage and salary workers, three in every five or 60.6 percent, worked for private establishments, 19.7 percent worked for private households, 19.3 percent worked for the government or government-controlled corporations, and 0.4 percent worked with pay on their family-operated farm or business.

According to Setyowati et al. (2023), majority of mothers who work as housewives will have more opportunities for interaction with their children, while working mothers spend at least 8 hours/day outside to complete work. Working mothers have a dual and active role in improving the family's economy, while homemakers spend their time at home taking care of their children. A mother's education affects her desire to work; besides, her education will affect her mindset and behavior. Mothers with higher education tend to want to actualize themselves as active workers earning a living according to their education and skills.

In addition, according to Aspiras et al. (2020), occupation or job varies from a person's field of specialization and will differ in wage, time consumption, etc. This is the main source of income, especially within families. Despite its financial aspect, parents' profession may also affect children when putting into consideration the amount they spend on work and the ethics they teach. Parents' job can also affect their child's perception and how they interact with their parents. Family environments are major predictors of the relationship between parents and their offspring.

Table 6
Profile of the Respondents as to Parents' Monthly Income

| Monthly Income | Frequency | Percentage (%) |
|---|---|---|
| 1000-5000 | 40 | 48.19 |
| 5001-10000 | 26 | 31.1 |
| 10001-15000 | 11 | 13.3 |
| 15001-20000 | 3 | 3.61 |
| 20001 and above | 3 | 3.61 |
| Total | 83 | 100 |

As gleaned in the table, 40 of the parents' respondents or 48.19 percent, was within the range of 1,000 to 5,000 pesos monthly while 26 or 31.1 percent of the population had a monthly income of 5,001 to 10,000. The lowest of three or 3.61 percent belonged to the monthly income range of 15,001 to 20,000 and 20,001 and above respectively.

This implies that majority of the parents of the respondents have low income. According to the 2018 Family Income and Expenditure Survey (FIES 2018) undertaken by the Philippine Statistics Authority and posted last June 2020, the average annual income per family is Php 313, 000 or Php 26, 083.33 monthly, while the average annual family expenditure is Php 239, 000 or 19, 916.67 per month.

The result in Table 6 is supported by the findings in the study of Rimpola (2022), which showed that the low-income (but not poor) cluster is between the poverty line and twice the poverty line, with income

between Php 10, 481 and Php 20, 962. This was according to the report of 2016 Philippine Institute for Development Studies that families whose monthly income less than Php 10,481 belong to the poor income cluster as the per capita income is less than the official poverty threshold. The survey in 2018 showed that 58.4 percent of Filipinos belonged to the low-income class.

However, Elliott and Bachman (2018) indicated that children in homes of lower socioeconomic status (SES) typically start school behind their peers on a host of domains. Understanding why some children start school less prepared to learn math than their peers is vital.

Table 7
Profile of the Respondents as to Number of Children in the Family

| Number of Children in the Family | Frequency | Percentage (%) |
|---|---|---|
| 1-2 | 16 | 19.28 |
| 3-4 | 35 | 42.2 |
| 5-6 | 17 | 20.5 |
| 7 and above | 15 | 18.07 |
| Total | 83 | 100 |

As shown in the table, 35 or 42.2 percent of the respondents had three to four children in the family followed by five to six children in the family with 17 or 20.5 percent. The least frequency in terms of the number of children in the family was seven and more comprising 15 or 18.07 percent.

This implies that the student-respondents have a family with an average number of children. Based on the 2017 National Demographic and Health Survey (NDHS), the average ideal family size is three children in the family.

However, according to Tanghal (2022), family size has a negative correlation with the numeracy level of the students. Family size and numeracy performance are inversely proportional. If the students have a large family, they have low academic performance, and vice versa. Parents with fewer children devote more time, money, and affection to their children's academic performance.

Table 8
Profile of the Respondents as to Geographical Location

| Distance (km) | Frequency | Percentage (%) |
|---|---|---|
| Below 1 | 31 | 37.35 |
| 1-2 | 22 | 26.51 |
| 3-4 | 11 | 13.25 |
| 5-6 | 14 | 16.87 |
| Above 7 | 5 | 6.02 |
| Total | 83 | 100 |

As shown in the table, respondents were residing near the school which is below one kilometer from the school, with 31 or 37.35 percent followed by one to two kilometers with 22 or 26.51 percent, five to six kilometers with 14 or 16.87 percent, and three to four kilometers with 11 or 13.25 percent. The least number of respondents was located above seven kilometers, with five or 6.02 percent.

This implies that respondents' residences are located near the school, which is below one kilometer. It further implies that the school is accessible to the students, thus, they can reach the school by walking. They can also attend the class on time.

However, according to Peteros et al. (2022) and Baliyan (2020), there is a significant influence and relationship between the school's distance and the student's academic performance in math. Students who must engage in long-distance walking will arrive at school very tired, which results in poor concentration during classes and failure to grasp the lessons they need to learn for the day because learning effectively requires students to be relaxed and undisturbed by inner and outer stimuli.

*Level of Numeracy Skills of Grade 7 Students in Dominador Narido High School*

In accordance with the administered evaluation given to the respondents, Table 9 shows the numeracy proficiency level of Dominador Narido High School

students. The Division of Camarines Norte has adopted the Division of Albay's 50-item standard test. Using a computerized, uniform method, the respondents' responses were collated.

Table 9
Level of Numeracy Skills of Grade 7 Students in Dominador Narido High School

| Numeracy Skills | Number of Learners According to Level of Numeracy Skills | | | | |
|---|---|---|---|---|---|
| | Needs Major Support | Anchoring | Emerging | Developing | Transforming |
| Knowing and Understanding | 83 | 0 | 0 | 0 | 0 |
| Computing and Solving | 83 | 0 | 0 | 0 | 0 |
| Estimating | 54 | 0 | 0 | 0 | 29 |
| Visualizing and Modeling | 75 | 6 | 0 | 0 | 2 |
| Representing and Communicating | 78 | 0 | 5 | 0 | 0 |
| Conjecturing and Reasoning | 79 | 4 | 0 | 0 | 0 |
| Proving and Decision Making | 60 | 0 | 0 | 0 | 23 |
| Applying and Connecting | 83 | 0 | 0 | 0 | 0 |

This table shows that in knowing and understanding (10 items), computing and solving (18 items), and applying and connecting (7 items), all respondents needed major support (74% and below). No one belonged to anchoring (75%–79%), emerging (80%–84%), developing (85%–89%), or transforming (90% and above) according to the standardized test given to the respondents. In estimating (1 item), 29 respondents got the correct answer, which fall under transforming, while 54 needed major support. In addition to proving and decision-making (1 item), 23 students were classified transforming, and 60 needed major support. In visualizing and modeling (4 items), two students were transforming, six students were on anchoring, and 75 students needed major support. Furthermore, in representing and communicating (5 items), five students were on emerging while 78 students needed major support. Also, in conjecturing and reasoning (4 items), four were on anchoring, while 79 needed major support.

This implies that the level of numeracy skills of the respondents along knowing and understanding, computing and solving, estimating, visualizing and modeling, representing and communicating, conjecturing and reasoning, proving and decision-making, and applying and connecting, needs major support. This is anchored on the Regional Memorandum No. 113, s. 2022, Conduct of Numeracy Assessment (ALNAT) for Grades 4–10.

Similarly, in the study of Tallud and Caballes (2023), the findings revealed that along with the eight numeracy skills, namely: knowing and understanding, computing and solving, estimating, visualizing and modeling, representing and communicating, conjecturing and reasoning, proving and decision-making, and applying and connecting, these skills need major support. The study conducted among Grades 1–3 learners of Jose Magsaysay Elementary School, Constancia Street, Barangay Olympia, Makati City, Philippines.

*Academic Performance of Grade 7 Students in Mathematics*

Table 10 shows the academic performance during the first quarter in Mathematics of 83 Grade 7 students. These grades were computed using these criteria: 40% written work, 40% performance tasks, and 20% quarterly exams.

Table 10
Profile of the Respondents in terms of their Academic Performance in Mathematics

| Mathematics Grades | Frequency | Percentage (%) |
|---|---|---|
| 95 and above | 1 | 1.20 |
| 90-94 | 8 | 9.64 |
| 85-89 | 8 | 9.64 |
| 80-84 | 18 | 21.69 |
| 75-79 | 48 | 57.83 |
| 74 and below | 0 | 0 |
| Total | 83 | 100 |

*Legend: Outstanding 90% to 100% Passed*
*Very Satisfactory 85% to 89% Passed*
*Satisfactory 80% to 84% Passed*
*Fairly Satisfactory 75% to 79% Passed*
*Did Not Meet Expectations 74 and below Failed*

As enunciated in the table, the majority of the respondents' Mathematics grades were in the range of 75% to 79%, with a frequency of 48 or 57.63 percent of the total population. However, 80% to 84% and 85% to 89% both got a frequency of eight or 9.64 percent. Only one or 1.20 percent of the respondents got 95% or above grades in Mathematics.

This implies that no respondents got failing grades in mathematics, but it is evident that the majority of them were low-performing students in terms of numbers or fairly satisfactory. The said descriptive interpretation of the grades is according to DepEd Order No. 31, s. 2020, Interim Guidelines for Assessment and Grading in Light of the Basic Education Learning Continuity Plan.

However, in the study of Andamon et al. (2018), they asserted that the mean of students' performance in mathematics belongs to the range approaching proficiency, which can be interpreted as moderate or at the average level of learning. Further, in the study of Capuno et al. (2019), which found that respondents had satisfactory performance with an average grade of 80.93. This result suggests that the performance of the respondents needs to be improved because many of them were just able to pass the subject.

*Significant Relationship Between the Profile of the Respondents and the Numeracy Skills*

Table 11
Test for Significant Relationship between the Profile of the Respondents and their Numeracy Skills

| | Profile of the Respondents | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Parent's Educational Attainment | | | Occupation | | | |
| Numeracy Skills | Age | Sex | Father | Mother | Monthly Income | Father | Mother | Number of Children in the family | Geographical Location |
| Knowing and Understanding | -.005 | .184 | 0.661 | -.039 | .023 | .656 | .522 | .002 | -.120 |
| Computing and Solving | -.082 | .297 | .031 | .154 | .215* | .813* | .578 | .071 | -0.030 |
| Estimating | .066 | .021 | .114 | .066 | .156 | .440 | .291 | -.185 | -0.019 |
| Visualizing and Modeling | .098 | .228 | -.079 | -.101 | -.155 | .502 | .450 | .193* | .097 |
| Representing and Communicating | -.026 | .215 | -.004 | -.034 | .095 | .671 | .453 | -.107 | .051 |
| Conjecturing and Reasoning | -.256* | .217 | .075 | .003 | -.041 | .512 | .437 | -.008 | -.110 |
| Proving and Decision Making | .127 | .001 | .123 | .172 | .051 | .323 | .290 | .042 | .018 |
| Applying and Connecting | .003 | .184 | -.054 | -.215* | .025 | .657 | .473 | .083 | -.016 |

*Legend:* **Significant @0.05 level of significance*

| Coefficient Interval | Correlation |
|---|---|
| 0.00 – 0.199 | Very Weak |
| 0.20 – 0.399 | Weak |
| 0.40 – 0.599 | Medium |
| 0.60 – 0.799 | Strong |
| 0.80 – 1.000 | Very Strong |

It is revealed that the age profile has no significant relationship with the numeracy skills of the student respondents except for conjecturing and reasoning (d=-0.256, p<.05). This means that age is not a predictor of the numeracy skills of the students. However, their age profile is a predictor of their numeracy skills when it comes to conjecturing and reasoning, though it can be described as a weak relationship.

The same result was obtained across sex profiles. It can be observed that there is no significant relationship between their sex profile and their numeracy skills (p>0.05). Thus, their sex profile is not a predictor of their numeracy skills.

Moreover, the parent's educational attainment has no significant relationship in terms of the numeracy skills of the students, based on the results. However, it can be observed that the mother's educational attainment has a weak significant relationship on applying and connecting (d=-.215, p<.05). Thus, the parents' educational attainment is not a predictor when it comes to their numeracy skills, except for applying and connecting, which is applicable to the mother's educational attainment only. Likewise, the profile of the students, along with their monthly income, and their numeracy skills have no significant relationship. But, when it comes to computing and solving (d=.215, p<.05), the profile of monthly income has a weak significant relationship. Again, the profile of monthly income cannot be considered a predictor of the numeracy skills of the students, except for computing and solving.

Along occupation of the parents, it has no significant relationship with the numeracy skills of the students except for computing and solving (C=0.813, p<.05) at the five percent significance level, which is the father's occupation. Thus, the occupation of parents is not a predictor of the numeracy skills of their children. The profile on the number of children in the family and the numeracy skills was tested, which resulted in a non-significant relationship between the variables considered. However, it can be observed that the number of children and the numeracy skills, along with visualizing and modeling (d=.193, p<.05), has a significant relationship, though it is a weak

relationship. Hence, the number of children in the family cannot be considered a predictor of the numeracy skills of Grade 7 students.

Finally, the profile of the respondents as to geographical location was tested. It was observed that there is no significant relationship between knowing and understanding, computing and solving, estimating, visualizing and modeling, representing and communicating, conjecturing and reasoning, proving and decision-making, and applying and connecting ($p>0.05$). Thus, the geographical location of the respondents cannot be considered a predictor of numeracy skills. Generally, the students' profile as to age, sex, educational attainment of the parents, monthly income, parents' occupation, and the number of children in the family are not predictors of their numeracy skills in terms of knowing and understanding, computing and solving, estimating, visualizing and modeling, representing and communicating, conjecturing and reasoning, proving and decision-making, and applying and connecting.

In the recent study of Gallardo et al. (2023), they revealed that the parent respondents' highest educational attainment does not have a significant relationship with their level of numeracy. The computed chi-square values are significantly lower than their critical values.

However, Davis-Kean et al. (2020) said that parents' educational attainment, occupation, and family income are powerful predictors of children's developmental outcomes. Variations in these resources predict significant academic disparities among children from different socioeconomic backgrounds that persist across schooling, perpetuating educational inequalities across generations. They posited that parental educational attainment provides a foundation that supports children's academic success indirectly through the beliefs and expectations that parents hold for their children, as well as the cognitive stimulation that parents provide in and outside of the home environment. The same is true in the study of Mues et al. (2021), which asserted that parental occupation and education seem to be important factors for students' mathematical achievement. Students whose parents had professional occupations outperformed students whose parents worked in elementary occupations in mathematics.

*Significant Relationship Between the Academic Performance and the Numeracy Skills*

Table 12
Test for Significant Relationship between the Academic Performance of the Respondents and their Numeracy Skills

| Numeracy Skills | Pearson Product Moment Correlation (r) | p-value |
|---|---|---|
| Knowing and Understanding | -0.014 | 0.902 |
| Computing and Solving | -0.040 | 0.716 |
| Estimating | -0.033 | 0.766 |
| Visualizing and Modeling | -0.312** | 0.004 |
| Representing and Communicating | 0.146 | 0.189 |
| Conjecturing and Reasoning | -0.027 | 0.805 |
| Proving and Decision Making | 0.292** | 0.007 |
| Applying and Connecting | -0.214 | 0.052 |

Table 12 shows that among the numeracy skills considered, visualizing and modeling (r=-0.312, p-value=.004) and proving and decision-making (r=0.292, p-value=0.007) obtained significant relationships in their academic performance in mathematics at a significant level of 0.01 (two-tailed). On the other hand, other numeracy skills such as knowing and understanding (r=-0.014, p-value=0.902); computing and solving (r=-0.040,p-value=0.716); estimating (r=0.033, p-value=0.766); representing and communicating (r=0.146, p-value=0.189); conjecturing and reasoning (r=-0.027, p-value=0.805); and applying and connecting (r=-.214, p-value=0.052) have no significant relationship with the mathematics performance of Grade 7.

It can be inferred that only visualizing and modeling (r=-0.312, p=0.004), and proving, and decision-

making (r=0.292, p=.007) are the predictors of academic performance in Grade 7 mathematics. Other numeracy skills are not considered predictors of their academic performance. Generally, the numeracy skills of Grade 7 students are not significantly correlated to their performance in mathematics; thus, the null hypothesis is not rejected.

However, Chan and Scalise (2022) discovered in the first study that only one out of four numeracy skills, which is a set of counting skills, predicted later mathematics achievement among preschoolers. In the second study, all four numeracy skills, namely, set counting, numeral identification, number comparison, and number line estimation, significantly predicted mathematics achievement among kindergartens. As children develop, other aspects of numeracy skills may become more important for mathematical achievement.

*Proposed Intervention Plan to Improve the Numeracy Skills and Academic Performance of Grade 7 Students*

Table 13
Proposed Intervention Plan to Improve the Numeracy Skills and Academic Performance

| Activities | Objectives | Strategies | Time Frame | Persons Involved | Expected Outcome | Remarks |
|---|---|---|---|---|---|---|
| PLANNING<br><br>Approval of the proposed intervention program | To ensure the implementation and effectiveness of the intervention program | 1. Meeting with the principal<br><br>2. Prepare program proposal with intervention plan | Week 1 after the opening of classes | Math Teacher (Proponent)Principal | Approved Proposal | Approved proposal before the conduct of the remediation program |
| PRE-IMPLEMENTATION<br><br>Orientation on the Conduct of Numeracy Assessment | To ensure the smooth conduct of the actual test administration | Orientation of parents and students | Week 2 after the opening of classes | Math Teachers, Students, Parents | All concerned parents have successfully oriented themselves to the program | Parents and students are properly oriented |
| IMPLEMENTATION<br><br>Pre-assessment | 1. To assess the numeracy skills of the students along knowing and understanding, computing and solving, estimating, visualizing and modeling, representing and communicating, conjecturing and reasoning, proving and decision-making, and applying and connecting.<br><br>2. To identify the students that need major support | Administer diagnostic test/pre-test | Friday of Week 2 after the opening of classes | Math Teachers and Students | All Grade 7 students have successfully taken the pre-assessment | 100% participation from the students |
| Approval of the Peer-Assisted Learning Strategies (PALS) materials and | To ensure the quality of the intervention materials. | Ask for the approval of the materials before implementing the program | Week 3 after the opening of classes | Education Program Supervisor and Learning Resource Management and Development | Approved PALS and SIM by the Education Program Supervisor and Learning Resource | Materials passed the screening committee |
| Strategic Intervention Materials (SIM) | | | | System Coordinator | Management and Development System Coordinator | |
| Conduct of Remediation Program | 1. To increase the numeracy skills of the students along knowing and understanding, representing and communicating<br>2. To develop camaraderie and collaborative effort among the students | Use of Peer Assisted Learning Strategies (PALS) | September to December, 2023<br><br>MWF (11:00 - 11:45 AM) | Math Teachers and Students, Tutor Students | Increased numeracy skills along knowing and understanding and representing and communicating and performance level in Math | 85% of the target performance level achieved |
| | 3. To develop and increase the numeracy skills of the students along computing and solving, estimating, visualizing and modeling, conjecturing and reasoning, proving and decision-making, and applying ang connecting | Use of Strategic Intervention Materials (SIM) | January to April, 2024<br><br>MWF (11:00 - 11:45 AM) | Math Teachers and Students | Increased numeracy skills along computing and solving, estimating, visualizing and modeling, conjecturing and reasoning, proving and decision-making, and applying and connecting and performance level in Math | 85% of the target performance level achieved |
| POST-IMPLEMENTATION<br><br>Post Assessment | 1. To assess the numeracy skills of the students in the eight numeracy skills<br>2. To determine the effectiveness of the strategies | Administer Post-Test | May, 2024 | Math Teachers and Students | 80% increased on the eight numeracy skills | 100% of the target outcome achieved |

On the assessment of the eight numeracy skills: knowing and understanding, computing and solving, estimating, visualizing and modeling, representing and communicating, conjecturing and reasoning, proving and decision-making, and applying and connecting, the level of numeracy skills of the Grade 7 students at Dominador Narido High School needed major support. Also, the academic performance of the students is fairly satisfactory. Thus, these are the areas of consideration for the proposed intervention plan. The main objective of the intervention is to develop the identified numeracy skills of the students by conducting several remediation activities to nurture their abilities and skills.

The activities in the intervention plan are divided into four phases: planning, pre-implementation, implementation, and post-implementation. In the planning phase, the approval of the proposed intervention program by the school principal will be

sought by the researcher to ensure its implementation and effectiveness. During the pre-implementation, an orientation on the conduct of numeracy assessments will be conducted for parents and students. This is to ensure the smooth conduct of the actual implementation, and the orientation will be done in the second week after the opening of classes.

The implementation phase consists of four activities: pre-assessment, crafting of intervention materials, approval of peer-assisted learning strategies and strategic intervention materials, and the conduct of remediation programs. In the pre-assessment, the Math teachers will administer a pretest to all Grade 7 students. This is to assess the numeracy skills of the students along knowing and understanding, computing and solving, estimating, visualizing and modeling, representing and communicating, conjecturing and reasoning, proving and decision-making, and applying and connecting, and identifying the students that need major support. The pre-assessment will be followed by the crafting of intervention materials by the Math teachers. The objective of this activity is to design intervention materials based on the results of the assessment. The Math teachers will undergo validation and approval of the SIM and PALS by the principal to ensure the quality of the materials.

The last activity on the implementation phase is the conduct of remediation programs to increase the numeracy skills and to develop camaraderie and collaborative effort among the students. The use of PALS involving Math teachers, tutor students and the students will be done to improve the numeracy skills along knowing and understanding, representing and communicating, and to increase the academic performance in Math. The use of SIM will be done to increase the numeracy skills along computing and solving, estimating, visualizing and modeling, conjecturing and reasoning, proving and decision-making, applying and connecting, and to increase the academic performance in Math.

In the post-assessment phase, a post-assessment will be administered by the Math teachers to the students to assess their numeracy skills and determine the effectiveness of the materials. This activity will be done in May 2024.

Peer-Assisted Learning Strategies (PALS) will be facilitated by the tutor students. These are the students who are highly competent in mathematics from Grades 8–10 and willing to tutor the low-performing students. Tutor students will pass the screening process conducted by the mathematics teacher. Materials that will be used during the intervention process will be provided by the school and approved by the principal, Education Program Supervisor (EPS), and Learning Resource Management and Development System (LRMDS) Coordinator.

Also, Strategic Intervention Materials (SIM) will be crafted by the mathematics teacher after the assessment of the numeracy skills. SIM will be used to develop numeracy skills along knowing, understanding, representing, and communicating numeracy skills. One SIM per month will be provided to master the least-mastered skills and competencies. Thus, four SIMs will be provided by the mathematics teacher for the whole intervention process. Activities in PALS and SIM will mainly focus on developing memory skills as well as the ability to plan, test ideas, and solve problems. Also, teachers will encourage cooperation and participation in the classroom, especially in learning numeracy. Cooperative learning strategies offer students the possibility to learn by applying knowledge in an environment more similar to the one they will encounter in their future work lives. By doing these activities and interacting with peers, students increase their academic performance, help each other learn, and become less dependent on teachers.

## IV. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter presents the summary, findings, conclusions, and recommendations drawn from the result of the study.

This study determined the correlates of numeracy skills of Grade 7 students at Dominador Narido High School as a basis for intervention. Specifically, it sought to answer the following questions: 1) How may the socio-demographic profile of the respondents be described in terms of age, sex, parent's educational attainment, parent's monthly income, parent's

occupation, number of children in the family, and geographical location?; 2) What is the level of numeracy skills of Grade 7 students at Dominador Narido High School along knowing and understanding, computing and solving, estimating, visualizing and modeling, representing and communicating, conjecturing and reasoning, proving and decision-making, and applying and connecting?; 3) What is the academic performance in Mathematics of Grade 7 students at Dominador Narido High School? 4) Is there a significant relationship between the socio-demographic profile and the numeracy skills of Grade 7 students at Dominador Narido High School?; 5) Is there a significant relationship between the numeracy skills and the academic performance of Grade 7 students at Dominador Narido High School?; 6) Based on the findings, what intervention may be formulated to improve the numeracy skills and academic performance of Grade 7 students?

## V. FINDINGS

The following findings are based on the data gathered.

1. The majority of the respondents were 13 to 14 years old, with a frequency of 52 or 63 percent of the total number of respondents and male with 47 or 56.63 percent, while 36 respondents or 43.37 percent were female. As for the parents' educational attainment, male parents were elementary school graduates with 25 or 30.12 percent, while the female parents of the respondents were high school graduates with 30 or 36.1 percent of the total population. Forty of the parents' respondents or 48.19 percent had a monthly income of 1,000 to 5,000. For male parents' occupations, 26 or 31.32 percent of them were farmers; however, the mothers of the respondents were housewives, comprising 58 or 69.88 percent. As to the number of children in the family, 35 or 42.2 percent had 3 to 4 children. As for the geographical location, respondents were residing below one kilometer from the school, with 31 or 37.35 percent of the population.
2. The level of numeracy skills of the respondents along knowing and understanding, computing and solving, estimating, visualizing and modeling, representing and communicating, conjecturing and reasoning, proving and decision-making, and applying and connecting was 74% and below.
3. The majority of the respondents' first-quarter Mathematics grades or 48 or 57.83 percent were in the range of 75% to 79%.
4. For the test of the significant relationship between the profiles of the respondents and the numeracy skills, the age profile of the respondents had no significant relationship with the numeracy skills of the respondents except for conjecturing and reasoning ($d=-0.256$, $p<.05$) with a weak relationship. In terms of sex, there was no significant relationship between sex and numeracy skills. Parental educational attainment had no significant relationship in terms of the numeracy skills of the students except for the mother's educational attainment, which had a weak significant relationship between applying and connecting ($d=-.215$, $p<.05$). Parents' monthly income and their numeracy skills had no significant relationship except for computing and solving ($d=.215$, $p<.05$) which had a weak significant relationship. The parents' occupations had no significant relationship except for computing and solving ($C=0.813$, $p<.05$) specifically the father's occupation. The profile on the number of children in the family and the numeracy skills had no significant relationship with the variables considered except for visualizing and modeling ($d=.193$, $p<.05$) with a weak relationship. The geographical location of the students had no significant relationship with any of the numeracy skills.
5. For the test of the significant relationship between the numeracy skills and the academic performance in Mathematics, there was no significant relationship between knowing and understanding ($r=-0.014$, p-value= 0.902), computing and solving ($r=-0.040$, p-value= 0.716), estimating ($r=0.033$, p-value=0.766), representing and communicating ($r=0.146$, p-value= 0.189), conjecturing and reasoning ($r=-0.027$, p-value=0.805), and applying and connecting ($r=-.214$, p-value=0.052). But there was a significant relationship between visualizing and modeling ($r=-0.312$, p-value=.004) and proving and decision-making ($r=0.292$, p-value=0.007).

6. The proposed intervention plan was designed to serve as the basis for improvement. The basis in formulating the intervention plan was based on the first quarter Mathematics grades and the level of numeracy skills of the students.

## RECOMMENDATIONS

Based on the findings and conclusions of the study, the following are recommended by the researcher:

1. The school may include in the priority projects of the school improvement plan the proposed intervention program on the numeracy skills of the students. Teachers may also conduct seminars or symposia for parents on how to manage their family.
2. Teachers may develop the eight numeracy skills using the proposed intervention plan.
3. Mathematics teachers may prepare daily activities focusing on the eight numeracy skills using peer-assisted learning strategies and strategic intervention materials related to real-life situations to improve students' academic performance in Math.
4. Teachers may identify the weaknesses or other factors affecting the numeracy skills of the students since the demographic profile has no significant relationship with the numeracy skills.
5. Mathematics teachers may identify the factors affecting the academic performance of the students in Mathematics since numeracy skills are not related to their performance.
6. Future researchers may conduct research on the factors affecting the numeracy skills and academic performance of the students in mathematics or action research to improve the level of numeracy skills and academic performance of the students.

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