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# PROBLEM-SOLVING SKILLS IN MATHEMATICS AMONG LEARNERS IN WEST I DISTRICT, CAGAYAN DE ORO CITY

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**ABSTRACT**

This study attempted to determine the level of problem-solving skills among Grade 5 learners in West I, Cagayan de Oro City during the school year 2022-2023. Specifically, this study sought to: a) describe the respondents' characteristics; b) identify the level of the respondents' problem-solving skills in Mathematics based on literacy and numeracy skills; and c) determine the significant relationship between the respondents' problem-solving skills in Mathematics and each of their characteristics.

The respondents of the study were the one hundred forty-five (145) grade five learners in West I District, Division of Cagayan de Oro City. A descriptive survey method of research design was used in this study. The data were processed using descriptive statistics such as percentage, frequency, mean, and standard deviation to describe the variables in the study. However, Pearson Product Moment Correlation Coefficient (r) was utilized to determine the significant relationship between the respondent's problem-solving skills and their characteristics. Survey questionnaire on problem-solving skills were adapted and modified from the Grade Five Mathematics self-learning modules of the Department of Education.

The findings revealed that the respondents' problem-solving skills on literacy (e.g. identifying what is asked, identifying what are facts given, identifying of operation used and formulation of number sentence) were satisfactory. Meanwhile, the respondents' numeracy skill (problem-solution) was poor.

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Learners who are struggling to solve mathematical problems, particularly those involving literacy skills like identifying what is given and what operation to use may find it challenging to link the mathematical ideas in the numeracy skills involving formulating number sentences and problem-solution.

Also, study habits show a great impact in respondents' problem solving skills by helping them in identifying relevant information and come up with effective solutions. It also contributed to the respondents' academic success and a salient factor in identifying the level of the respondents' problem solving skills in Mathematics.

**Keywords:** *Problem Solving Skills, Mathematics*

## INTRODUCTION

Many learners struggled to solve mathematical problems since it requires an array of skills such as discovering, analysing, and solving problems. This has been a struggle not only to the parents, but also to the teachers who are considered the second parents in the school.

Most of the teachers in Mathematics complain of the inability of the learners to solve mathematics problem. In fact, many of them find it challenging to comprehend mathematics. This occurs as a result of Mathematics being presented in a way that is less engaging and appears challenging to understand. As a result, learners frequently feel uninterested in the class and have poor engagement. In addition, the teaching strategies used by teachers tend to limit learners ability to express them creatively while learning, which makes them less motivated to learn mathematics and results in learning that are less than ideal. Most learners do not understand the significance of mathematics in everyday life and they are more passive, reluctant, afraid and shy in expressing their ideas in solving problems.

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In the recent result of Trends in International Mathematics and Science Study 2019 (TIMSS) revealed that Filipino students lagged behind other countries in the international assessment for Mathematics and Science for grade four. The Philippines only scored 297 in Mathematics and 249 in Science, which are "significantly lower" than any other participating country. TIMSS is an assessment given to grades four and eight students. The result showed that in Mathematics, only 19% of Filipino students were on the low benchmark, which means that they had "some basic mathematical knowledge", while 81% did not even reach this level. It also showed that learners can add, subtract, multiply, and divide one- and two-digit whole numbers. They can solve simple word problems. They have some knowledge of simple fractions and common geometric shapes. Students can read and complete simple bar graphs and tables.

Despite the poor performance of Filipino students in Mathematics, the Department of Education (DepEd) reiterated its commitment to ensure the provision of quality education for all Filipino learners. It helps further our efforts to raise the quality of education in the country. Moreover, Department of Education Order No. 18, s 2017 was issued stating the Guidelines on the Utilization of the 2017 Every Child a Reader Program (ECARP) Funds for the Early Language, Literacy, and Numeracy Program: Professional Development Component. These guidelines shall cover the expansion of the professional development component of the program described in Department of Education Order No. 12, s. 2015 entitled *Guidelines on the Early Language, Literacy, and Numeracy Program: Professional Development Component.* The Program aims to develop in Filipino children the literacy and numeracy skills, and attitudes, which will contribute to lifelong learning. With this, it is the goal of the Department to improve the literacy and numeracy skills of learners from Kindergarten to Grade 3 following the K to 12 Basic Education Curriculum by establishing a sustainable and cost-effective professional development system for teachers.

Since problem-solving skills are central importance in Mathematics today, learners are provided with problems that are new to them and find ways and steps to solve it. It also used

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visual representation to help them understand the problem better and improve their mathematical reasoning. Through visual representation, learners can have clearer vision on what has been asked in the problem. And it seems that everybody agrees that problem-solving skills are important and should be improved. Above all, Russel (2019) mentioned that learning how to solve problems in mathematics knows what to look for. Mathematics problems often require established procedures and knowing what procedure to apply. In order to create procedures, one must be aware of the problem situation, be able to gather the necessary data, establish a plan or strategies, and employ the strategy in the right way.

Thus, it is on this premise that this study is undertaken to identify the learner's problem-solving skills in Mathematics. Likewise, the vision of DepEd in providing high-quality education in a more holistic approach will be realized without compromising the other aspects of students' development.

**Statement of the Problem**

This study attempted to determine the level of problem-solving skills in Mathematics among Grade 5 learners in West I District, Division of Cagayan de Oro City during the School Year 2022-2023. Specifically, this paper sought to answer the following questions:

1. How are the respondents distributed in terms of:
   1.1 Sex;
   1.2 Parents' Occupation;
   1.3 Parents' Highest Educational Attainment;
   1.4 Study Habit; and
   1.5 Parent's Follow Up?
2. To what level is the respondents' problem-solving skills in Mathematics as to:
   2.1 Literacy Skills; and
   2.2 Numeracy Skills

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3. Is there a significant relationship between the respondents problem-solving skills in Mathematics and each of the following:
   3.1 Sex;
   3.2 Parents' Occupation;
   3.3 Parents' Highest Educational Attainment;
   3.4 Study Habit; and
   3.5 Parent's Follow Up?

## METHODOLOGY

This chapter discusses the methods and procedures used in the study: research design, research setting, respondents, sampling procedure, research instrument, data gathering procedure and statistical treatment used in analyzing the data gathered in the study.

### Research Design

This study employed descriptive survey method of research. This research design was appropriate for this study because it is designed to gather information about present existing situations with respect to the understanding of the respondents towards problem-solving skills in Mathematics. The data were gathered through the use of teacher-made questionnaire to be given to grade five learners of West I District, Cagayan de Oro City.

The research did not only require the gathering, tabulating and computation of data but also involved analysis and interpretation of the results of its significance and implication. The results were classified according to the variables considered in the study: sex, parents' occupation, parents' highest educational attainment, study habits, and parent's follow-up.

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**Research Setting**

This study was conducted at West I District, Division of Cagayan de Oro City, wherein the six public elementary schools are: Balulang Elementary School, Fr. William F. Masterson S.J. Elementary School, Macanhan Elementary School, Sacred Heart Village Elementary School, Upper Carmen Elementary School, and West City Central School.

According to the estimated data gathered in the Learners Information System of the Department of Education there were about 240 grade five learners at Balulang Elementary School, 257 grade five learners at Fr. William Masterson S.J Elementary School, 235 grade five learners at Macanhan Elementary School, 188 grade five learners at Sacred Heart Village Elementary School, 144 grade five learners at Upper Carmen Elementary School, and 767 grade five learners at West City Central School. The over-all total number of grade five learners in the West I District is 1, 831. The researcher chooses the public elementary school in West I District, Cagayan de Oro City because it is where the researcher belongs. It is convenient for her to conduct, gather and facilitate all the data in the study.

*Cagayan de Oro* is a coastal highly urbanized city in the Northern Mindanao region, known as "City of Golden Friendship". It is situated at approximately 8° 29' North, 124° 39' East, in the island of Mindanao. Elevation at these coordinates is estimated at 9.7 meters or 31.7 feet above mean sea level. Cagayan de Oro is politically subdivided into 80 barangays.

On February 22, 2007, President Gloria Macapagal-Arroyo signed "House Bill 5859" creating the second congressional district in the city by splitting the present lone district into west and east with the Cagayan de Oro River as the natural boundary. There are 24 barangays in west district and 56 barangays in the second district with a population of 728, 402 as determined by the 2020 Census, making the city as the tenth most populous city in the Philippines. Its total land area reaches up to 488.86 square kilometres representing 13.9% of the entire Misamis Oriental Province. It includes 25 kilometers of coastline and a harbor, Macajalar Bay. The surface

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of Cagayan de Orio representing approximately 44.7% of the land area is classified as agricultural land, while 38.4% is classified as open spaces.

Cagayan de Oro is the regional center and logistics and business hub of Northern Mindanao.

The city's economy is largely based on industry, commerce, trade, service and tourism. The economy of Cagayan de Oro City posted a growth of 9.6% in 2021, a rebound from -8.8 percent decline in the previous year. In 2021, the Gross City Domestic Product (GCDP) of the City is valued at PhP 239.25 billion from the 2020 level of PhP 218.3 billion.

**Respondents and Sampling Procedure**

The respondents of the study were the one hundred forty-five (145) Grade 5 learners of West I District, Division of Cagayan de Oro City during the School Year 2022-2023. The researcher used Slovin's Formula with 8% margin of error and with a population of 1, 831 learners to obtain the desired sample size. Moreover, stratified sampling procedure was utilized to get the appropriate number of respondents in every school. This was done by dividing the sample size by its population. Table A indicates the number of grade five learners by school.

**Table A**

**Distribution of Respondents**

| Schools | Population | Sample Size |
|---|---|---|
| Balulang Elementary School | 240 | 19 |
| Fr. William Masterson S.J. Elementary School | 257 | 20 |
| Macanhan Elementary School | 235 | 19 |
| Sacred Heart Village Elementary School | 188 | 15 |
| Upper Carmen Elementary School | 144 | 12 |

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| | | |
|---|---|---|
| West City Central School | 767 | 60 |
| **Total** | **1831** | **145** |

**Research Instrument**

The instrument used to gather the necessary data was a questionnaire with two parts. The first part involved the respondent's characteristics such as sex, parents' occupation, parents' highest educational attainment, study habit, and parent's follow-up (Capuno et al., 2019). There are ten indicators each for study habit and for parent's follow-up.

The second part of the questionnaire dealt on the respondent's problem solving skills in mathematics based on literacy skills which involved the identification of what is asked in the problem; identification of the facts given; identification of the operation to use, formulation of number sentence; and numeracy skills which involved the problem solution. These skills were adapted from the study of Libres (2020) titled "Problem Solving Skills in Mathematics in Baungon District, Misamis Oriental". However, the problem solving test to measure the skills of the learners are adapted and modified from the grade five Mathematics self-learning modules of the Department of Education. The content areas are whole numbers, fractions, decimals and percentage. A table of specification (TOS) was constructed to determine the type of test design, skills and the content areas covered in the study.

The researcher has a problem solving test of thirty (30) items involving fifteen (15) questions on one-step problem solving and another fifteen (15) questions on two-step problem solving of whole numbers, fractions, decimals, and percentage. Each problem has five questions. The following questions will be asked to identify the level of problem solving skills of grade five learners based on their literacy skills: first, what is asked? Second, what are the facts given? Third, what operation will be used to get the answer? Fourth, what is the number sentence? And as to their numeracy skills: what is the problem solution to get the answer? The scores of the respondents will be based on their given answers with the total points of 150.

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Some items are modified to avoid familiarity of the problem and the number of times these items might have been used. Problems 1, 2, 3, 7, 8, 9, 10, 15, 16, 17, 18, 23, 24, 25 and 26 are one-step problem, while problems 4, 5, 6, 11, 12, 13, 14, 19, 20, 21, 22, 27, 28, 29, and 30 are two-step problems.

**Data Gathering Procedure**

The conduct of the study started from a signed letter of recommendation from the office of the Graduate Studies of PHINMA-Cagayan de Oro College. Then, it was personally forwarded to the Division Superintendent of Cagayan de Oro City to ask permission to conduct the study. Once it will be approved, the researcher asked permission from the school principal of the six schools from West I District for her to administer the instrument. The researcher utilized the use of technology such as mobile phones and internet in the conduct of the study in monitoring the instruments with the teacher in charge. The researcher also asked the assistance from the teacher in charge to help disseminate the instrument during the modular distribution and retrieval of modules for convenience and safety health protocols.

The researcher personally collected the data after the questionnaires are answered. An item analysis was used to determine the level of the respondents' problem solving skills in mathematics. This was used to check, analyze, tabulate and interpret the data.

**Statistical Treatment**

After collecting and recording the data gathered in this study, the researcher used the following statistical tools:

Descriptive statistics such as frequency, percentage, mean and standard deviation was used to describe the variables in the study.

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Pearson Product Moment Correlation Coefficient (r) was utilized to determine the significant relationship between the respondents' problem solving skills and each of their characteristics.

## RESULTS AND DISCUSSION

This chapter discusses the presentation, analysis and interpretation of the data gathered from the survey questionnaires given to the respondents to determine the level of problem-solving skills in Mathematics among Grade 5 learners in West I District, Division of Cagayan de Oro City during the School Year 2022-2023.

Problem 1: How are the respondents distributed in terms of:

1.1 Sex;

1.2 Parents' Occupation;

1.3 Parents' Highest Educational Attainment;

1.4 Study Habit; and

1.5 Parent's Follow Up?

**Table 1**

**Distribution of the Respondents' in Terms of Sex**

| Sex | Frequency | Percentage |
|---|---|---|
| Male | 70 | 48.30 |
| Female | 75 | 51.70 |
| **Total** | **145** | **100.00** |

Table 1 illustrates the respondents' characteristics in terms of sex. Results revealed that the highest frequency of 75 (51.70%) are females. This means that there are more female

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learners in the schools where the study was conducted and that they made a substantial portion of the population in comparison to male students. This implies that female learners dominate the population in the grade five level of West I District, Division of Cagayan de Oro City. As noticed, there are more females than males in the classroom of grade five levels where the study was conducted. This finding conformed the Philippine Statistics Authority were 108.8 female births for every 100 male births in 2011, a sex ratio of 52.10% more females (910, 263) than males 47.90% (836.421) in live births.

Moreover, the lowest frequency of 70 (48.30%) are males. This means that there was less number of males than females. They are outnumbered by the female learners in the place. It implies that there were few male learners born in 2011. In the classroom setting, it is noticeable wherein most of the classes are dominated by female. In some circumstances, men may seek employment in an informal capacity, such as laboring, earlier in their lives. As a result of him having to work to support his family, they dropped from school.

According to data from the Philippine Statistical Authority's Annual Survey on Poverty Indicators, boys made up two-thirds (65.0%) of the country's OOSC in 2017. School attendance was strongly correlated with the family's economic condition, with boys making up a higher percentage than girls.

**Table 2**

**Distribution of Respondents in Terms of Parents' Occupation**

| Occupation | Father | | Mother | |
|---|---|---|---|---|
| | Frequency | Percentage | Frequency | Percentage |
| Businessman | 13 | 9.00 | 12 | 8.30 |
| Carpenter | 5 | 3.40 | 0 | 0.00 |
| Driver | 37 | 25.50 | 0 | 0.00 |
| Engineer | 6 | 4.10 | 3 | 2.10 |
| Farmer | 2 | 1.40 | 1 | 0.70 |

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| | | | | |
|---|---|---|---|---|
| Teacher | 0 | 0.00 | 5 | 3.40 |
| Vendor | 3 | 2.10 | 13 | 9.00 |
| Others (OFW, Delivery Rider, Policeman, Security Guard, Housewife) | 79 | 54.50 | 111 | 76.60 |
| Total | 145 | 100.00 | 145 | 100.00 |

Table 2 presents the distribution of respondents in terms of parents' occupation. In terms of respondents' fathers' occupation, results revealed that the highest frequency of 79 (54.50%) belonged to others such as OFW, delivery rider, policeman, security guard. This means that the occupation of the respondent's father is working as an Overseas Filipino Worker (OFW), delivery rider, policeman, security guard to support their family financially. Overseas Filipino Worker (OFW) is frequently used to refer to Filipino migrant workers or individuals with Filipino citizenship who temporarily reside in another nation for employment. Their motivation for working abroad is frequently tied to their desire to provide for their families, such as by financing their children's education, enabling them to acquire a home or other property, starting their own business, helping out relatives, and/or saving money for retirement. As a result, fathers were physically absent during the formative years of their children. It is noticeable that children lack parental guidance while growing up and they were absent during important occasions such as birthdays, graduation, etc.

According to Mojica and Del Mundo (2019), the academic achievement of children whose parents migrate for employment has both positive and negative effects. It has been stated that parental assistance is preferable throughout the foundation stage so that adolescents can succeed in the classroom and finish the "readiness stage" - whether it be academic, social, emotional, or psychological. Furthermore, for ages 9-12, (wherein the students are in their puberty stage and experiencing an identity crisis, psychological and physiological changes), the distance away from

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their parents has a positive and negative impact. The impact thus depends on the "choices of the students"— whether they desire to succeed or not.

Moreover, the lowest frequency of zero (0) belonged to the teacher. This denotes that none of the respondents' fathers is working as a teacher. However, a frequency of 2 (1.40%) belonged to respondents' father's occupations as a farmer. This denotes that the parents of the two respondents work as a farmer. It implies that the father might maintain a variety of field crops, orchards, vineyards, poultry, or other livestock. They may possess their land or work as laborers on other people's property. As observed, they work manual labor jobs like farming to support their families. Their major material values as laborers come from their farming abilities. These abilities are regarded as blue collar jobs and are typically compensated on an hourly basis. The term "blue collar jobs" refers to employment that needs manual labor, according to Berger (2019). Their labor can be either skilled or unskilled. Welders, mechanics, power plant operators, construction workers, and electricians are a few examples of blue-collar occupations.

On the other hand, for the occupation of the respondents' mothers, the highest frequency of 111 (76.60%) belonged to the mothers of the respondents who were plain housewives. This posits that the mother of these respondents does not have work of their own to generate income for their respective families. It implies that most of the mothers are dependent on the income of their husbands. It is noticeable that they prefer to stay at home and take care of the family's needs. They take care of their child's needs before going to school such as breakfast, and lunch, and do other household chores afterward. According to Philippine Statistics Authority (2020), unemployed persons were highest at 65.70% which agrees that most of the mothers do not have work.

Furthermore, the lowest frequency of zero (0) belonged to the respondent's mother's occupation as a driver or carpenter. This means that none of the mother's respondent is working as a driver or does carpentry works with their husbands. Moreover, a frequency of 1 (0.70%) belonged to respondents' mother's occupations as a farmer. This means that one of the mother's

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respondents works as a farmer, either a family own or works as a laborer. This suggests that the mother might grow crops by hand-weeding, planting, or transplanting them, as well as working as a laborer. As noticed, the mother works as one of the father's assistants. They collaborate as a team, making everything run smoothly and accelerating their task.

According to Adedapo, et al (2019), parental occupational characteristics have a considerable impact on their children's academic success. So, it may be said that pupils who have parents with steady employment and income perform better academically than students whose parents are not employed. Also, pupils who have parents who work in offices and in educational environments perform better than students whose parents work outside of offices. Students whose parents usually close early from work and return home to help them with schoolwork perform better than those whose parents close later from work. Students whose parents' work entails long journeys away from home perform more poorly than those whose parents have jobs that do not involve long journeys away from home.

**Table 3**

**Distribution of Respondents in Terms of Parents' Highest Educational Attainment**

| Educational Attainment | Father | | Mother | |
|---|---|---|---|---|
| | Frequency | Percentage | Frequency | Percentage |
| College Graduate | 42 | 29.00 | 44 | 30.30 |
| College Level | 28 | 19.30 | 29 | 20.00 |
| High School Graduate | 43 | 29.70 | 43 | 29.70 |
| High School Level | 19 | 13.10 | 19 | 13.10 |
| Elementary Graduate | 3 | 2.10 | 6 | 4.10 |

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|---|---|---|---|---|
| Elementary Level | 10 | 6.90 | 4 | 2.80 |
| **Total** | **145** | **100.00** | **145** | **100.00** |

Table 3 revealed the respondents' parents' highest educational attainment. The data showed that the highest frequency of 43 (29.70%) of the respondents' fathers graduated high school. This indicates that the father's respondents completed high school but did not enter the tertiary level. This implies that the respondents' fathers did not plan or dream to pursue higher education. As observed, there are numerous factors to take into account when it comes to educational attainment in the Philippines, particularly given that the majority of families live in poverty and do not place high importance on furthering their education. They are so focused on making money that they prefer to work for a living rather than attend school on an empty stomach. As a result, their educational pursuits take a back seat in their lives.

This seems to conform with the annual statistics on the population's educational attainment gathered by the Census Bureau between 2006 and 2016, revealed that the percentage of people who had completed at least high school increased from 85 to 89 percent, and the percentage who had a bachelor's or higher degree increased from 28 to 33 percent. High school graduates are people who completed high school as well as those who did so using equivalency programs.

On the other hand, the lowest frequency of 3 (2.10%) of the fathers' respondents was an elementary graduate. This means that they finished Grade Six yet did not pursue secondary education. It connotes that some of the respondents' fathers did not enrol in secondary education due to different circumstances and maybe it is not their priority due to financial constraints, insufficient budget in paying their tuition, or supplementing the daily expenses in attending school. As perceived, they need to help their family augment their financial needs by working any available jobs such as laborers.

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Clearinghouse Technical Assistance Team (2020) pointed out that higher levels of education are linked to an overall better quality of life including fewer behavioral and physical health problems, lower unemployment rates, and lower rates of incarceration. While there are other intervening factors, increasing young parents' educational opportunities would have long-lasting positive effects on their children's educational and life-long outcomes.

Furthermore, the highest frequency of 44 (30.30%) of the respondents' mothers graduated college. This means that mothers finished a bachelor's degree at the tertiary level. It connote that parents who graduated college prepare them for a job and adult life intellectually and socially. They were able to find stable, regular jobs and better career opportunities such as higher paying, here and abroad, that would help the family financially. Also, it promotes stability and contentment in general. As noticed, if they have a college degree, they will have more work opportunities, be a better contender for jobs, have a larger earning potential, and experience greater economic and career stability.

According to the Study on International Staff (2018), students with college educated parents were also more likely to graduate, which the study attributed to social and economic reasons. Students without a parent who attended college could not have a parent with first-hand experience to guide them through college. Additionally, they are more likely to come from a socioeconomic background, meaning there was less money to cover the costs of college so; there was a higher chance of dropping out due to financial restraints.

On the other hand, the lowest frequency of 4 (2.80%) reached the elementary level. This entails that the respondents' mothers are elementary undergraduates. It implies that the respondents' mothers are unable to graduate from elementary school for a variety of reasons, such as financial difficulties, preventing them from pursuing higher education. As a result, they are struggling and unable to assist or guide their children in academic school performance. Parental education is regarded as the most stable (permanent) aspect of socioeconomic status.

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It is well established that family plays an important role in a child's academic achievement and development.

Parental education level is one of the socioeconomic status indicators connected to student accomplishment that are included by the Trends in International Mathematics and Science Study (TIMSS). The relevance of educated parents and its connection to parental decisions regarding their children's education were highlighted in the study by Idris et al. (2020). Parental education was found to be essential for raising children in the right manner. Compared to parents with low and medium levels of education, the decisions made by highly educated parents are more pertinent and reflective. This clarifies how parents' educational attainment affects their children's academic success in a favourable way.

**Table 4**

**Distribution of Respondents in Terms of Study Habits**

| Indicators | Mean | SD | Description |
|---|---|---|---|
| I find time to study my lesson in mathematics. | 2.62 | 0.86 | Most of the time |
| I spent more time in solving mathematics problem. | 2.54 | 0.88 | Most of the time |
| I solve Mathematics problem when music is on. | 1.92 | 1.03 | Sometimes |
| I answer Mathematics problem in a quiet place. | 2.99 | 1.03 | Most of the time |
| I minimize distraction when I study mathematics. | 2.65 | 0.97 | Most of the time |
| I solve mathematics problems with my classmates. | 2.32 | 1.07 | Sometimes |
| I study problem solving with my textbook at home. | 2.24 | 1.00 | Sometimes |
| I solve mathematics problem with a high level of concentration. | 2.63 | 0.99 | Most of the time |
| I study my lesson in mathematics before I go to sleep. | 2.44 | 1.05 | Sometimes |
| I take a break after solving mathematics problem. | 3.03 | 0.99 | Most of the time |

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| | | | |
|---|---|---|---|
| **Overall** | **2.54** | **0.99** | **MOST OF THE TIME** |

*Legend:*

| | | | |
|---|---|---|---|
| 3.50 - 4.00 | At all times/High | 1.50 - 2.49 | Sometimes/Poor |
| 2.50- 3.49 | Most of the time/Average | 1.00 – 1.49 | Never/Very Poor |

Table 4 displays the respondents' study habits with the overall mean of 2.54 (SD=0.99) described as **Most of the Time**. It means that respondents had an average study habits and possibly reviewed their lessons in mathematics, but it is still insufficient as shown in their performance in problem solving. They make an effort to review their lessons, although their commitment and willingness are just moderate. It could be noted that their time to review controls of their activity such as household chores and the usage of technology such as mobile phones and internet. However, the respondents' motivation to continue their education despite some obstacles is evident.

Okesina (2019) stated that study habits refer to a routine commitment to focused learning. It determines how intellectually a subject will advance beyond its areas of strength and weakness. In order to advance academically, students must adhere to a time-based study schedule for themselves. It is important to take personality, goals, and aptitude into account while considering study habits.

The indicator **I take a break after solving mathematics problem** obtained the highest mean rating of 3.03 (SD=0.986) described **Most of the Time**. This means that the respondents take a break to help the brain relax and retain information better without being stressed. As perceived, taking breaks from studying to recharge your mind and body will enhance your energy, productivity, and ability to concentrate-not to mention your mental health and well-being. Also, it makes them more motivated and guards against burnout. Some things to do during breaks are stretching, hydrating oneself, reading, or watching something that will inspire the

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respondents to be motivated to study. The amount of time for breaks matters to boost the energy level. The National Institutes of Health researchers (2021) disclosed that during rest the volunteers' brains rapidly and repeatedly replayed faster versions of the activity seen while they practiced typing a code. The more a volunteer replayed the activity the better they performed during subsequent practice sessions, suggesting rest strengthened memories.

The indicator **I solve Mathematics problem when music is on** got the lowest mean rating of 1.92 (SD=1.028) described as **Sometimes**. This indicates that the respondent does not like to hear music when studying mathematics. It implies that music might serve as a distraction during solving a mathematics problem. As seen, some learners prefer to study in a quiet room to understand and concentrate on the lesson on problem solving skills in mathematics. This finding does not confirm with the study of Texas A and M University (2021) disclosing that listening to music can make studying more enjoyable; psychologists from the Department of Psychological & Brain Sciences have found that this popular study habit is more distracting than beneficial. Human beings are not capable of true multitasking because attention is a limited resource. However, in the study of Gold et al. (2019), music can activate the same reward centers in your brain as other things you enjoy. Rewarding yourself with your favorite music can provide the motivation you need to learn new information.

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**Table 5**

**Distribution of Respondents in Terms of Parents' Follow-up**

| Indicators<br>*My parents…* | Mean | SD | Description |
|---|---|---|---|
| check my Mathematics notebook when I arrive home from school. | 2.78 | 0.98 | Sometimes |
| check my assignments in Mathematics problem solving at home. | 3.14 | 0.96 | Sometimes |
| communicate with my teacher about my performance in Mathematics. | 2.78 | 0.9 | Sometimes |
| monitor my grades in Mathematics every grading period. | 2.80 | 0.95 | Sometimes |
| spend time with me every time I solve problems in mathematics. | 2.65 | 0.98 | Sometimes |
| guide me in solving Mathematics problem through examples. | 2.95 | 0.92 | Sometimes |
| help me how to compute for the answer in solving Mathematics problem. | 2.72 | 0.99 | Sometimes |
| provide me with many textbooks in mathematics. | 2.32 | 0.99 | Rarely |
| reward me when I receive good grades in Mathematics. | 2.76 | 1.01 | Sometimes |
| monitor my class attendance in school especially during Mathematics time. | 2.63 | 1.17 | Sometimes |
| **Overall** | **2.75** | **0.99** | **SOMETIMES** |

*Legend:* 3.50 - 4.00 Very Often/ Very High; 2.50 - 3.49 Sometimes/High; 1.50 - 2.49 Rarely/Low; 1.00 – 1.49 Never/Very Low

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Table 5 discloses the respondents' parental follow-up with the overall mean of 2.75 (SD=0.994) described **Sometimes**. This means that respondents' parents show a **high** parental follow-up in their children's education. This would imply that the respondents' parents do follow up with their children's lessons in mathematics but it does not show on the poor interpretation of the numeracy skills result. As perceived, parents do follow up on their children's lessons in mathematics but they may lack confidence in helping their children's lessons. Perhaps, they believe it would take time and effort to participate, assist and monitor their children as much as they would like to.

In an article by fedena.com (2018) titled "How Poor Parental Support Affects Student Growth and Achievement" stated that children who receive support from their parents develop an appropriate mind-set, motivation, and self-discipline at school. Disengaged parents who are not interested in the academic life of their kids often promote school failures.

The indicator **My parents check my assignments in Mathematics problem solving at home** obtained the highest mean rating of 3.14 (SD=0.955) described as **Sometimes.** This means that the parents of the respondents show a **high** support for their children's education. This indicator had the highest frequency which means that the respondents' parents had a poor and low level of follow-up with the checking of mathematics assignments. This implies that these parents may have the feeling that they are inadequate and incompetent to teach their children's assignments. Thus, they let their children answer the assignment alone. As observed, children do their assignments alone without their parents' supervision or guidance.

According to Salin (2017), parents are not aware of the significance of education so they just do not care about it. Moreover, they also believe that only teachers have the responsibility for their children's education. If their children do not do well in school, they will blame the teacher. They do not understand their responsibility toward their children's learning.

Further, the indicator **My parents provide me with many textbooks in mathematics** got the lowest mean rating of 2.32 (SD=0.991) described as **Rarely**. This denotes

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that the parents of the respondents did not provide any textbooks in mathematics that would help them understand or practice in problem solving. It implies that parents cannot afford to buy mathematics textbooks because parents need to prioritize the basic needs of the family such as food, bills, etc. As noticed, there are no supplementary materials that would help enrich their children's skills and improve their knowledge in problem-solving skills in mathematics.

There are many streams of studies investigating whether textbooks affected students' academic performance. According to Mithans, et al (2020), a textbook is a teaching tool that facilitates both effective teaching as well as independent learning. The teacher can integrate the textbook into all stages of the teaching process. Simultaneously, the textbook also serves as a tool for students' independent learning. On the other hand, Hadar (2017) assessed whether textbooks provide opportunities for higher levels of understanding in mathematics affect students' performance in Israel's Arab community. They found that these opportunities positively affected students' performance.

For students who have supportive parents guiding them at home, it has been noticed that these students are also more likely to enjoy school. Thus, parental involvement and support at home not only enhance academic performance, but also have a positive influence on a student's mind-set, attitude, and behavior. Parent's constant involvement affects the child's attitude toward school and classroom conduct.

**Problem 2: To what level is the respondents' problem solving skills in Mathematics as to:**

**2.1 Literacy Skills**

**2.2 Numeracy Skills**

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**Table 6**

**Distribution of Respondents Problem-Solving Skills in Mathematics**

| Indicators | Mean | SD | Description |
|---|---|---|---|
| Literacy | | | |
| *Identification of what is asked in the problem* | 27.64 | 4.161 | Excellent |
| *Identification of the facts given* | | | |
| *Identification of the operation to use* | 23.69 | 6.411 | Very Good |
| *Formulation of Number Sentence* | 12.56 | 6.882 | Fair |
| | 10.32 | 6.960 | Poor |
| **Overall** | **18.55** | **6.103** | **Satisfactory** |
| Numeracy Skills | | | |
| *Problem Solution* | 8.12 | 7.107 | Poor |
| **Overall** | **8.12** | **7.107** | **Poor** |
| **OVERALL** | **82.57** | **6.605** | **Satisfactory** |

| **Legend:** | **Numeracy** | | **Literacy** | **Numeracy** | |
|---|---|---|---|---|---|
| **Literacy** | | | | | |
| 131-150 | 26 – 30 | Excellent | 81-100 | 17 – 19 | Satisfactory |
| 121-130 | 23 – 25 | Very Good | 61-80 | 11 – 15 | Fair |
| 101-120 | 20 – 24 | Good | Below 60 | 10 and below | Poor |

Table 6 demonstrates the respondents' level of problem solving skills in Mathematics with an overall mean of 82.57 (SD=6.605) described as **Satisfactory**. This indicates that the respondents can test a simple hypothesis, solve a problem with a single, clear constraint, and

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grasp a little portion of it. They understand and grasp text easily based on their own comprehension and derive meaning from the text when they try to connect the skills in problem solving and thinking process. It implies that the respondents can only answer word problem solving in one step. As perceived, one-step word problems are better than two-step word problems for the children. They have difficulty comprehending and applying operations in the two-step word problem that involves two different operations (e.g. multiplication and division) or two of the same operation that must be solved to find the solution such as word problem numbers 13 and 14 that involves two-step word problem in fractions. Some children also failed to fulfil Polya's four-step word problem, especially in two-step word problem. To accomplish a sub-goal, they can plan and carry out one action at a time. According to Leppäaho (2018) mathematical problem-solving requires skills to apply a variety of different solution strategies and models. Demitra and Sarjoko (2018) supports this finding stating that to solve a problem, one must first analyze it, then organize the available information, create an action plan, assess all the actions taken, and make decisions.

In particular, the respondent's overall literacy skills obtain an overall mean of 18.55 (SD=6.103) described as **Satisfactory.** This means that students understand a problem in its context, identify key words that can help them solve the problem, come up with solutions to the problem, and then implement those answers. It denotes that although students were able to name what is asked and given in the problem and state the questions it posed, they could not comprehend the connections of each known aspect when they tried to solve it. As perceived, many students struggle to understand how the various variables in the word problem relate to one another and frequently make mistakes when solving them. The findings of Siniguian (2019) demonstrate the need of teaching children mathematical concepts and formulas as well as the necessity of exposing them to a variety of mathematical problem types that will encourage them to think critically by employing various problem-solving techniques that are suited for solving difficulties.

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The indicator **Identification of what is asked in the problem** obtained the highest mean of 27.64 (SD=4.161) described as **Excellent.** This means that most of the respondents answered the questions correctly. It suggests that they have a technique in answering the questions by looking at the signal words such as how much, how many, what is, etc., and the question mark at the end of each sentence. As perceived, they were able to identify what is asked in the problem based on their understanding and grasp the questions based on their comprehension. This finding agrees with Powell et al., (2020), stating that word-problem solving is a type of text comprehension, and student's ability to solve word problems in mathematics depends on their ability to comprehend language. Children when reading word problems make sure they comprehend what they are reading. Also, they require more time to comprehend challenging word problems since they need to pay attention and visualize information in order to recall and comprehend what they read.

The indicator **Formulation of Number Sentence** obtained the lowest mean score of 10.32 (SD=6.960) described as **Poor**. This means that the respondents have difficulty in formulating the number sentence by applying the operations used in the identification of what is asked, specifically the two-step word problem such as word problem numbers 4, 5 and 6 which involves whole numbers; word problem numbers 12, 13, 14 involves fraction. As perceived, the respondents' understanding of the word problem prevented them from producing a mathematical equation. Children may find it difficult to choose a calculation to perform or may choose the incorrect calculation as a result of these issues. This finding supports with Espinal and Gelvez's (2020) study, which contends that pupils who have trouble reading and comprehending mathematical issues would struggle to determine the arithmetic processes required to arrive at solutions.

Meanwhile, the respondents' numeracy skills performance obtained the overall mean of 8.12 (SD=7.107) described as P**oor**. This indicates that the respondents have difficulty in applying the problem solution because they did not understand the question and they failed from the

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solution strategies that they employed in their problem solving schema. It implies that they lack proficiency in mathematical problem-solving techniques. As observed, they are poor in problem solving ability specifically the two-step word problems that involves two operations because they have not grasped how concepts should be applied to real-life situations. Also, they overlooked the additional information in the word problem because their mathematics vocabulary is low. Because of this, they failed to convey their problem and solution of mathematical sentence.

According to Salangsang and Subia (2020), reading proficiency, comprehension, and self-regulated strategies play important roles in pupils' mathematical thinking on problem solving. Learning how to read and comprehend a problem in a language (English), not only their native dialect is equally important as learning mathematics. Knowing the vocabulary and understanding the problem context help the learners learn problem solving and self-regulate the strategies most meaningful and interesting to them. Emphasis on the reading abilities of the learners has to be given focus in the mathematics curriculum at the primary level which helps the learners reduce their difficulties (Subia, 2018).

**Problem 3: Is there a significant relationship between the respondents' problem-solving skills in mathematics and each of the following:**

**3.1 Sex;**

**3.2 Parents' Occupation;**

**3.3 Parents' Highest Educational Attainment;**

**3.4 Study Habit; and**

**3.5 Parent's Follow Up?**

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**Table 7**

**Result of the Test on Relationship between the Respondents' Problem Solving Skills in Mathematics and their Characteristics**

| Respondents' Characteristics | Problem Solving Skills in Mathematics | | | | | OVERALL *r-value* *p-value* |
|---|---|---|---|---|---|---|
| | Literacy | | | | Numeracy | |
| | **Identification of what is asked in the problem** *r-value* *p-value* | **Identification of the facts given** *r-value* *p-value* | **Identification of the operation to use** *r-value* *p-value* | **Formulation of Number Sentence** *r-value* *p-value* | **Problem Solution** *r-value* *p-value* | |
| Sex | 0.014 (NLR)<br>0.870 NS | 0.066 (NLR)<br>0.428 NS | 0.129 (WPR)<br>0.123 NS | 0.100 (WPR)<br>0.231 NS | 0.062 (NLR)<br>0.459 NS | 0.096 (NLR)<br>0.253 NS |
| Father Occupation | 0.106 (WPR)<br>0.206 NS | 0.044 (NLR)<br>0.597 NS | 0.042 (NLR)<br>0.619 NS | 0.009 (NLR)<br>0.916 NS | 0.042 (NLR)<br>0.618 NS | 0.001 (NLR)<br>0.994 NS |
| Mother Occupation | 0.066 (NLR)<br>0.432 NS | 0.049 (NLR)<br>0.555 NS | 0.071 (NLR)<br>0.398 NS | 0.047 (NLR)<br>0.577 NS | 0.044 (NLR)<br>0.602 NS | 0.045 (NLR)<br>0.593 NS |
| Father Highest Educational Attainment | 0.020 (NLR)<br>0.808 NS | 0.044 (NLR)<br>0.602 NS | 0.097 (NLR)<br>0.245 NS | 0.041 (NLR)<br>0.626 NS | 0.092 (NLR)<br>0.271 NS | 0.049 (NLR)<br>0.560 NS |
| Mother Highest Educational Attainment | 0.018 (NLR)<br>0.826 | 0.007 (NLR)<br>0.929 | 0.024 (NLR)<br>0.773 | 0.023 (NLR)<br>0.785 | 0.042 (NLR)<br>0.613 | 0.018 (NLR)<br>0.829 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | NS | NS | NS | NS | NS | NS |
| Study Habits | 0.099<br>(NLR)<br><br>0.237<br>NS | **0.131**<br>**(WPR)**<br><br>**0.015***<br>**S** | **0.231**<br>**(WPR)**<br><br>**0.005***<br>**S** | **0.214**<br>**(WPR)**<br><br>**0.010***<br>**S** | **0.196**<br>**(WPR)**<br><br>**0.018***<br>**S** | **0.222**<br>**(WPR)**<br><br>**0.007***<br>**S** |
| Parent's Follow-up | 0.065<br>(NLR)<br><br>0.440<br>NS | 0.027<br>(NLR)<br><br>0.936<br>NS | 0.007<br>(NLR)<br><br>0.936<br>NS | 0.011<br>(NLR)<br><br>0.896<br>NS | 0.016<br>(NLR)<br><br>0.850<br>NS | 0.007<br>(NLR)<br><br>0.936<br>NS |

***Legend:*** *significant at p<0.05 alpha level S – significant NS – not significant

Table 7 displays the respondents' problem solving skills and their characteristics. The overall data present that the respondents' study habits had a **significant relationship** in their literacy of problem solving skills in mathematics namely the identification of the facts given, identification of the operation to use, formulation of a number sentence, and numeracy which involves the problem solution as indicated by the probability value less than 0.05, which led to the rejection of the null hypothesis. Then, there is **no significant relationship** on the study habits in the literacy skills' identification of what is asked in the problem.

This simply denotes constant study habits would give a positive relationship for learners to be able to improve, comprehend and ease their difficulty in problem solving skills. This suggests that the study habits of the respondents contribute to their performance in problem solving in mathematics. If students have good study habits, they will perform well in the subject. It also suggests that the study habits of the respondents need to be improved. The kind of study habits that they have, it can be seen as one of the reasons for their satisfactory performance in problem solving in mathematics. Mathematical concepts most of the time involve computations and problem solving which require students to practice not only in school but also at home that is why teachers usually give assignments to students for them to practice the skills. However, when

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students are busy with other activities, they will be limited or have no time to practice the learned skills.

Verma et al. (2022) supports this finding when she revealed that students with good study habits exhibit higher mathematics achievement than students with low study habits. It also revealed that good study habits lead to better achievement in mathematics.

Meanwhile, in the respondents' problem solving skills and their characteristics such as sex, parents' occupation, parents' highest educational attainment, and parents' follow-up, have **no significant relationship** in the literacy namely identification of what is asked in the problem, identification of the facts given, identification of the operation use, and formulation of number sentence; and numeracy which involves problem solution. As perceived, their probability value is greater than the desired alpha of 0.05 which lead to the acceptance of null hypothesis.

This means that regardless of the respondents' characteristics, it does not affect the respondents' problem solving skills in mathematics. It implies that respondents explore the concepts and develop understanding of the problem of the literacy skills by identifying what is asked in the problem, identification of facts given, formulation of number sentence and numeracy skills which involves problem solution. As perceived, they use various approaches, utilize knowledge that they previously learned, and employ convincing strategies that justify their ideas. To be able to invent and test strategies, students need to have basic skills and understanding of problem-solving processes. As Leppäaho (2018) noted, a person's ability to solve mathematical problems depends on a variety of factors, including motivational factors, reading and writing skills, and other skills (such as how pupils may apply various tactics). Mathematical problem-solving includes the application of a variety of different solution strategies and models, and it is a skill that can only be acquired by constant practice.

Respondents' characteristics such as sex, parents' occupation, parents' highest educational attainment and parents' follow-up are not significant in the problem solving skills in mathematics because problem-solving skills are not necessarily dependent on an individual's sex,

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parental occupation, education level or parental follow-up. Problem-solving ability is a complex skill that involves a combination of cognitive abilities, such as critical thinking, reasoning, and logic, as well as domain-specific knowledge.

In addition, other factors such as motivation, interest, and exposure to mathematics could play a more significant role in an individual's problem-solving skills than their sex, parental occupation, or parents' educational attainment. Therefore, it is important to consider a range of factors that could influence problem-solving skills in mathematics, and not rely on a few characteristics alone.

**Conclusions:**

Based from the findings of the study, the researcher was able to draw some conclusion:

Learners who are struggling to solve mathematical problems, particularly those involving literacy skills like identifying what is given and what operation to use may find it challenging to link the mathematical ideas in the numeracy skills involving formulating number sentences and problem-solution. Learners struggle, particularly when it comes to comprehending and coming up with a solution that is both correct and complex, connecting mathematical ideas, and using questions to verify the accuracy of the results. The difficulties are brought about by a variety of reasons, such as the pupils' inexperience with word problems and the fact that learning does not promote problem-solving.

Also, study habits show a great impact in respondents' problem solving skills by helping them in identifying relevant information and come up with effective solutions. It also contributed to the respondents' academic success and a salient factor in identifying the level of the respondents' problem solving skills in Mathematics.

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