



HOLY CROSS COLLEGE OF CALINAN, INC
DAVAO – BUKIDNON HIGHWAY, CALINAN POBLACION, DAVAO CITY

**THE RELATIONSHIP BETWEEN STUDENTS' COMPREHENSION
AND MATH PROBLEM-SOLVING SKILLS**

**Talip, Jazyl Blaise
Rinsulat, Kyle Patrick
Chamen, Pearl Emerald
Manansala, Dimple
Blas, Joshua**

March, 2024

THE RELATIONSHIP BETWEEN STUDENTS' COMPREHENSION AND MATH PROBLEM-SOLVING SKILLS

A Research Paper
Presented to the Faculty of the Basic Education Department
of the Holy Cross College of Calinan, Inc.

In Partial Fulfillment of the Requirements in
Practical Research 2

Talip, Jazyl Blaise
Rinsulat, Kyle Patrick
Chamen, Pearl Emerald
Manansala, Dimple
Blas, Joshua

March, 2024
APPROVAL SHEET

In partial fulfillment of the requirements in Practical Research, this study entitled
THE RELATIONSHIP BETWEEN STUDENTS' COMPREHENSION AND MATH PROBLEM-SOLVING SKILLS, prepared and submitted by **Jazyl Blaise S. Talip, Kyle Patrick Q. Rinsulat, Pearl Emerald A. Chamen, Dimple B. Manansala and Joshua G. Blas** is hereby recommended for oral examination, approval and acceptance.

RIALYN V. BAGUIO
Research Adviser

PANEL OF EXAMINERS

Approved by the panel of examiners, after the presentation of the study with the grade of
PASSED.

MELINA C. GONZALES, EdD
Panel Member

EDZEL S. LANGGA
Panel Member

Accepted in partial fulfillment of the requirements in Practical Research 1 and 2.

Date of Oral Examination: March 19, 2024

MA. CORAZON C. SUNGA, Ph. D.
Basic Education Principal
ACKNOWLEDGEMENT

The researcher extends heartfelt gratitude to those who have provided unwavering support and collaborative efforts, including invaluable guidance, insightful discussions, financial support, and personal encouragement, significantly enriching the outcomes of the study.

To our dedicated research adviser, Ms. Rialyn V. Baguio, we extend our deepest gratitude for her invaluable guidance and unwavering support throughout our research journey.

To our committed research teacher, Ms. Vallerie Escolano, we owe a profound debt of gratitude for equipping us with essential research skills that have been pivotal in shaping our approach and understanding throughout this study.

To Dr. Melina Gonzales and Sir Edzel Langga, our respected panelists, we express our heartfelt gratitude for their invaluable contributions and thoughtful feedback, which has significantly enhanced the quality and rigor of our research.

To Sr. Cherie Elosia L. Garote, PM., our respected school president, and Maria Corazon Sunga, the principal of our basic education department, we extend our deepest gratitude for granting us permission and providing unwavering support, allowing us to conduct this study.

To Ms. Shogar Echavez, our invaluable support during the pilot testing phase, we extend our heartfelt appreciation for her dedication and mentorship, which significantly contributed to the success of our study.

To Mr. Mark Laurence Aldepolla whose assistance during the reliability testing of our pilot study was invaluable, the researchers extend their sincerest gratitude. His expertise greatly contributed to the refinement and accuracy of our research.

To the parents Mr. & Mrs. Talip, Mr. & Mrs. Rinsulat, Mr. & Mrs. Chamen, Mr. & Mrs. Manansala, and Mr. & Mrs. Blas, the researchers extend their heartfelt appreciation for your unwavering support and encouragement, which served as a source of motivation throughout our research journey.

Above all, to the God Almighty Father, the researchers thank Him His divine guidance, unwavering support, and abundant blessings, which have empowered them with the strength and wisdom to overcome challenges and achieve the research goals. They are profoundly thankful for the opportunity to embark on this journey of becoming researchers, guided by His grace and wisdom every step of the way.

The Researchers

ABSTRACT

The aim of this study was to ascertain the relationship between comprehension and math problem-solving skills among Grade 7 students of the participating school. To ensure result alignment, a quantitative correlational research design was employed. Seventy- three respondents participated in this survey. Statistical tools utilized included Frequency and

Percentage Distribution, Mean, Standard Deviation, and Pearson Correlation Coefficient.

Two research instruments were used: an adapted questionnaire to gauge comprehension levels, and an assessment by a professional math teacher evaluating learners' competency.

Both instruments underwent pilot testing and reliability testing, achieving a Cronbach's Alpha of 0.7, indicating acceptability. Findings revealed decoding as the most challenging aspect of comprehension, with a mean of 3.13. Meanwhile, background knowledge had the highest mean of 3.47, indicating respondents had expanded knowledge aiding in reading, comprehension, and retention. In math problem-solving, linear equations posed the greatest difficulty with a mean of 2.93, whereas respondents demonstrated proficient ability in solving basic operation of integers with a mean of 5.18. Results indicated no significant relationship between comprehension and math problem-solving skills (p -value = 0.098), leading to rejection of the alternative hypothesis stating such a relationship.

Keywords: *Comprehension, math problem-solving skills, quantitative correlational, Grade 7, Cronbach's alpha, professional math teacher*

TABLE OF CONTENTS

	Page
TITLE PAGE	i
APPROVAL SHEET	ii
ACKNOWLEDGEMENT	iii
ABSTRACT	iv
LIST OF TABLES	8
LIST OF FIGURES	9

Chapter 1. INTRODUCTION

Background of the Study	1
Statement of the Problem	3

Hypotheses	4
Review of Related Literature	5
Theoretical Framework	26
Conceptual Framework	27
Definition of Terms	28
Significance of the Study	29
Scope and Delimitation	31
Chapter 2. METHODS	
Research Design	32
Research Respondents	33
Research Locale	33
Research Instrument	34
Data Gathering Procedure	35
Ethical Considerations	35
Data Analysis	37
Chapter 3. RESULTS AND DISCUSSIONS	
Presentation and Discussion/Interpretation of Data	40
Chapter 4. CONCLUSIONS AND RECOMMENDATIONS	
Conclusions	49
Recommendations	49
REFERENCES	52
APPENDICES	
Appendix 1a: Letter of Permission	63
Appendix 1b: Letter of Permission	65

		vii
Appendix 2a: Letter of Request	67	
Appendix 2b: Letter of Request	69	
Appendix 3a: Validation Sheet	71	
Appendix 3b: Validation Sheet	72	
Appendix 4a: Letter to the Validator	73	
Appendix 4b: Letter to the Validator	75	
Appendix 5a: Survey Questionnaire	77	
Appendix 5b: Raw Data Comprehension and Math Skills	83 84	Appendix: 6a: Level of
According to Sex		
Appendix 6b: Level of Comprehension and Math Skills	85	
According to Age		
Appendix 7: Reliability Result	86	
Appendix 8: Editor's Certificate	118	
CURRICULUM VITAE	119	

LIST OF TABLES

Table		Page
1.	Interpretation of Math Problem-Solving Skills	38
2.	Interpretation of the Level of Math Problem-Solving Skills	38
3.	Interpretation of the Level of Comprehension	39
4.	The Quantitative Interpretation of the Degree of Relationship of Pearson Correlation Coefficient	39
5.	Respondents' Demographic Profile	40
6.	Respondents' Level of Comprehension	41
7.	Respondents' Level of Comprehension	42
8.	Respondents' Level of Math Problem-Solving Skills	44
9.	Respondents' Level of Math Problem-Solving Skills	46
10.	The Quantitative Interpretation of the Degree of Relationship Between Respondents' Comprehension and Math Problem-Solving Skills	48

LIST OF FIGURES

Figure		Page
1.	Conceptual Framework	27
2.	Map of the School	34

Chapter 1 INTRODUCTION

Background of the Study

Comprehension is a crucial ability to explore the text that is being encountered. It involves the whole understanding and interpretation of several concepts and matters (Liou, 2021). It leads the students to acquire new knowledge and improve their mental ability. In mathematics, mathematical problem-solving skill is a tool that develops critical thinking, logical sense and the ability to look for deeper meanings to comprehend mathematical situations (Ponzuric, 2022). Thus, comprehension skills of students are vital in mastering and understanding mathematics.

In the global scenario, Chand (2019) published in a news article that there are schools that had recorded low passing rates in mathematics during examination periods. For instance, North Guru Nanak in Fiji has an 11% pass rate, while Bua has no recorded passers which draws disappointment among teachers, parents, and school heads. They pointed out the students' low comprehension skills as a reason for this existing problem. Based on a study conducted by Hadianto, Damaianti, Mulyati and Sastromiharjo (2021) which measures the comprehension competence of the students in Bandung, Indonesia, it shows that in category A the reading competence mean is 54.5%, while counting competence mean is 55.3%. In category B, the reading competence mean is 41.8% and counting competence mean is 43.5%. For the last category, it has a reading competence mean of 38.5% and a counting competence mean of 41%. The figures shows that students in Bandung, Indonesia have a low comprehension level in understanding word problems.

Meanwhile, Trance (2013) examined the problem that is faced by most students in Iloilo City about oral problem-solving skills. It was revealed that 132 mistakes were

recorded based on their oral responses in each word problem. On the other hand, comprehension skill has an average of 24.62% as one of the common mistakes committed by Filipino students. Moreover, based on the research of Jala (2020) among the students of Bohol it was revealed that many got a low score in reading comprehension with a mean of 20.26 and a standard deviation of 4.14. It was also shown that they encountered difficulties in problem solving considering that the computed mean was 5.247 and a standard deviation of 3.34.

In Davao City, Timario (2020) revealed in his study that Grade 7 students are within the developing stage with a mean of 38.98%. In terms of the students' problemsolving skills, it is evident that they have poor understanding of mathematical worded problems because their translation skill was only 29.04% and computation skills is 20.34%. Additionally, Bongac (2021) conducted a study measuring the competence in mathematics of students in Davao City. It was shown that the average score was 16.73 out of 50 or 58.4% which is considered exceptionally low.

Therefore, the researchers would like to conduct this study to determine whether there is a significant relationship between the students' comprehension and math problem solving skills. Additionally, the study aims to provide additional data and evidence concerning the specific areas of weaknesses of high school students. Delving into the domains of algebraic expression, linear equations, basic operations of integers, percentage, rate and base excites the researchers to go further in exploring, as these concepts in mathematics play a vital role in shaping one's skills. And to be able to discover whether this dilemma exists within the institution.

Statement of the Problem

This study determines the relationship between comprehension and math problemsolving skills of the participating school. In achieving this goal, it is specially focused on providing answers to the following questions:

1. What is the demographic profile of the respondents in terms of:
 - 1.1 sex; and
 - 1.2 age?
2. What is the comprehension level of the respondents in terms of:
 - 2.1 decoding;
 - 2.2 fluency;
 - 2.3 vocabulary skills; and
 - 2.4 background knowledge?
- 3.What is the level of comprehension of the respondents when grouped according to:
 - 3.1 sex; and
 - 3.2 age?
4. What is the level of math problem-solving skills of the respondents in terms of:
 - 4.1 algebraic expression;
 - 4.2 linear equations;
 - 4.3 basic operations of integers; and

4.4 percentage, rate, and base?

5. What is the level of math problem-solving skills of the respondents when grouped according to:

5.1 sex; and

5.2 age?

6. Is there a significant relationship between comprehension and math problem-solving skills of the respondents?

Hypotheses

H_o : There is no significant relationship between comprehension and math problem-solving skills of the respondents.

H_a : There is a significant relationship between comprehension and math problem-solving skills of the respondents.

Review of Related Literature

In this section, researchers gathered various information coming from diverse sources that are related to comprehension and math problem-solving skills in order to understand the concepts thoroughly and have a strong foundation that will support the study.

Crucial Role of Decoding Skills in Reading Comprehension

According to Parrish (2021), when thinking of reading challenges, it is set in mind about children who have difficulty turning written letters into spoken English. This group of struggling readers has poor phonological (speech-sound) ability and has difficulty comprehending many of the words. As someone learns to decode, reading comprehension becomes more about focus and linguistic knowledge. Teachers may begin to identify some students in the third grade who can read content fast but do not comprehend. Moreover, Gwiazdowski (2021), revealed that below-grade level readers struggle not only in language arts but also in other academic fields due to their reading skills. Throughout the day, they struggle to read directions, schedules, and lesson-enhancing reading.

Further, Morin (2020) stated that when children struggle with decoding, they may become frustrated when they are unable to sound out a word. In other situations, individuals may take so long to sound out a word that they no longer understand what the text they're reading is about, or they may give up trying to sound out words and merely guess what a word could be based on its first letters. They may also seek assistance from their parents or find excuses to quit reading, such as a sudden tummy discomfort. In some circumstances, individuals may offer excuses before the reading session even begins. Signs of problems may also appear in their writing samples. Hoover and Tunmer (2018), stated that decoding is commonly seen as the ability to recognize quickly and precisely printed words to determine the meaning of the words included. This implies that anyone who struggles with one or both of these extensively recognized cognitive processes would struggle to grasp what they are reading.

In the study of Setiawati (2019), it was demonstrated how kids can understand reading by displaying their decoding skills. According to Albadawi (2017), decoding is the

act of distinguishing letters and sounds before reading words. Decoding is the process by which proficient readers turn printed text into linguistic sounds. Phonics, phonemic awareness, and word identification are all required for decoding. As a child's decoding skills improve, less time may be spent determining what a word is and more time can be spent determining what the word means. Learning to decode is one of the reading developmental stages for comprehending the words that comprise a phrase.

The results revealed that scoring below the decoding threshold was related with stalled improvement in reading comprehension. The decoding threshold hypothesis can explain disparities in the function of decoding in reading comprehension in students at Grade 5 and higher (Wang, Sebatini, O'Reilly, & Weeks 2019). Ruotsalainen (2022) discovered that students with lower average reading skills devoted more time to code- focused activities such as decoding and spelling. Instructional management was aimed at the entire group.

The Multifaceted Nature of Reading Fluency

According to OECD (2013), teaching children to read fluently and comprehend a book is one of the essential reasons for early childhood education. Morin (2020) compares fluency in reading to fluency in another language, highlighting the importance of understanding and communication. Additionally, reading fluently increases writing success, language proficiency, and comprehension of what is read. Mullin (2019) also states that finding the right balance between reading fluency and comprehension is crucial. All children, regardless of their reading challenges, must work to increase their fluency and comprehension.

Education professionals widely recognize the multifaceted nature of reading fluency. Hollowell (2021) highlights that fluency encompasses a combination of skills, including reading quickly, accurately, fluently, and expressively, all of which contribute to

comprehension. Kim and Wagner (2015) have shown a strong relationship between text reading fluency and comprehension. Fluency development is essential for readers, as it involves not only speed and accuracy but also the ability to read expressively and understand the text deeply. This multifaceted approach to fluency underscores its importance for effective reading and comprehension.

Jiban (2022) emphasizes that conveying meaning fluently is essential for understanding literature. Students enhance their comprehension by not only identifying terminology but also using phrasing, highlighting specific words, and accurately expressing meaning. According to Endo (2021), fluency encompasses students' ability to read literature truthfully, appropriately quickly, and expressively. Fluency enables learners to grasp text more effectively, as fluent readers can digest words quickly and comprehend them with ease. Downing (2022) suggests that improving a child's reading fluency not only enhances their comprehension but also helps fill any gaps in their reading skills. Furthermore, fostering connections with literature is beneficial for children, especially if it contributes to their reading improvement.

Fluent reading significantly contributes to reading comprehension, as noted by Green (2021). Fluent readers can allocate their cognitive resources more effectively towards understanding the text rather than decoding individual words. This connection between word recognition and comprehension is a key aspect of fluency. Shanahan (2019) emphasizes the importance of teaching reading fluency as it helps students understand how print functions, strengthens decoding skills, and enables them to translate text into prosody. Integrating verbal fluency instruction into a comprehensive reading strategy can benefit most students.

Correctness, reading rate, and expressive comprehension are integral aspects of reading fluency. Definitions of fluency vary, with some emphasizing speed and decoding, while others prioritize understanding (Mather & Wendling, 2016). White (2023) suggests that practicing speaking and listening skills can enhance oral fluency, aiding in comprehension and enabling fluent responses. Reading fluency involves comprehending text without pausing to sound out words.

Fluent word reading is believed to enhance reading comprehension by improving automatic word recognition, thus allowing readers to allocate cognitive resources to understanding the text (Stevens, Walker, & Vaughn, 2016). Menon (2017) suggests that fluent readers are engaging to listen to, as they can captivate an audience with expressive reading. Fluent reading enables learners to comprehend text holistically rather than focusing solely on individual words, facilitating a deeper understanding of the material. Practice, particularly reading aloud, is essential for improving reading fluency and should be encouraged both in the classroom and at home.

Williams (2023) emphasizes that proficient readers can maintain focus on the text's meaning while reading fluently and smoothly, without interruptions. Reading fluency plays a crucial role, as students lacking it often encounter difficulties in comprehension, vocabulary development, and overall academic achievement. According to Miranda and Reflinda (2022) there is a significant relationship between fluency and comprehension, indicating that children who have high reading fluency tend to have excellent comprehension skills. However, Pedeliadu, Giazitzidou and Stamovlasis (2020), claims that fluency has no apparent influence on students' comprehension.

The Role of Vocabulary in Reading Comprehension

Vocabulary skill is the ability to use words appropriately in relation to their meaning, as emphasized by Melvin (2022). Expanding one's vocabulary goes beyond the simple act of looking up words in a dictionary and using them in sentences. Instead, students' vocabularies develop throughout their lives through both direct and indirect learning. Summer (2022) highlights the evident relationships between vocabulary and comprehension in reading. Even expert readers may encounter unfamiliar words, emphasizing the challenges inexperienced readers face when confront with seemingly straightforward stories.

Craddock (2022) highlights the importance of vocabulary in reading comprehension. Understanding the meaning of words plays a crucial role in enhancing the comprehension of a text. Children who lack a robust vocabulary often struggle to comprehend what they read and face challenges in effective communication through both speech and writing. Craddock also suggests that the teaching of words and their meanings should be an essential component of all literacy and content instruction. Lastiri (2023) adds that a strong vocabulary enables individuals to express their thoughts more effectively and accurately, as opposed to struggling to string together a collection of words that may incorrectly convey an opinion.

Miller (2017) underscores the significance of vocabulary development in achieving the main objective of reading, which is comprehension. Miller's research suggests that a strong vocabulary not only aids in reading but also enhances proficiency in various aspects of communication, including listening, speaking, reading, and writing skills. McKay (2023) emphasizes the importance of improving vocabulary skills when learning a second

language. A vast vocabulary not only enhances clarity in speech and writing but also significantly impacts language comprehension.

Terry (2022) stresses that comprehension is challenging when one encounters words they do not understand or cannot relate to. Comprehension, defined as the capacity to understand and apply what has been read or learned, is closely tied to vocabulary. As Terry points out, an individual's vocabulary comprises all the words they know, and reading comprehension involves analyzing and synthesizing words, sentences, and concepts. Therefore, enhancing one's vocabulary contributes to improved comprehension. Rigg (2019) suggests that fostering a rich language environment through various activities such as listening to high-quality children's picture books, engaging in discussions, and storytelling can enhance language development.

According to Nurmalaasari & Haryudin (2021), students' limited vocabulary to express each characteristic of the thing they write about can hinder their reading comprehension, writing ability, and communication skills. This highlights the crucial role of vocabulary in both reading comprehension and language development. Spivey (2013) further emphasizes the necessity of direct instruction, exposure to words, and social interaction for students to acquire an extensive vocabulary. Lastiri (2023) adds that a strong vocabulary enables individuals to express their thoughts more effectively and accurately, as opposed to struggling to string together a collection of words that may incorrectly convey an opinion.

Understanding the Concept of Background Knowledge

It is essential to recognize the significant role that background knowledge plays in shaping one's understanding and comprehension of new information and concepts, as it ultimately influences their overall learning journey. In the same manner, background

knowledge is essential to reading comprehension, according to a study by Neuman, Kaefer, and Pinkham (2019); the more you know about a topic, the simpler it is to read a text, comprehend it, and retain the information. According to the study of Smith et al. (2021), the findings repeatedly indicate that increased levels of background knowledge significantly enhance children's ability to grasp a given material.

Moreover, as stated by Terada (2019), 3,534 high school students were included in a research study, and the student responses were then examined by researchers to derive a background-knowledge score, which served as an indicator of their level of familiarity with the subject. The findings show a negative correlation between the scores obtained by students who achieved below 59 percent on the background-knowledge assessment and their subsequent performance on the reading comprehension test. However, it has been seen by researchers that there is a significant increase in comprehension above the barrier of 59 percent. This finding implies that a deficiency in prior knowledge can hinder reading comprehension and suggests the existence of a foundational level of information that facilitates a rapid enhancement in comprehension. Reading is done to gain knowledge and advance one's academic career through understanding texts' meanings. In interactive instruction, background knowledge is a fundamental element that helps students decode texts and accelerate their learning. It incorporates knowledge that has been acquired explicitly, tacitly, metacognitively, and conceptually through life experiences (Anyiendah, Oundo, & Kibui, 2021).

Further, Alst (2014) stated that to better understand what they are reading, good readers frequently rely on their background knowledge and experiences. Good readers build connections between the text and their background knowledge. According to a study, readers employ their background knowledge including language, information, and conceptual understanding to grasp the material they are reading. It was demonstrated that

youngsters are better able to comprehend material if they have background knowledge about the subject (Schwartz, 2023).

Likewise, Starke (2021) had discovered that an important factor in influencing a student's effectiveness in reading comprehension is background knowledge. A child's ability to comprehend what they are reading can frequently depend on this one element. The goal of reading is comprehension. Making connections is a crucial reading technique that motivates readers to exchange text to-text and text-to-world connections.

Gender Disparities in Reading Comprehension

The data illustrates the outcomes of a reading comprehension assessment, highlighting girls' overall superior reading skills compared to boys. Girls demonstrate proficiency in understanding various types of words, including those with uncommon meanings, difficult vocabulary, and complex definitions. This emphasizes the superiority of girls in reading comprehension abilities (Anantasa, 2016). In the study by Asgarabadi, Rouhi, and Jafarigohar (2015), their descriptive statistics analysis revealed that males outperformed females in reading performance. This finding underscores a notable gender disparity in reading abilities, suggesting a potential area for further investigation into factors contributing to this difference. Such insights could inform educational strategies aimed at addressing gender-based variations in academic achievement.

Ngongare, Samola, and Rettob (2020) reported an observed t-value of 3.333, surpassing the critical t-value of 2.000 at a significance level of 0.05 and degrees of freedom of 58. As a result, the null hypothesis was rejected according to the criteria specified, signifying those female students significantly outperformed their male counterparts in comprehending neutral texts, as evidenced by their study. Hence, the research findings affirm the distinct superiority of female students in reading comprehension skills compared

to their male peers. According to (Toivainen et al., 2017), boys started to excel over girls in reading comprehension, showcasing a more robust incorporation of their verbal skills within their overall cognitive framework. This integration of verbal abilities into intelligence was notably stronger in boys compared to girls. It marked a notable difference in performance between the genders in reading comprehension.

With boys averaging a mean score of 12.70 and girls achieving 16.94, a notable contrast in reading comprehension performance between genders is apparent. The rejection of the hypothesis suggesting no significant difference highlights that girls outshine boys in this aspect, supported by the significant t-value of 3.282 at the 0.05 level. This discrepancy underscores the distinct reading comprehension levels between genders, with girls demonstrating superior abilities compared to boys in comprehending texts (Anjum, 2015). However, Rahmahwati and Ummah (2020) revealed that there is no difference with the comprehension of male and female.

Age-Dependent Variations in Reading Comprehension Among Grade 7 Students

According to Aquino and De Vera (2018), their study focused on reading comprehension among Grade 7 students. Surprisingly, they found that some 12-year-old students in the same grade level demonstrated stronger reading comprehension skills compared to their 13-year-old peers. This variation in skill levels highlights the importance of personalized approaches to cater to individual developmental stages and educational needs, ultimately leading to more effective interventions and support strategies. Kashner (2021) also states that among this age range, 13-year-olds often show superior proficiency in comprehension tasks compared to their younger counterparts at ages 11 and 12. This highlights the significance of age-related cognitive milestones in shaping reading comprehension abilities during the adolescent years.

Greely (2022) suggests that 12-year-olds often demonstrate superior comprehension abilities compared to their peers at ages 11 and 13. This age-related difference in comprehension levels may be attributed to cognitive development and increased exposure to a variety of texts. Moreover, the ability of 12-year-olds to extract nuanced information, analyze complex relationships within texts, and apply critical thinking skills sets them apart in terms of reading comprehension proficiency during this developmental stage. Cueto's (2019) study suggests that male respondents, particularly those aged 11 to 15 Notably, older participants showed satisfactory performance across vocabulary, grammar, and reading comprehension assessments compared to their younger counterparts.

The analysis of reading performance scores between younger (11-13 years old) and older students revealed significant differences. Younger students generally exhibited lower total reading performance scores compared to their older counterparts, as well as lower scores in reading fluency and comprehension. Despite the statistical significance, the effect size for age on reading performance tasks was relatively small, suggesting that age accounts for little of the variance in reading performance (Vlachos, Walla, & Papadimitriou, 2015). Ramirez and Abanto (2024) revealed that among the grade 7 respondents, the age range of 13 to 14 years old was the most prevalent, constituting 64.2% of the surveyed population. This finding suggests that students in this age group generally demonstrate a higher level of reading comprehension compared to their younger peers, highlighting the developmental differences within the grade 7 cohort.

Challenges of Algebraic Expressions

Based on Singh (2022), an algebraic expression is a mathematical claim that

illustrates the relationship between two or more variables. It combines variables, constants, addition, subtraction, multiplication, and division mathematical operations. These expressions allow us to analyze and comprehend complex situations by using mathematical correlations. In accordance with Adzo (2021), this subject is often challenging for students. However, it is one of the most exciting areas of mathematics, and frequent study of the subject can help learners advance their logical and reasoning skills.

For many students, algebraic expression presents an impossible task because it is the first math subject they take in which they must deal with variables, abstract ideas, and problem-solving skills. Investigations by Rudyanto, Marsigit, Wangit, and Gembong (2019) also revealed several difficulties students encountered when using algebraic expressions. Most students struggle to understand basic algebraic formulas, especially when it comes to understanding what variables are. The main concept that needs to be grasped to continue learning algebra at a higher level, according to Booth, McGinn, Barbieri, and Young (2017), is the variable in the algebraic statement.

As indicated by Baidoo (2019), algebraic expressions are often challenging for learners due to their adherence to the laws of arithmetic functions. Students may struggle with understanding concepts such as polynomials, which can comprise both numerators and denominators. Uncorrected errors and misunderstandings can compound over time, hindering students' ability to grasp rational algebraic equations. Masullo (2017) notes that students frequently struggle to comprehend abstract concepts within algebraic topics. Additionally, students may face difficulties in applying fundamental mathematical ideas and effectively breaking down expressions into their component parts.

Middle and secondary school students are expected to delve into the fundamentals of algebra, which encompass developing rules to define patterns, formulating algebraic

expressions and equations, and solving equations, according to Nataraj and Thomas (2016). Cam (2023) underscores the challenge of comprehending advanced algebraic topics without a solid grasp of these foundational skills. Additionally, Pandey (2020) suggests that regular practice with algebraic calculations can enhance logical thinking and problemsolving abilities, leading to improved proficiency in solving algebraic problems.

Understanding Linear Equations and Student Challenges

A linear equation is defined as an equation where the variables involved have a maximum power of 1. Essentially, it represents a mathematical relationship that forms a straight line. While every linear equation represents a single line, each line corresponds to an infinite number of equations, all featuring a variable with a maximum power of 1 (Staff, 2020). A system of linear equations usually shows a particular solution, although it may instead show neither no solution nor an infinite number of solutions. A linear equation with two variables is characterized by the dependence of one variable, denoted as 'x,' on the value of the other variable, denoted as 'y.' The graph of a linear equation will show a linear relationship between two variables, leading to a straight line (Grover, 2022).

Ernawati and Muzaini (2020) discovered through preliminary interviews conducted with mathematics teachers that students encountered difficulties with mathematical concepts. This difficulty was observed among the research respondents who were in the eighth grade at the time. This can be seen in the students' incapacity to successfully solve the questions given to them by their teachers, particularly in the domain of systems of linear equations involving two variables. In consideration of the daily mathematics assessment administered to students, it was observed that the mean score attained by the students was 60.8 out of a possible maximum score of 100. Out of the total of 30 students that participated in the examination, only 11 were able to attain the Minimum Mastery Criteria

established by the educational institution, which was set at a score of 75. And, based on the analysis and interpretation of the research findings and after discussion, it can be concluded that specific students encounter problems comprehending the concept of a two variable linear equation system. This difficulty can appear in several forms, including difficulties in the basic concepts, comprehending problem-solving techniques, and executing the necessary calculations (Widada et al., 2020).

Linear equations involve the use of one or more variables, wherein the value of one variable is dependent upon the value of another variable. A wide range of scenarios involving unknown quantities can be successfully modeled using linear equations. Examples include determining income trends over a period, estimating mileage expenses, and forecasting profitability (Smith, 2018). Linear equations play an essential part in the field of mathematics because of their ability to explain the connection between two variables or events, facilitate the calculation of rates, and enable the conversion of measurements from one unit to another. Atteh et al. (2017) revealed that the balance model not only encourages learners to actively participate but also engages them intellectually in solving linear equations. Drawing from these foundational findings, the researchers concluded that employing the balancing model teaching approach is significant for fostering active learning and enhancing students' conceptual grasp of linear equations.

Challenges and Misconceptions Handling Integer Operations

Dube and Robinson (2018) stated that students struggled with integer operations. The rules are easily confused, especially when the signs of integers include both the positive and negative signs. Furthermore, students struggled with integer operations, particularly when dealing with negative values. Students are perplexed by the signed integers, particularly when the equation featured a positive (+) or negative (-) sign

as a result, they frequently met the misunderstanding of "rule mix-up" where they just remember the rules of each integer operation and apply them incorrectly (Khalid & Embong, 2019).

Fuadiah, Suryadi, & Turmudi (2016) investigated the misconceptions of Grade 7 students and discovered that many students had difficulty understanding the concept of integer particularly which is related with negative numbers. The students do not understand the laws and principles of completing the positive and negative integer count operations correctly. Sometimes students neglect the positive and negative symbols of integers, supposing that there is no difference between the two (Maulyda et al., 2021).

According to (Kwakye, 2022), the teacher's job was to interact with the students and try to understand what they produce with the materials. This paper proposes that number rules be utilized as manipulatives to teach and learn addition and subtraction of integers in group settings at the junior high school level. Operating signed numbers or integers was one of the essential mathematics competencies with which many high school pupils failed and had misconceptions. Students' misconceptions and errors in integers might have an impact on their degree of mastery. As well as mathematical ability studies that assess students' competence levels and the gender difference in fundamental integer operations is relatively small. Furthermore, there has also been little research into how to counter pupils' misconceptions (Jamaludin & Maat, 2020).

When comparing two negative integers with opposing integers, students became perplexed. They frequently overlook the negative sign, and pupils frequently add or subtract numbers because they are unfamiliar with the action of multiplication using simple parenthesis (Zurbano, 2019). However, according to the study of Sahat, Tengah, & Prahmana (2018), a large number of students had no difficulties adding positive integers

before and after intervention, as revealed by high pre-test and post-test scores. Overall, students' performance in integer addition improved significantly, with the average percentage increasing from 60.2% in the pre-test to 89.7% in the post-test. It indicates that most of the 12 students who took the integer counting operations exam had very high learning outcomes, leading to the conclusion that the math learning test in integer counting operations using teacher-made media leads to generally high and very high results (91.6%).

Struggles with Percentage, Rate, and Base Concepts in Mathematics

Some children between the ages of 13 and 17 believed math to be the most challenging subject due, in part, to their short attention span. Lack of knowledge of fundamental ideas is the most frequent problem when learning arithmetic skills. Since solving arithmetic problems requires following a step-by-step procedure, pupils cannot begin to tackle a difficult problem if the first few are unclear (Ali, 2019). A percentage is a useful number whose numerical value serves as the basis for its conceptual meaning. Functional context is described by Tomson (2021) as "the context in which something is done." According to Erdem, Ozçelik, and Gürbüz (2018)'s study, students had difficulty understanding and interpreting the concept of percentage, finding a quantity with a specific percentage, writing a quantity as a percentage of another quantity, finding the amount that corresponds to a specific percentage of a quantity, writing various representations as a percentage, and recognizing the differences between two percentages.

According to (Diba & Parabwanto, 2019), some predictions match the replies of students based on the analysis results. Students in general when solving issues, remembering is still preferred over understanding. Students continue to make mistakes in calculations and in determining correlations between quantities. According to Çalışıcı

(2018), the study's findings revealed that the students have difficulty memorizing the ratioproportion topic. The report specifically emphasized that pupils lack understanding of which number pairs of the same proportion can be increased or divided without changing the equation. And the students' lack of ability could impact their entire math competencies.

Contradicting ideas by Zamora (2019) indicate that students demonstrate improvement from their last test by demonstrating a respectable level of expertise when they reach a 60% proficiency level in answering word problems involving percentages, rates, and bases. Students aim for steady progress and the skillful application of these ideas in a variety of settings in order to establish mastery. Sufficient practice, individualized teaching, and practical application are still essential for developing students' advanced skill with percentages, bases, and rates. Furthermore, according to Domanais (2022), the passing percentage for Filipino students' national mean percentage score on the National Achievement Test (NAT) Mathematics subtest is approximately 75%. As a result, the study has determined the competency levels of students in Grade 7, with an emphasis on numerical ideas where they show strong proficiency with percentages and rates. The objective is to guarantee that they have a thorough understanding of these ideas and to raise their level of mathematical skills.

Gender Differences in Math Problem-Solving Skills

The study of Pambudi, Budayasa, and Lukito (2018) found that male students' mathematical connection profiles in solving mathematical problems were efficient, strong, and successful. Female students, on the other hand, had an inefficient, poor, and ineffective mathematical connection profile when it came to problem solving. Another study found that male students, particularly those with strong mathematical skills, performed better at

understanding problems and creating solutions than female students, particularly those with weak mathematical skills (Izzah, Faslurrohman, & Permatasari, 2022).

According to the findings from the given contexts male students with high skills outperform female students with high skills in several elements of problem-solving (Santosa, Maison & Huda, 2023). A quantitative study by Özpinar and Arslan (2023) revealed no significant difference in mathematical problem-solving abilities between male and female students.

In the study of Tarigan, Simanjorang, and Siagian (2022) it shows that female students are better at solving math problems compared to male students. Female students outperform male students in all stages of problem-solving, particularly in understanding the problem and developing a solution plan. Although there's not much difference in implementing the solution plan, females still show superiority overall in every problem-solving stage. In summary, female students excel in math problem-solving compared to their male counterparts across all stages of problem-solving. Girls scored 17.84 on average, whereas boys scored 11.60, indicating a significant disagreement in mathematical problem-solving performance. The rejection of the hypothesis of no significant difference highlights that female outperformed male in this domain, as evidenced by the t-value of 3.291, which is significant at the 0.05 level. This discrepancy illustrates the different degrees of mathematical achievement across genders, with females outperforming boys in solving mathematical problems (Anjum, 2015).

Age Variability of 7th Grade Students in Mathematical Problem-Solving

The data revealed a range of student respondents. The majority of them were 12-13 years old, which is the typical age of a 7th grader. However, some were younger, implying

that they started school at an early age, while others were older, as is normal in rural institutions. In terms of past math grades, the majority of them did well, with scores ranging from 85% to 89.99%. Their average performance was described as satisfactory, with a mean score of 84.75% (Malibiran, Aplon, and Izon, 2019). According to the study by Jordan and Sunico (2022), students in Grade 7 showed an excellent level of skill in using a mathematical problem-solving approach.

Based on the findings, 7th grade students aged 12–13 might show different levels of math problem-solving skills. The Algebraic Thinking Test (ATT) Instrument was created to evaluate algebraic thinking skills in problem solving among seventh graders, and it has good validity and reliability (Jahudin and Siew, 2019). Özpinar and Arslan (2023) found that among the Grade 7 students 15 years old are most likely proficient in mathematical problems.

Students aged 12 to 13 frequently struggle with arithmetic problem solving, especially when faced with complications (Popham, Adams, & Hodge, 2019). Furthermore, it has been suggested that teachers assign problem-solving activities based on their particular issues and allow students to use their chosen coping methods to improve their performance in mathematical problem solving (Cui & Ng, 2021). These findings highlight the importance of dealing with and helping 12- to 13-year-old kids develop good problem-solving skills in mathematics.

The Relationship between Comprehension and Math Problem-Solving Skills

According to the study of Can (2020), the correlations between the variables were positively significant. Further, reading comprehension seems to play a little mediating role

in the relationship between logical thinking and word problem solving. In addition, according to Simbulas et al. (2015), the results revealed that students had average reading comprehension and problem-solving skills. There is a significant relationship between reading comprehension and problem-solving skills. On the contrary, Auzar (2018) revealed that there are no significant relationships between comprehension and the ability to understand questions about mathematical worded problems.

According to Villaflor & Jalos (2023), the estimated r value of 0.066 indicates a weak association between reading comprehension and mathematical problem-solving skills. This value emphasizes an insufficient constant association, implying that reading comprehension skill does not significantly predict or correlates to mathematical problem-solving ability. According to Hijada and De La Cruz (2022), the relationship was weakly positive between comprehension and students' problem-solving abilities. It indicates a failure in rejecting the null hypothesis in which there is no significant relationship between the two variables.

The synthesis of the reviewed literature underscores the intricate relationship among reading comprehension, logical thinking, and problem-solving skills. Can (2020) presents findings indicating a positive and significant correlation between these variables, with reading comprehension exhibiting a modest mediating role between logical thinking and word problem solving. This suggests the necessity of integrating activities aimed at enhancing both word problem solving and logical reasoning skills. Simbulas (2015) further reinforces this assertion by emphasizing the pivotal role of students' comprehension of problems prior to attempting solutions, with vocabulary emerging as a critical predictor of problem-solving proficiencies. However, Auzar (2018) provides contrasting results, suggesting an absence of robust or statistically significant associations between reading

comprehension and comprehension of mathematical word problems. Villaflor & Jalos (2023) and Hijada and De La Cruz (2022) similarly report weak correlations between reading comprehension and problem-solving skills, challenging the notion of a consistent and predictive linkage between these constructs. Overall, while certain studies underscore the significance of reading comprehension in facilitating problem-solving capacities, others suggest a more intricate and nuanced relationship warranting further exploration and consideration within educational frameworks.

Theoretical Framework

This study is anchored on Cognitive Load Theory by John Sweller. According to the said theory, learners may become overwhelmed by the enormous amount of interactive information that must be processed at once before meaningful learning can begin. The basic principle of cognitive load theory is that instruction should be designed in a way that is at an optimal level of complexity (intrinsic load), reduces the load on working memory resulting from processes that do not contribute to learning (ineffective or extraneous load), and optimizes the load as much as possible (germane load). Cognitive load theory focuses on instructional control of the excessively high load that complex tasks impose on learners' capacity-limited working memory (Sweller et al. 1998).

The relationship between reading comprehension and math problem-solving abilities can be better understood in the context of Cognitive Load Theory, which investigates how human working memory capacity affects learning and problem-solving. Our working memory is involved with decoding, comprehending, and integrating information as we read comprehension activities. It might be more difficult to properly commit cognitive resources to math problem-solving if our working memory is already overburdened with the cognitive demands of reading comprehension. Hence, even in the

absence of a significant relationship between comprehension and math problem-solving skills, Cognitive Load Theory remains applicable as it underscores the challenge individuals face in allocating cognitive resources effectively when their working memory is burdened, informing instructional design to optimize learning outcomes in both domains.

Conceptual Framework

The study was guided by the following conceptual framework shown below:

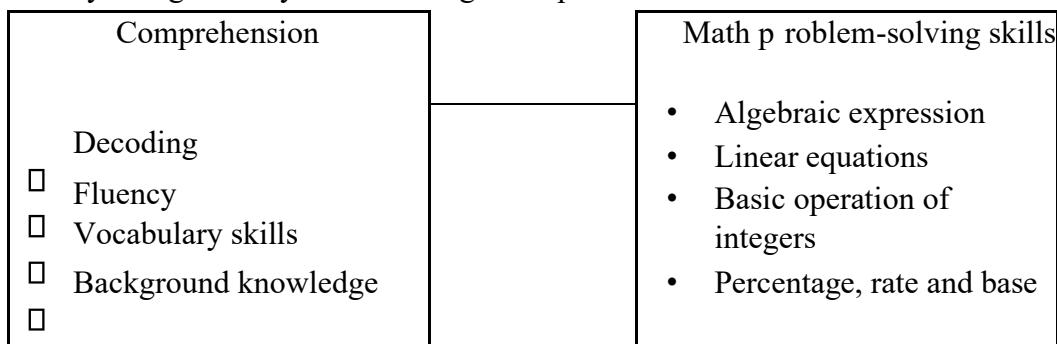


Figure 1: Conceptual Framework

As shown above, the researchers were trying to find out if there is a significant relationship between comprehension and math problem-solving skills of Junior High School students. Predictor-criterion model was being utilized which assessed the association of two variables included in the study. The predictor variable is the comprehension which provides information about the other variable. Lastly, the criterion variable is math problem-solving skills that is measured as the outcome.

Definition of Terms

The following terms used in this study were defined operationally.

Comprehension

- refers to how the respondents understands and analyzes by utilizing their decoding, fluency, vocabulary skills and background knowledge.

Math Problem-Solving

- **Skills** are the capacity of the respondents to solve math problems involving algebraic expression, linear equations, basic operation of integers, percentage, rate and base.

- **Decoding** encompasses the ability of the respondents to confidently recognize and process printed words and sound out unfamiliar terms

- **Fluency** the respondents' capacity to read accurately and expressively at an appropriate pace.
- **Background Knowledge** the continual expansion of respondents' knowledge through education and active application of acquired knowledge.

- **Vocabulary Skills** the ability to use newly encountered words, applying them accurately and infer meaning from the context.

- **Algebraic Expression** a mathematical phrase combining numbers, variables and operations like addition or multiplication.

- **Linear Equation** a mathematical statement that represents a straight line on a graph and can be solved to find the value of a variable.

- **Basic Operation of Integers** fundamental arithmetic operation including addition, multiplication, subtraction and division.

- **Percentage, Rate and Base** mathematical concept representing a portion of a whole, where the base is the amount, the rate is the part, and the percentage shows the part as the fraction of the whole.

Significance of the Study

This study determined the possible relationship between comprehension and math problem-solving skills of the students. The result of this study may have a positive impact on students, mathematics teachers and future researchers. Moreover, the connection between the two variables will be highlighted and serve as a guide for them to assess and understand the areas of weaknesses. Dealing with this topic is beneficial to be able to shed light on the problems that had been existing in the students' comprehension and in the field of mathematics.

This study may help the students to recognize how comprehension influences their ability to solve mathematical problems. It may also help them to assess their skills in terms of comprehension and problem-solving in mathematics. With this, they can find ways to develop and improve what they lack of. The students may attain a deeper understanding which allows them to face mathematical situations with proficiency and confidence.

This could give benefit for mathematics teachers and educators in a way that they can learn to adjust and create a learning environment which can help students develop their comprehension and math problem solving skills. It provides ongoing assessment data that might assist them in planning their lessons. Also, it can increase reading fluency and make the teachers confident to teach in front of their students. Knowing the difficulties inside the classroom setting is an important key to suggest programs that create an advantage for their learners in enhancing their skills.

It may also be advantageous for future researchers as the findings of this study may serve as a foundation and related literature for academic papers in the future. It can help researchers develop new ideas and obtain knowledge about comprehension and math

problem solving skills. Additionally, the findings can inspire them to have further exploration that can possibly help in broadening an existing idea. Therefore, it could potentially help so that they can create future innovations towards fostering comprehension and math problem solving skills.

Scope and Delimitation

The goal of this study is to determine the relationship between comprehension and math problem solving skills. The students of the Basic Education Department, particularly the Grade 7 of S.Y. 2023-2024 were chosen as the respondents. The researchers concentrated on four crucial areas of math problem-solving: algebraic expression, linear equations, basic operation of integers, percentage, rate and base. Through the lenses of decoding, fluency, vocabulary skills and background knowledge comprehension were tested. The research established empirical insights into the potential relationships and impacts between these areas by focusing on these components of comprehension and math problem-solving within the context of the chosen grade level and academic year.

The delimitation of this study is that it only included the Grade 7 students during the specified academic year which means that the findings were not generalizable to other grade levels. In measuring the level of comprehension, it only focused on decoding, fluency, vocabulary skills and background knowledge without looking on other facets of comprehension. Moreover, math problem solving skills exclusively measured the topic of algebraic expression, linear equations, basic operation of integers, percentage, rate and base and did not explore and consider other mathematical concepts.

Chapter 2

METHODS

This chapter involves the research design and research procedure that is used by the researchers in order to continue pursuing the study. It discusses the research locale, research respondents, research instrument, ethical considerations, and data analysis.

Research Design

This study is quantitative research which utilizes the descriptive-correlational type of research. According to Bhandari (2020), the process of gathering and interpreting numerical data is known as quantitative research. It may be applied to identify trends and averages, formulate hypotheses, examine causality, and extrapolate findings to larger groups. Moreover, in correlational research, relationships between two or more variables are determined. Simply expressed, it analyzes whether a rise or fall in one variable is accompanied by a rise or fall in another. The results of a correlational study allow researchers to ascertain if two variables change together and to what extent (Tan, 2014). The objective of descriptive research is to describe a population, circumstance, or phenomena accurately and methodically.

Additionally, descriptive method was utilized to represent the demographic profile of the respondents within the participating school in which it includes their sex and age. This type of method allows the researchers to interpret the level of students' comprehension in terms of decoding, fluency, vocabulary skills and background knowledge. In the part of math problem solving skills, it was also useful to reach the level of accuracy. Lastly, the utilization of correlational study helps to determine the relationship between the two variables.

Research Respondents

This study investigated the relationship between comprehension and math problemsolving skills. Only the grade 7 students in each section that voluntarily decide to engage themselves and with consents are included in the study. On the other hand, other year levels are excluded, and those grade 7 students refuse to participate. To ensure that there is a representative sample, the researchers employed stratified random sampling. According to Thomas (2020), when a population has a wide range of features and researchers want to be sure that each characteristic is accurately represented in the sample, they turn to stratified sampling. This aids in the study's validity and generalizability and helps to prevent research biases like undercoverage bias.

Research Locale

The study was conducted within a private Catholic school in Davao City. The school has been administered by the sisters of the Presentation of Mary since 1958. At the moment, it is one of the few schools in Calinan, Davao City that offers pre-school through college-level education, which is extremely beneficial and provides education to a large number of students. According to the Philippine Accrediting Association of Schools, Colleges and Universities (PAASCU), it has an accreditation level of II and has been maintained for years.



Figure 2: Map of the School

Research Instrument

The survey questionnaire that was used in measuring the level of comprehension is adapted which means that the basis of making it was coming from the obtained information from reliable sources. Moreover, it was grouped according to these indicators; decoding, fluency, vocabulary skills and background knowledge which consists of 5 statements each. The researchers ensure the validation of the questionnaire by having a validity test done by the panelist. On the other hand, the assessment that serves as an instrument to measure the level of math problem solving skills, the researchers asked a math teacher to ensure that the assessment to be reliable and valid.

To ensure the reliability of the test items, the questionnaire was subjected to a pilot testing and reliability testing using the Cronbach's alpha of 0.7 which indicates an acceptable internal consistency as supported by Taber (2017). Meanwhile, there are items being omitted for it has a lower value indicated in Cronbach's alpha and using only the items that are acceptable that is being used during the final respondents of the study. Considering the following competencies: algebraic expression, linear equations, basic operations of integers and percentage, rate, and base.

Data Gathering Procedure

During the data collection process for this study, the researchers prioritized the establishment of both validity and reliability. A professional mathematics educator was asked to develop an assessment instrument specifically designed to evaluate proficiency in mathematical problem-solving. This instrument thereafter undergo pilot testing and validation procedures. In addition, the self-constructed questionnaire undergo a comprehensive validation procedure, which include expert evaluation, to ascertain its

reliability and validity. In addition to establish content validity, the study also included reliability tests to evaluate internal consistency.

After the rigorous processes, the researchers asked permission from the school administration, and sent letter to the school registrar, principal and school president. When it was approved, an orientation was provided so that the respondents were aware of the main objective of the study and how they can benefit from it. They were also be informed that their participation was voluntary, and they are not forced to join. Furthermore, a consent form was distributed and after that, when they accepted to be part of the study, questionnaire and assessments were distributed giving them enough time in accomplishing it. Lastly, the data were gathered and evaluated by the researchers.

Ethical Considerations

The process of conducting research involves several considerations to ensure ethical and responsible treatment of participants. Throughout the research process, it's essential for researchers to prioritize obtaining informed consent and ensuring confidentiality in order to maintain the trust and safety of their participants (Llego, 2023).

In the study being conducted, the researchers ensured to follow these considerations in a way that a permission was asked from the respondents through its Informed Consent Form to ensure that participation is voluntary. Respondents are fully informed about the purpose of the study, procedures involved, and any potential risks or discomfort they may encounter. They are also informed of their right to withdraw from the study at any time without consequence. This ensures that participants understand the nature of the study and can make an informed decision about participation.

Clear communication is crucial in obtaining informed consent, with participants provided with understandable information and the opportunity to ask questions. Agreement to participate is voluntary and without pressure. Informed consent contributes to the

protection of participants' rights and well-being by promoting transparency and respecting their right to privacy. According to Lee (2021), confidentiality entails a set of guidelines that restrict access or impose limitations on the utilization of information.

While Hecker & Kalpokas (2024) also states that privacy pertains more to the participants' authority regarding the scope and method of disclosing personal information. Researchers maintain confidentiality and respect participants' privacy throughout the research process. Additionally, data handling and security are prioritized, with information kept securely and accessible only to researchers and their research adviser. Overall, these considerations demonstrate the commitment of researchers to ethical conduct and the welfare of research participants throughout the research process.

Data Analysis

In analyzing the data, the researcher utilized the Frequency and Percentage Distribution, Pearson Correlation Coefficient, Mean and Standard Deviation.

According to Tabogoc (2013) Frequency and Percentage Distribution was utilized to analyze the percentage of various data that involves the profile of the respondents. The pattern of a variable's frequencies is called the frequency distribution. The frequency with which each potential value of a variable appears in a dataset (Turney, 2022). This provides a comprehensive overview of the characteristics and composition of the sample population. Thus, it was used in Research Question 1 for it involves the demographic profile of the respondents.

Addressing Research Questions 2, 3, 4 and 5 mean and standard deviation serves as the researcher's statistical tool. In mathematics and statistics, the mean is a singular number that represents the data's center point or average value. It is the most prevalent measure of

central tendency and is also known as the arithmetic mean. It is often referred to as the "average" (Frost, 2023).

Lastly in Research Question 6 Pearson correlation coefficient is the best tool to measure the relationship of both variables which are the comprehension and math problemsolving skills. The most popular method for determining a linear connection is the Pearson correlation coefficient (r) (Turney, 2022).

Table 1. Interpretation of the Math Problem-Solving Skills

Range of Means	Description	Interpretation
8.81- 11.00	Advanced	The students exceed the core requirements in solving mathematical problems.
6.61- 8.80	Proficient	The student has developed fundamental skills and knowledge and can solve mathematical problems independently.
4.41- 6.60	Approaching Proficiency	The students have developed fundamental knowledge and skills in solving mathematical problems. Hence, needs assistance from teachers and peers.
2.21- 4.40	Developing	The students possess the minimum knowledge and skills in solving mathematical problems.
0- 2.20	Beginning	The students struggle in solving mathematical problems.

The given description and interpretation above were adapted from DepED order series of 2012 in which it encloses the general guidelines for the assessment and rating of learning outcomes. It follows the level of proficiency which has 5 descriptions: beginning, developing, approaching proficiency, proficient and advanced.

Table 2. Interpretation of the Level of Math Problem-Solving Skills

Range of Means	Description	Interpretation
35.21- 44.00	Advanced	The students exceed the core requirements in solving mathematical problems.
26.41- 35.20	Proficient	The student has developed fundamental skills and knowledge and can solve mathematical problems independently.
17.61- 26.40	Approaching Proficiency	The students have developed fundamental knowledge and skills in solving mathematical problems. Hence, needs assistance from teachers and peers.
8.81- 17.60	Developing	The students possess the minimum knowledge and skills in solving mathematical problems.
0- 8.80	Beginning	The students struggle in solving mathematical problems.

This table was intended to measure the level of math problem solving skills for the overall score (44 items) of the respondents to answer SOP 5.

Table 3. Interpretation of the Level of Comprehension

Range of Means	Description
4.21- 5.00	Strongly Agree
3.41- 4.20	Agree
2.61- 3.40	Neutral
1.81- 2.60	Disagree
1.00- 1.80	Strongly Disagree

Table 4. The Quantitative Interpretation of the Degree of Relationship of Pearson Correlation Coefficient

R	Descriptive Level
± 1.00	Perfect Correlation
between ± 0.75 to ± 0.99	High Positive (Negative) Correlation

between ± 0.51 to ± 0.74	Moderately High Positive (Negative) Correlation
between ± 0.31 to ± 0.50	Moderately Low Positive (Negative) Correlation
between ± 0.01 to ± 0.30	Low Positive (Negative) Correlation
0.00	No Correlation

Chapter 3 RESULTS AND DISCUSSION

This chapter presents the results of the data analysis together with a discussion of the study's problem statement. This also delves into the analysis and interpretation of the results.

Research Question #1: What is the demographic profile of the respondents in terms of sex and age?

Table 5. Respondents' Demographic Profile

	Frequency	Percentage
Sex		
Male	38	52%
Female	35	48%
Total	73	100%
Age		
11	1	1%
12	37	51%
13	32	44%
14	2	3%
15	1	1%
Total	73	100%

Table 5 shows the demographic profile of the respondents, with 38 male (52%) who voluntarily participated in the study. On the other hand, female respondents have a frequency of 35 (48%). In terms of age of the respondents, 11 years old has 1 (1%), 12 years old has 37 (51%), 13 has 32 (44%), 14 has 2 (3%) and, lastly, 15 has only 1 (1%).

Research Question #2: What is the comprehension level of the respondents in terms of: decoding, fluency, vocabulary skills and background knowledge?

Table 6. The Respondents' Level of Comprehension

	Mean	Standard Deviation	Description
Decoding	3.13	0.76	Neutral
Fluency	3.31	0.75	Neutral
Vocabulary Skills	3.36	0.67	Neutral
Background Knowledge	3.47	0.73	Agree
Average	3.32	0.63	Neutral

Table 6 shows the mean of the respondents' level of comprehension in the four indicators being identified. It can be noted that among the four indicators, respondents get the lowest mean of 3.13 with a standard deviation of 0.76 in the area of decoding that has a description of neutral. This means that the respondents were not confident with their ability to recognize printed words quickly and accurately. Further, it is not easy for the respondents to process unfamiliar word and believing that there current decoding skills were still neutral and didn't reach at proficient level.

On the other hand, background knowledge got a mean of 3.47 with a standard deviation of 0.73 which is considered the highest compared to the other three areas namely decoding, fluency and vocabulary skills. This implies that the respondents have expanded their knowledge that helps them to read, comprehend and retain information. Also, it means that their background knowledge helps to make connections between the text they were reading to aid comprehension.

The results presented in the prevailing section specifically was connected to Morin (2020) the data, indicating a low mean score in the area of decoding among respondents, resonates with Morin's assertion that children experiencing challenges in decoding may encounter frustration when attempting to sound out words. This frustration could stem from an inability to promptly recognize printed words, as suggested by the neutral perception reflected in the mean score. The result indicating that background knowledge has the highest mean compared to decoding, fluency, and vocabulary skills aligns with existing literature of Alst (2014) by stating that good readers frequently rely on their background knowledge to better understand what they are reading.

Research Question #3: What is comprehension level of the respondents when grouped according to sex and age?

Table 7. Respondents' Level of Comprehension

Sex		Mean	Standard Deviation	Description
Female	3.32	0.48	Neutral	
	3.32	0.73	Neutral	
Age	11	3.9	0	Neutral
	12	3.26	0.61	Neutral

13	3.38	0.65	Neutral
14	3.3	0.4	Neutral
15	3.2	0	Neutral

Table 7 shows the respondents level of comprehension when grouped according to sex and age. Based on the results, the average level of comprehension of male and female were 3.32. Hence, it only differs with the standard deviation in which male is 0.73 while female is 0.48 which implies that there was more variability of responses in male respondents. Further, it has the description of neutral which is the average responses of male and female in terms of four areas in comprehension namely the decoding, fluency, vocabulary skills and background knowledge.

In addition, the age of 11 has the highest mean of 3.9 which falls on a neutral description implying that the respondent was not yet confident in the ability to recognize printed words quickly and accurately. Further, cannot convey the meaning of what is being read to others and not that fluent in understanding literature. On the other hand, 15-yearold has the lowest mean of 3.2 which can be interpreted based on the respondent scale that the current decoding skill was not that proficient. Moreover, the respondent believes that his or her reading speed is not that right and understanding of literature was not that fluent.

The result of the study specifically the level of comprehension in terms of the sex of the respondents was supported by Rahmahwati and Ummah (2020) that revealed no significant difference between the comprehension of male and female. On the other hand, Anantasa (2016) and Ngongare, Samola, and Rettob (2020) both found that female students significantly outperformed their male counterparts in reading comprehension. Further, the study conducted by Aquino and De Vera (2018), it was surprisingly discovered

that among the Grade 7 students' younger participants has a stronger comprehension compared to the older. Hence, Ramirez and Abanto (2024) contradicted this result in which it was stated that, the older students in Grade 7 have a higher level of comprehension.

Research Question #4: What is the level of math problem-solving skills of the respondents in terms of algebraic expressions, linear equations, basic operation of integers, percentage, rate and base?

Table 8. Respondents' Level of Math Problem Solving Skills

	Mean	Standard Deviation	Description	Interpretation
Algebraic Expression	3.63	2.04	Beginning	The respondents struggle in solving mathematical problems in terms of algebraic expression.
Linear Equation	2.93	1.58	Beginning	The respondents struggle in solving mathematical problems in terms of linear equation.
Basic Operation of Integers	5.18	2.60	Approaching Proficiency	The respondents have developed fundamental knowledge and skills in solving mathematical problems. Hence, needs assistance from teachers and peers in terms of basic operation of integers.
Percentage, Rate and Base	3.52	1.94	Developing	The respondents possess the minimum knowledge and skills in solving mathematical problems in terms of percentage, rate and base.

Table 8 shows the level of math problem-solving skills of the respondents in terms of the four areas in mathematics namely, algebraic expression, linear equation, basic operation of integers, percentage, rate and base. Based on the results, linear equation has

the lowest mean of 2.93 with a standard deviation of 1.58 that has a description beginning. It implies that struggles to solve mathematical problem involving linear equation. On the other hand, basic operation of integers has the highest mean of 5.18 with a standard deviation of 2.60 that indicates approaching proficiency which means that the respondents have developed fundamental skills and knowledge in solving basic operation of integers. Hence, they were still dependent to their teachers and peers.

The prevailing results were supported by Ernawati and Muzaini (2020) which discovered through preliminary interviews conducted with mathematics teachers that the students were incapable of solving the domain of systems of linear equations involving two variables. However, Sahat, Tengah, & Prahmana (2018), revealed that students had no difficulties adding positive integers before and after math intervention. Thus, it was connected with the results of the study in which the students were mostly struggling in the concept of linear equations.

Research Question #5: What is the level of math problem-solving skills of the respondents when grouped according to sex and age?

Table 9. Respondents' Level of Math Problem-Solving Skills

Sex		Mean	Standard Deviation	Description	Interpretation

	Female	17.00	4.20	Developing	The respondents possess the minimum knowledge and skills in solving mathematical problems.
	Male	13.66	5.25	Developing	The respondents possess the minimum knowledge and skills in solving mathematical problems.
Age	11	18	0	Approaching Proficiency	The students have developed fundamental knowledge and skills in solving mathematical problems. Hence, needs assistance from teachers and peers.
	12	15.46	4.92	Developing	The students possess the minimum knowledge and skills in solving mathematical problems.
	13	14.90	4.92	Developing	The students possess the minimum knowledge and skills in solving mathematical problems.
	14	12	4	Developing	The students possess the minimum knowledge and skills in solving mathematical problems.
	15	27	0	Proficient	The student has developed fundamental skills and knowledge and can solve mathematical problems independently.

Table 9 shows the level of math problem solving skills of the respondents when grouped according to sex and age in which it was derived from average of the total scores of the respondents over 44 items. Based on the results, female has a mean of 17.00 and a standard deviation of 4.20 that can be describe as developing. It implies that female

respondents possess minimum knowledge and skills in solving mathematical problems. On the other hand, male has a mean of 13.66 with a standard deviation of 5.25 which means that have the minimum knowledge and skills to solve mathematical problems involving the areas of algebraic expression, linear equations, basic operation of integers, percentage, rate and base.

Further, 15-year-old respondent has the highest mean of 27 with a standard deviation of 0 since there is only one respondent having this age which can be interpreted that the respondent has developed fundamental skills and knowledge and can solve mathematical problems independently. On the 14-year-old has the lowest mean of 12 with a standard deviation of 4 implying that the respondents only possess a minimum knowledge and skills in solving mathematical problems.

The following results were supported by the study of Tarigan, Simanjorang, and Siagian (2022) which revealed that female students are better at solving math problems compared to male students. However, it was contradicted by Pambudi, Budayasa, and Lukito (2018) in which it was discovered that female has poor math problem solving skills compared to male. Further, it was connected to the study of Özpinar and Arslan (2023) stating that 15 years old were proficient on mathematical problems.

Research Question #6: Is there a significant relationship between comprehension and math problem-solving skills of the students?

Table 10. The Quantitative Interpretation of the Degree of Relationship between Respondents' Comprehension and Math Problem-Solving Skills

Pearson r	Description	P-Value	Decision of H_a
0.195	Low positive correlation	0.098	Reject

It was shown in Table 10 that the Pearson r is 0.195 while the p-value is 0.098 which means that there is low positive correlation between students' comprehension and math problem-solving skills. Therefore, the alternative hypothesis was rejected which stated that there is a significant relationship between students' comprehension and math problemsolving skills.

It was revealed by Can (2020) that reading comprehension seems to play a little mediating role in the relationship between logical thinking and word problem solving. Results from the study of Auzar (2018), discovered no strong or significant relationships between reading comprehension and the ability to understand questions about mathematical word problems. According Simbulas (2015), the results revealed that students had average reading comprehension and problem-solving skills. There is a significant relationship between reading comprehension and problem-solving skills.

Chapter 4

CONCLUSION AND RECOMMENDATIONS

This chapter presents the conclusion and recommendations from the data analyzed and discussed from the previous chapter.

Conclusion

The study revealed that respondents generally had a neutral level of confidence in decoding printed words, indicating a lack of proficiency, particularly with unfamiliar words. However, their comprehension improved notably when they could relate it to their

background knowledge. Both male and female respondents showed similar average comprehension levels, with slightly greater variability observed among male responses. In terms of math problem-solving skills, respondents struggled notably with linear equations but demonstrated proficiency in basic operations with integers. Gender disparities were evident, with females displaying developing skills in math problem-solving while males showed minimal proficiency across various mathematical areas. Thus, the null hypothesis, stating no significant relationship between comprehension and math problem-solving skills, was accepted, and the alternative hypothesis was rejected with a p-value of 0.098, which is greater than the common significance level of 0.05.

Recommendations

Students are encouraged to seek support from both parents and teachers to identify and address areas of weakness effectively. It is essential for students to actively engage with foundational mathematical concepts and reading skills, receiving guidance from both home and school environments. Collaborating with teachers enables students to develop personalized strategies for improvement and access additional resources provided within the home environment, thereby maximizing their learning potential.

Parents are integral to their children's educational journey and should actively engage in their academic development. They play a vital role in imparting fundamental mathematical and literacy skills, collaborating closely with teachers to identify and support areas needing improvement. By participating in programs facilitating open dialogue with educators, parents can meaningfully contribute to their child's educational progress, fostering a harmonious partnership between home and school.

Educators and school administrators must prioritize creating a conducive learning environment that caters to diverse student needs. This involves offering ongoing professional development opportunities to teachers, enhancing their instructional practices to address varying learning styles effectively. Implementing comprehensive literacy programs and targeted interventions ensures essential support for students across different skill levels. Additionally, fostering collaboration between parents and teachers ensures a holistic approach to student support, ultimately promoting academic success and wellbeing within the school community.

Future researchers are encouraged to utilize a variety of assessment instruments to accurately gauge comprehension levels among respondents. Incorporating statistical analyses, such as ANOVA for age groups and T-Tests for gender differences, ensures clarity and precision in assessing comprehension levels and math problem-solving skills. By employing various methodologies, future researchers can enhance the validity and reliability of research findings, contributing to a deeper understanding of educational practices and outcomes.

REFERENCES

- Abanto, R. & Ramirez, P. (2024). *Correlates of reading comprehension skills of grade 7 students in Dominador Narido High School: Basis for intervention*. Retrieved from <https://www.irejournals.com/formatedpaper/1705559.pdf>
- Adzo, K. (2021). *Why is algebra important? 5 reasons why it is essential to learn*. Retrieved from <https://startup.info/why-is-algebra-important-5-reasons-why-it-isessential-to-learn>.
- Albadawi, K. (2017). The Influence of Reading Comprehension on Reading Fluency. *British Journal of English Linguistics*, Vol.5, No.2, pp.1-8. Retrieved from <https://www.eajournals.org/wp-content/uploads/The-Influence-of-Reading-Comprehension-on-Reading-Fluency.pdf>
- Ali, A. (2019). *Why students find difficulty in math's problem solving*. Retrieved from <https://medium.com/@iranaahsanali/why-students-find-difficulty-in-mathsproblem-solving-69ef827807d9>
- Alst, J. (2014). *Activating background knowledge- a step to improving reading comprehension*. Retrieved from <https://blog.maketaketeach.com/activating-background-knowledge-a-step-to-improving-reading>. Retrieved from <https://blog.maketaketeach.com/activating-background-knowledge-a-step-to-improving-reading-comprehension/>
- Anantasa, J. (2016). *Gender differences in reading comprehension achievement*. Retrieved from <https://www.syekhnurjati.ac.id/jurnal/index.php/eltecho/article/download/953/732>
- Anjum, S. (2015). *Gender difference in mathematics achievement and its relation with reading comprehension of children at upper primary stage*. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1079951.pdf>

- Anyiendah, M., Oundo, P., & Kibui, A. (2021). Deployment of background knowledge and performance in comprehension passage reading among primary school learners in Vihiga County, Kenya. *Hindawi Education Research International, Volume 2021, 1.* <https://doi.org/10.1155/2021/4285044>
- Aquino, M., De Vera, P. (2018). *Development of learning material for grade 7 struggling.* Retrieved from <https://files.eric.ed.gov/fulltext/EJ1247185.pdf>
- Asgarabadi, Y.H, Rouhi, A., Jafarigohar, M. (2015). *Learners' gender, reading comprehension, and reading strategies in descriptives and narrative macro-genres.* Retrieved from <https://www.academypublications.com/issues2/tpls/vol05/12/17>
- Atteh, E., Andam, E. A., & Amoako, J. (2017). The impact of using balance model in teaching linear equation. *International Journal Article, 11(3), 1–12.* Retrieved from <https://doi.org/10.9734/ACRI/2017/35310>.
- Auzar, M.S. (2018). *The relationships of reading comprehension ability with the ability to understand the questions of mathematical word problems.* Retrieved from https://www.researchgate.net/publication/326104139_The_Relationships_of_Reading_Comprehension_Ability_with_theAbility_to_Understand_The_Questions_of_Mathematical_Word_Problems?fbclid=IwAR2DwDclh2Pz-LM2MoMAMLEHa194W1B2KarAfcrgzBbrQtSz4jCcBQhLOAs
- Baidoo, J. (2019). *Dealing with grade 10 learners' misconceptions and errors when simplifying algebraic fractions.* University of Johannesburg, South Africa. Retrieved from <https://journals.co.za/doi/abs/10.10520/EJC-17aa794007>
- Bhandari, P. (2020). *What is quantitative research? | definition, uses & methods.* Retrieved from <https://www.scribbr.com/methodology/quantitativeresearch/#:~:text=Quantitative%20research%20is%20the%20process,generalize%20results%20to%20wider%20populations.>
- Bongac, B. G. (2021). *Self-efficacy and anxiety as determinants of mathematical achievement of Grade 7 students: A quan + qual approach.* Retrieved from https://www.globalscientificjournal.com/researchpaper/Self_Efficacy_And_Anxiety_As_Determinants_Of_Mathematical_Achievement_Of_Grade_7_Students_A_Quan_Qual_Approach.pdf
- Booth, J. L., McGinn, K. M., Barbieri, C., & Young, L. K. (2017). *Misconceptions and learning algebra.* In And the Rest is Just Algebra (pp. 63-78).
- Çalışıcı, H. (2018). *Middle school students' learning difficulties in the ratio-proportion topic and a suggested solution: envelope technique.* Retrieved from <https://files.eric.ed.gov/fulltext/EJ1187432.pdf>
- Can, D. (2020). *The Mediator Effect of Reading Comprehension in the Relationship between Logical Reasoning and Word Problem Solving.* Retrieved from https://eric.ed.gov/?id=EJ1269039&fbclid=IwAR3zRSe5yZ5R3VoeR5UCVHCVo1tx7Jh1lwEvbFTO_A1MMob0nLOk9jcq7U0

- Chand, S. (2019). *Mathematics year 13, low pass rates hurt mass*. Retrieved from <https://fijisun.com.fj/2019/12/14/mathematics-year-13-low-pass-rate-hurts-mass/>
- Craddock, P. (2022). *The importance of vocabulary*. Retrieved from <https://www.reading.com/blog/reading-and-vocabulary>
- Cueto, M. (2019). *Level of English proficiency of grade 7 students in the National High Schools of San Juan District: Basis of enhancement program*. Retrieved from <https://ojs.aaresearchindex.com/index.php/AAJMRA/article/view/8751>
- Cui, Z., & Ng, O. (2021). The interplay between mathematical and computational thinking in primary school students' Mathematical Problem-Solving within a Programming environment. *Journal of Educational Computing Research*, 59(5), 988–1012. <https://doi.org/10.1177/0735633120979930>
- Diba, D.M.S., and Parabwanto, S. (2019). *The analysis of students' answers in solving ratio and proportion problems*. Retrieved from https://www.researchgate.net/publication/331664212_The_analysis_of_students'_answers_in_solving_ratio_and_proportion_problems
- Domanais, M. (2022). *Improving the least mastered competencies on number and number sense of grade 7 learners*. Retrieved from https://www.researchgate.net/publication/364626754_Improving_The_Least_Mastered_Competencies_On_Number_And_Number_Sense_Of_Grade_7_Learners
- Downing, T. (2022). *Opinion: Reading fluency important in early development; spurs comprehension success*. Retrieved from <https://www.citizen-times.com/story/opinion/2022/10/02/opinion-reading-fluency-important-in-earlydevelopment-comprehension/69524905007/>
- Dube, A., & Robinson, K. (2018). Children's understanding of multiplication and division: Insights from a pooled analysis of seven studies conducted across seven years. *British Journal of Developmental Psychology*, 206-219. doi:10.1111/bjdp.12217
- Endo, A. (2021). *What Is Oral Reading Fluency?* Retrieved from <https://www.hmhco.com/blog/what-is-oral-reading-fluency>
- Erdem, E., Özçelik, A., & Gürbüz, R. (2018). Difficulties encountered by 7th graders in the subject percent' and suggestions. *İnönü University Journal of the Faculty of Education*, 19(3), 638-653. <https://doi.org/10.17679/inuefd.345749>
- Ernawati, E., & Muzaini, M. (2020). *The analysis of students' difficulties in solving systems of linear equation problems in two variables*. Retrieved from <https://www.ejournal.my.id/jsgp/article/download/405/344>
- Frost, J. (2023). *What is the mean and how to find it: Definition & formula*. Retrieved from https://statisticsbyjim.com/basics/mean_average/
- Fuadiah, N. F., Suryadi, D., & Turmudi. (2016). Some difficulties in understanding negative numbers faced by students a qualitative study applied at secondary schools in Indonesia. *International Education Studies*, 10(1), 24-38. doi:10.5539/ies.v10n1p24

- Greely, C. (2022). *Reading milestones*. Retrieved from <https://kidshealth.org/en/parents/milestones.html>
- Green, S. (2021). *EEF blog: Shining a spotlight on reading fluency*. Retrieved from EEF blog: Shining a spotlight on reading fluency | EEF
- Grover, J. (2022). *Solving linear equations: Formulas, methods, and questions*. Retrieved from <https://collegedunia.com/exams/solving-linear-equations-mathematicsarticleid-3013>
- Gwiazdowski, S. (2021). *The Effects of Decoding Strategies on Young Readers*. Retrieved from https://mdsoar.org/bitstream/handle/11603/21435/GwiazdowskiShannon_paper.pdf?sequence=1
- Hadianto, D., Damaianti V., Mulyati, Y., & Sastromiharjo A. (2021). *Does reading comprehension competence determine level of solving mathematical word problems competence?* Retrieved from <https://iopscience.iop.org/article/10.1088/1742-6596/1806/1/012049/meta>
- Hecker, J. & Kalpokas, N. (2024). *Preserving privacy and confidentiality in research*. Retrieved from <https://atlasti.com/guides/qualitative-research-guide-part1/confidentiality-privacy-research>
- Hijada Jr. M., Dela Cruz, M. (2022). *The gap between comprehension level and problem-solving skills in learning mathematics*. Retrieved from https://ejournals.ph/article.php?id=18177&fbclid=IwAR3i1jS7VA8oDybfZQun19bvzjztIQd2klCBfu_MT2ATA1xRGDUzHChLdfI
- Hollowell, K. (2021). *Things That Affect Reading Fluency*. Retrieved from <https://education.seattlepi.com/things-affect-reading-fluency-2103.html>
- Hoover, W. A., & Tunmer, W. E. (2018). The simple view of reading: Three assessments of its adequacy. *Remedial and Special Education*, 39(5), 304– 312. doi:10.1177/0741932518773154
- Izzah, L., Faslurrohman, M., & Permatasari, D. (2022). *Students' mathematics problemsolving viewed from mathematics anxiety and gender*. <https://doi.org/10.35316/alifmatika.2022.v4i2.166-175>
- Jahudin, J., & Siew, M. (2019). An algebraic thinking skill test in problem-solving for 7th graders. *Problems of Education in the 21st Century*. <https://doi.org/10.33225/pec>
- Jala, G. (2020). Pupils' reading comprehension, problem-solving skills and academic performance. *Journal of World Englishes and Educational Practices*, 2(4), 1-9. www.jweep.org
- Jamaludin, N. H., & Maat, S. M. (2020). A systematic literature review on students misconceptions in mathematics. *Academic Research in Business and Social Sciences*, 10(6), 127-145. doi:10.6007/IJARBSS/v10-i6/7273
- Jiban, C. (2022). *Supporting fluency and comprehension using practices grounded in the science of reading*. Retrieved from

- <https://www.nwea.org/blog/2022/supporting-fluency-and-comprehension-using-practices-grounded-in-the-science-of-reading/>
- Jordan, M., Sunico, E. (2022). *An integrative reading comprehension approach and mathematical problem-solving approach to enhance students performance of grade 7*. Retrieved from <https://ijrp.org/paper-detail/3621>
- Kashner, Z. (2021). *Raise a reader: A parent guide to reading for ages 11-13*. Retrieved from <https://www.scholastic.com/parents/books-and-reading/books-and-readingguides/raise-reader-parent-guide-to-reading-ages-11-13.html>
- Khalid, M., & Embong, Z. (2019). *Sources and possible causes of errors and misconceptions in operations of integers*. Retrieved from <https://www.iejme.com/download/sources-and-possible-causes-of-errors-andmisconceptions-in-operations-of-integers-6265.pdf>
- Kim, Y. S., and Wagner, R. K. (2015). Text (Oral) Reading fluency as a construct in reading development: an investigation of its mediating role for children from grades 1 to 4. *Sci. Stud. Read.* 19, 224–242. doi: 10.1080/10888438.2015.1007375
- Kwakye, D.O. (2022). *The teaching and learning of integer operations: The case of number rule and conventional method*. Retrieved from <https://www.researchgate.net/publication/365767479>
- Lastiri, L. (2023). *9 reasons why improving your vocabulary is important*. Retrieved from <https://irisreading.com/reasons-why-improving-your-vocabulary-isimportant/>
- Lee, E. (2021). *What is confidentiality?* Retrieved from <https://cpdonline.co.uk/knowledge-base/safeguarding/what-is-confidentiality/>
- Liou, K. (2021). *Reading comprehension*. Retrieved from <https://www.sjsu.edu/writingcenter/docs/handouts/Reading%20Comprehension.pdf>
- Llego, M. A. (2023). *Protecting participant rights: Ensuring informed consent and confidentiality in educational research*. Retrieved from <https://www.teacherph.com/protecting-participant-rights-educational-research/>
- Malibiran, H., Aplaon, Z., & Izon, M. V. (2019). *Determinants of problem-solving performance in mathematics 7: A regression model*. Retrieved from https://www.researchgate.net/publication/335099202_Determinants_of_ProblemSolving_Performance_in_Mathematics_7_A_Regression_Model
- Masullo, C. (2017). *What's the problem with word problems*. Retrieved from <https://www.edweek.org/teaching-learning/opinion-whats-the-problem-withwordproblems/2017/12#:~:text=Students%20often%20don't%20understand,or%20separate%20an%20equation's%20steps>
- Mather, N. & Wendling, B. (2016). *Reading Fluency*. Retrieved from <https://www.sciencedirect.com/topics/psychology/reading-fluency#:~:text=Reading%20fluency%20>

encompasses%20accuracy%2C%20the,emphasize%20the%20role%20of%20comprehension.

Maulyda, M.A., Oktaviyanti, I., Jiwandono, I.S., Gunawan, G. (2021). *Misconceptions and errors in integer operations: A study in preservice elementary school teachers (PGS)*. Retrieved from, https://www.researchgate.net/publication/349157564_Misconceptions_and_Errors_in_Integer_Operations_A_Study_in_Preservice_Elementary_School_Teachers_PGS

McKay, I. (2023). *14 ways to improve your vocabulary skills*. Retrieved from [https://mangolanguages.com/resources-articles/14-easy-ways-to-improveyour-vocabulary-skills/](https://mangolanguages.com/resources-articles/14-easy-ways-to-improve-your-vocabulary-skills/)

Melvin, M. (2022). *7 creative strategies for vocabulary teaching*. Retrieved from <https://www.prodigygame.com/main-en/blog/vocabulary-strategies/?fbclid=LwAR3H3MtnmGto-Ymix0GKsTWbCSkLDYedmRMp-KPvtaMNo0XvnmHHPwHTUmA>

Menon, N. (2017). *Reading fluency vs. reading comprehension: What you need to know*. Retrieved from <https://www.cedarhillprep.com/best-green-brook-private-dayschool/>

Miller, J. (2017). *The importance of vocabulary*. Retrieved from <https://www.jcfs.org/blog/importance-vocabulary>

Miranda, M. & Reflinda (2022). *A correlation between oral reading fluency and reading comprehension at tenth grade students MAS TI Canduang*. Retrieved from <https://journal nusantra.com/index.php/PESHUM/article/download/963/743/1658>

Morin, A. (2020). *The value of decoding skills for students*. Retrieved from <https://www.verywellfamily.com/what-are-decoding-skills-620853#:~:text=Decoding%20skills%20can%20help%20students,may%20have%20difficulty%20sounding%20out>.

Morin, A. (2020). *Why Reading Fluency Is Important*. Retrieved from <https://www.verywellfamily.com/what-is-reading-fluency-p2-620984>

Mullin, M. (2019). *Reading Fluency Vs Reading Comprehension*. Retrieved from <https://bitsofwisdomforall.com/reading-fluency-and-reading-comprehension/#:~:text=Reading%20fluency%20is%20the%20speed,comprehension%20are%20at%20grade%20level>.

Nataraj, S. & Thomas, M. (2016). Teaching and learning middle school algebra: valuable lessons from the history of mathematics. *And the Rest is Just Algebra*, 131–154. https://doi.org/10.1007/978-3-319-450537_8

Neuman, S., Kaefer, T., Pinkham, A. (2019). *Building background knowledge*. Retrieved from <https://www.readingrockets.org/article/building-background-knowledge>

- Ngongare, G., Samola, N., Rettob, A. (2020). *The influence of gender on reading comprehension*. Retrieved from <https://ejurnal.unima.ac.id/index.php/jellt/article/download/6880/3255>
- Nurmalasari, N., & Haryudin, A. (2021). The students' difficulties in learning reading. *Project (Professional Journal of English Education)*, 4(1), 29. <https://doi.org/10.22460/project.v4i1.p29-34>
- OECD (2013). *Pisa 2015 Draft Reading Literacy Framework March 2013*. Retrieved from <http://www.oecd.org/pisa/pisaproducts/Draft PISA 2015 Reading Framework.pdf>
- Özpinar, İ., & Arslan, S. (2023). Teacher-based evaluation of students' problem solving skills. *International Journal of Psychology and Educational Studies*, 10(2), 543–560. <https://doi.org/10.52380/ijpes.2023.10.2.1160>
- Padeliadu, S., Giazitziduo, S., & Stamovlasis, D. (2020). *Developing Reading Fluency of Students with Reading Difficulties through a Repeated Reading Intervention Program in a Transparent Orthography*. Retrieved from (PDF) Developing Reading Fluency of Students with Reading Difficulties through a Repeated Reading Intervention Program in a Transparent Orthography
- Pambudi, D. S., Budayasa, İ. K., & Lukito, A. (2018). Mathematical Connection Profile of Junior High School Students in Solving Mathematical Problems based on Gender Difference. *International Journal of Scientific Research and Management*, 6(08). <https://doi.org/10.18535/ijsrn/v6i8.m01>
- Pandey, A. (2020). The importance of learning algebra in life. Retrieved from <https://www.gethow.org/the-importance-of-learning-algebra-in-life>
- Parrish, N. (2021). *5 ways to support students who struggle with reading comprehension*. Retrieved from <https://www.edutopia.org/article/5-ways-support-students-who-struggle-reading-comprehension/>
- Ponzuric, J. (2022). *Math problem solving strategies to support students*. Retrieved from <https://jennyponzuric.com/math-problem-solving-strategies-to-support-students/>
- Popham, M., Adams, S. E., & Hodge, J. (2019). Self-Regulated Strategy Development to Teach Mathematics Problem Solving. *Intervention in School and Clinic*, 55(3), 154–161. [https://doi.org/10.1177/1053451219842197 pp.1-8.](https://doi.org/10.1177/1053451219842197) Retrieved from <https://www.eajournals.org/wp-content/uploads/The-Influence-of-Reading-Comprehension-on-Reading-Fluency.pdf>
- Rahmawati, K., & Ummah, S. S. (2020). The comparison between male and female students in reading comprehension achievement at the third semester of TBI STAIN Pamekasan. *Panyonara: Journal of English Education*, 2(1), 69. <https://doi.org/10.19105/panyonara.v2i1.3126>
- Rigg, D. (2019). *The importance of strong oral language & vocabulary skills (Instalment 1 of 3)*. Retrieved from <https://pld-literacy.org/the-importance-of-strong-orallanguage-vocabulary-skills-for-later-literacy-success/?fbclid=IwAR2D0QDOPRt>

JVqFvR12JQAdh80bYbplCxpBaYtL3Cra4jeTIM7q6B0zCPU

Rudyanto, H., Marsigit, M., Wangit, M., & Gembong, S. (2019). The use of bring your own device-based learning to measure student algebraic thinking ability. *International Journal of Emerging Technologies in Learning (iJET)*, 14(23), 233241.

Ruotsalainen, J., Pakarinen, E., Poikkeus, M. (2022). *Literacy instruction in first grade: classroom-level associations between reading skills and literacy instruction activities.* Retrieved from <https://onlinelibrary.wiley.com/doi/full/10.1111/14679817.12384>

Sahat, N., Tengah, K., & Prahmana, R. (2018). The teaching and learning of addition and subtraction of integers through manipulative in Brunei Darussalam. *Journal of Physics: Conference Series*. <https://doi.org/10.1088/1742-6596/1088/1/012024>

Santosa, A. P., Maison, & Huda, N. (2023). Analysis of Mathematics Problem solving ability Students based on mathematical resilience and gender. *Asian Journal of Education and Social Studies*, 46(4), 1–11. <https://doi.org/10.9734/ajess/2023/v46i41007>

Schwartz, S. (2023). *What is background knowledge, and how does it fit into the science of reading?* Education week. Retrieved from <https://www.edweek.org/teaching-learning/what-is-background-knowledge-and-how-does-it-fit-into-the-science-of-reading/2023/01>

Setiawati, S. (2019). *The students' decoding ability in comprehending reading a text.* Retrieved from https://www.researchgate.net/publication/334170185_The_Students_Decoding_Ability_In_Comprehending_Reading_A_Text

Shanahan, T. (2019). *Wake up reading wars combatants: Fluency instruction is part of the science of reading.* Retrieved from <https://www.shanahanonliteracy.com/blog/wake-up-reading-wars-fluency-instruction-is-part-of-the-science-of-reading>

Simbulas, L. J. C., Regidor, R., Catulpos, R. (2015). *Reading comprehension and mathematical problem solving skills of University of the Immaculate Conception freshmen students.* Retrieved from <https://ejournals.ph/article.php?id=12835&fbclid=IwAR3OxEkUSJOXVtSPaAZ4UMT3gLo5v5dS9XlvDPwo7D7dut8iOMWKPTz8>

Singh, M. (2022). *10 common examples of how we use algebraic expressions in daily lives.* Retrieved from <https://numberdyslexia.com/algebraic-expressions-real-lifeexamples>.

Smith, J. (2018). *How are linear equations used in everyday life?* Retrieved from https://sciencing.com/linear-equations-used-everyday-life-6022370.html?fbclid=1WaR0eps2iVxblqDnlz9DaaFCuXGK3lBzHhln0tlz_Vw5nVqPJ3Wjy7JNdTwA

- Smith, R., Snow, P., Serry, T., & Hammond, L. (2021). The role of background knowledge in reading comprehension: A Critical review. *Reading Psychology, 42*(3), 214–240. <https://doi.org/10.1080/02702711.2021.1888348>
- Spivey, B. (2013). *Help students develop strong vocabulary skills*. Retrieved from https://www.handyhandouts.com/viewHandout.aspx?hh_number=380&nfp_title=Help%20Students%20Develop%20Strong%20Vocabulary%20Skills&fbclid=IwAR0qngf6pi6CpqxSNQH9tldlBF7jmDziM-oM8tQkWT35yaBacvNWOfXedf4
- Staff, S. (2020). *Teaching linear equations in math*. Retrieved from Teaching Linear Equations in Math | HMH
- Starke, K. (2021). *The importance of background knowledge in understanding text*. Retrieved from <https://www.teachhub.com/teaching-strategies/2021/08/theimportance-of-background-knowledge-in-understanding-text/>
- Stevens, E. A., Walker, M. A., & Vaughn, S. (2016). The effects of reading fluency interventions on the reading fluency and reading comprehension performance of elementary students with learning disabilities. *Journal of Learning Disabilities, 50*(5), 576-590. doi:10.1177/0022219416638028
- Summer, K. (2022). *The influence of vocabulary on reading comprehension*. Retrieved from <https://bedrocklearning.org/literacy-blogs/vocabulary-and-reading-comprehension/>
- Sweller, J. et. al (1988). *Cognitive Load Theory: Advances in research on worked examples, animations, and cognitive load measurement*. Retrieved from [https://link.springer.com/article/10.1007/s10648-010-91454#:~:text=Cognitive%20load%20theory%20\(Sweller%201988,before%20meaningful%20learning%20can%20commence](https://link.springer.com/article/10.1007/s10648-010-91454#:~:text=Cognitive%20load%20theory%20(Sweller%201988,before%20meaningful%20learning%20can%20commence)
- Taber, K. S. (2017). The use of Cronbach's Alpha when developing and reporting research instruments in science education. *Research in Science Education, 48*(6), 1273–1296. <https://doi.org/10.1007/s11165-016-9602-2>
- Tabogoc, D. (2013). *Statistical treatment*. Retrieved from <https://www.slideshare.net/DarylTabogoc/statistical-treatment>
- Tan, L. (2014). *Correlational study*. Retrieved from BC-MSB-2014-269.pdf (nie.edu.sg)
- Tarigan, M., Simanjorang, M., Siagian, P. (2022). Analysis of mathematical problem solving ability students judging by gender differences in 1 Kuta Buluh Junior High School. *Journal of Education and Practice*, doi: 10.7176/jep/13-17-02
- Terada, Y. (2019). *Research zeroes in on a barrier to reading (Plus, Tips for Teachers)*. Edutopia. <https://www.edutopia.org/article/research-zeroes-barrier-reading-plus-tips-teachers/>
- Terry, B. (2022). *Vocabulary and reading comprehension*. Retrieved from <https://scholarwithin.com/vocabulary-and-reading-comprehension?fbclid=1>

wAR0lyvGTnzTrGXSZBeYC5Vfl8FoDGk52mDloZKdPylM_ezczvJ_PLKuM
 #:~:text=Words%20are%20everywhere%2C%20so%20as,to%20make%20sense
 %20of%20words

- Timario, R. (2020). *Reading comprehension and problem solving skills of Grade seven students: A mixed sequential explanatory approach*. Retrieved from <https://www.ajhssr.com/wp-content/uploads/2020/06/K20468391.pdf>
- Toivainen, T., Papageorgiou, K.A., Tosto, M.G., & Kovas, Y. (2017). Sex differences in non-verbal and verbal abilities in childhood and adolescence. *Intelligence*, 64, 81–88. <https://doi.org/10.1016/j.intell.2017.07.007>
- Tomson, A. (2021). *An interdisciplinary analysis of the concept of percent*. Retrieved from <https://escholarship.org/uc/item/63c4h4g8>
- Trance, N. J. (2013). *Process inquiry: Analysis of oral problem-solving skills in Mathematics of engineering students*. Retrieved from <https://eric.ed.gov/?id=ED540490>
- Turney, S. (2022). *Frequency distribution | tables, types & examples*. Retrieved from <https://www.scribbr.com/statistics/frequency-distributions/>
- Turney, S. (2022). *Pearson correlation coefficient ® | guide & examples*. Retrieved from <https://www.scribbr.com/statistics/pearson-correlation-coefficient/>
- Vlachos, F., Papadimitriou, A., & Walla, P. (2015). Effect of age and gender on children's reading performance: The possible neural underpinnings. *Cogent Psychology*, 2(1). <https://doi.org/10.1080/23311908.2015.1045224>
- Wang, Z., Sabatini, J., O'Reilly, T., & Weeks, J. (2019). Decoding and reading comprehension: A test of the decoding threshold hypothesis. *Journal of Educational Psychology*, 111(3), 387–401. <https://doi.org/10.1037/edu0000302>
- White, G. (2023). *Fluency vs Proficiency*. Retrieved from <https://www.languagetesting.com/blog/fluency-vs-proficiency/#:~:text=Some%20fluent%20in%20a%20language,a%20logical%20phrase%20or%20sentence>.
- Widada, W., Herawaty, D., Rahman, M. H., Yustika, D., Gusvarini, E. P., & Anggoro, A. (2020). Overcoming the difficulty of understanding systems of linear equations through learning ethnomathematics. *Journal of Physics*, 1470(1), 012074. <https://doi.org/10.1088/1742-6596/1470/1/012074>
- Williams, C. (2023) *The importance of fluency in reading*. Retrieved from <https://www.studentachievementsolutions.com/the-importance-of-fluency-in-reading/#:~:text=Fluent%20readers%20can%20read%20smoothly,development%2C%20and%20overall%20academic%20success>.
- Zamora, I. (2019). *Tablet and skills in solving word problem involving finding percentage / rate? base.* Retrieved from <https://ojs.aaresearchindex.com/index.php/AAJMRA/article/view/7037>

- Zurbano, E. (2019). *Analysis of errors encountered by grade 7 students in the study of integers: Basis for proposed action plan.* Retrieved from <https://ojs.aaresearchindex.com/index.php/AAJMRA/article/view/5285>

Appendix 1a: Letter of Permission



HOLY CROSS COLLEGE OF CALINAN, INC Davao- Bukidnon Highway, Calinan Poblacion, Davao City

December 22, 2023

Sr. Cherie Eloisa Garrote, PM
School President
Holy Cross College of Calinan, Inc.

Dear Sister Garrote,

Greetings of peace and solidarity!

We are writing this letter to inform you that we will be conducting a research study entitled: **THE RELATIONSHIP BETWEEN STUDENTS COMPREHENSION AND MATH PROBLEM-SOLVING SKILLS** as the major requirement in our Practical Research 1 and 2. The objective of our study is to determine the relationship between comprehension and math problem-solving skills of the participating school. Questionnaires will be used to gather data from the grade 7 students at Holy Cross College of Calinan for the school year 2023-2024. The result of the study will be part of our contribution to improve understanding of students and teachers with the connection of the two variables.

In line of this, we would like to ask permission to conduct a thorough survey and obtain insightful information from the respondents on about their comprehension and math problem-solving skills administering the questionnaire on January 3-5. After the said course, we would like to further ask a permission to allow us to get number of students in each section from the Registrar's office. Also, confidentiality of the information obtained is assured as there will be no other individuals who have access on them except the researchers and their research adviser.

Participation in this study is completely voluntary, therefore, participants are free to withdraw from the study at any time without moral obligation to the researcher and to the school. Further the participants have the right to verify the data to be included in the final manuscript.

Should you wish to know more about the study, please feel free to contact:

Jazyl Blaise Talip at 09484656745 or jaztalip@gmail.com

Thank you very much.

Very truly yours,

Jazyl Blaise S. Talip
Researcher

Kyle Patrick Q. Rinsulat
Researcher

Pearl Emerald A. Chamen
Researcher

Dimple B. Manansala
Researcher

Joshua G. Blas
Researcher

Noted by:

Rialyn V. Baguio
Research Adviser

Approved by:

Sr. Cherie Eloisa Garrote, PM
School President

Complaints about this research:

The Holy Cross College of Calinan requires that all the participants are informed and if they have complaints regarding the manner in which the research is conducted, it may be given to the researcher, or if an independent person is preferred, to the Research and Publication Head, Research Office, Holy Cross College of Calinan with the following numbers: 295-0797 or 09491985644.

Appendix 1b: Letter of Permission



HOLY CROSS COLLEGE OF CALINAN, INC Davao- Bukidnon Highway, Calinan Poblacion, Davao City

December 22, 2023

Dr. Ma. Corazon C. Sunga
Basic Education Principal
Holy Cross College of Calinan, Inc.

Dear Ma'am,

Greetings of peace and solidarity!

We are writing this letter to inform you that we will be conducting a research study entitled: **THE RELATIONSHIP BETWEEN STUDENTS COMPREHENSION AND MATH PROBLEM-SOLVING SKILLS** as the major requirement in our Practical Research 1 and 2. The objective of our study is to determine the relationship between comprehension and math problem-solving skills of the participating school. Questionnaires will be used to gather data from the grade 7 students at Holy Cross College of Calinan for the school year 2023-2024. The result of the study will be part of our contribution to improve understanding of students and teachers with the connection of the two variables.

In line of this, we would like to ask permission to conduct a thorough survey and obtain insightful information from the respondents on about their comprehension and math problem-solving skills administering the questionnaire on January 3-5. After the said course, we would like to further ask a permission to allow us to get number of students in each section from the Registrar's office. Also, confidentiality of the information obtained is assured as there will be no other individuals who have access on them except the researchers and their research adviser.

Participation in this study is completely voluntary, therefore, participants are free to withdraw from the study at any time without moral obligation to the researcher and to the school. Further the participants have the right to verify the data to be included in the final manuscript.

Should you wish to know more about the study, please feel free to contact:

Jazyl Blaise Talip at 09484656745 or jaztalip@gmail.com

Thank you very much.

Very truly yours,

Jazyl Blaise S. Talip
Researcher

Kyle Patrick Q. Rinsulat
Researcher

Pearl Emerald A. Chamen
Researcher

Dimple B. Manansala
Researcher

Joshua G. Blas
Researcher

Noted by:

Rialyn V. Baguio
Research Adviser

Approved by:

Dr. Ma. Corazon C. Sunga
School President

Complaints about this research:

The Holy Cross College of Calinan requires that all the participants are informed and if they have complaints regarding the manner in which the research is conducted, it may be given to the researcher, or if an independent person is preferred, to the Research and Publication Head, Research Office, Holy Cross College of Calinan with the following numbers: 295-0797 or 09491985644.

Appendix 2a: Letter of Request



HOLY CROSS COLLEGE OF CALINAN, INC Davao- Bukidnon Highway, Calinan Poblacion, Davao City

December 22, 2023

Ms. Merry Angela T. Jala
Basic Education Registrar
Holy Cross College of Calinan, Inc.

Dear Ma'am,

Greetings of peace and solidarity!

We are writing this letter to inform you that we will be conducting a research study entitled: **The Relationship Between Comprehension and Math Problem-Solving Skills** as the major requirement in our Practical Research 1 and 2. The objective of our study is to determine the relationship between comprehension and math problem-solving skills of the participating school. The result of the study may provide a significant benefit within the school specifically the teachers and students.

In lieu of this, we would like to ask permission to get from your office the total number of students enrolled in the school year 2023-2024 under grade 7 with the following sections:

Grade 7- St. George
Grade 7- St. Helen

Confidentiality of the information obtained is assured as there will be no other individuals who have access on them except the researchers and their research adviser.

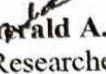
Should you wish to know more about the study, please feel free to contact:

Jazyl Blaise S. Talip at 09484656745 or jaztalip@gmail.com

Thank you very much.

Very truly yours,


Jazyl Blaise S. Talip
Researcher

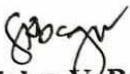

Pearl Emerald A. Chamen
Researcher


Joshua G. Blas
Researcher


Kyle Patrick Q. Rinsulat
Researcher


Dimple B. Manansala
Researcher

Noted by:


Rialyn V. Baguio
Research Adviser

Approved by:


Merry Angela T. Jala
Basic Education Registrar

Complaints about this research:

The Holy Cross College of Calinan requires that all the participants are informed and if they have complaints regarding the manner in which the research is conducted, it may be given to the researcher, or if an independent person is preferred, to the Research and Publication Head, Research Office, Holy Cross College of Calinan with the following numbers: 295-0797 or 09491985644.

Appendix 2b: Letter of Request



HOLY CROSS COLLEGE OF CALINAN, INC

Davao- Bukidnon Highway, Calinan Poblacion, Davao City

=

September 23, 2023

Shogar T. Echavez, MA
Math Teacher
Lamanan National High School

Dear Ma'am,

Greetings of peace and solidarity!

I hope this letter finds you well. We are currently involved in an important research study titled "The Relationship between Comprehension and Math Problem Solving Skills." The objective of our study is to determine the relationship between comprehension and math problem-solving skills of the participating school. We are writing to kindly request your assistance and expertise in developing a test questionnaire to assess math problem solving skills for this research.

Recognizing your extensive knowledge and experience in the field of mathematics, we are confident that your input would be invaluable in shaping a well-designed questionnaire that accurately measures participants' level of math problem solving skills.

The primary aim of this research is to explore whether there is a significant correlation between the student's comprehension and math problem solving skills. By creating a questionnaire, we hope to gather reliable data that can shed light on this relationship and contribute to our understanding of mathematics education.

We would greatly appreciate your collaboration in crafting a set of comprehensive and well-structured questions that effectively evaluate participants' level of math problem solving skills. Your guidance in ensuring the validity and reliability of the assessment tool would be instrumental in the success of this research. Attached are the list of competencies and will become the scope of our assessment: Solves problems involving algebraic expressions. M7AL-IIg-2 Solves linear equation or inequality in one variable involving absolute value by: (a) graphing; and (b) algebraic methods. M7AL-IIi-j-1

Solves routine and non-routine problems involving basic operations of integers using appropriate strategies and tools. Solves routine and non-routine problems involving finding the percentage, rate and base using appropriate strategies and tools. M6NS-IIId-143.

If you are available for a brief meeting or discussion, either in person or through virtual means, we would be more than willing to accommodate your schedule. Alternatively, if you prefer to communicate via email or phone, we are open to any form of interaction that suits you best.

Your contribution to this study will be duly recognized in the research documentation, and your insights will undoubtedly enhance the quality and impact of the results.

Thank you for considering our request, and we are looking forward to the possibility of collaborating with you on this significant endeavor. Please feel free to contact us at **09484656745** or **jaztalip@gmail.com** to discuss this further.

Very truly yours,

Jazyl Blaise S. Talip
Rinsular Pearl
Researcher



Researcher



Researcher

Kyle Patrick Q.
Emerald A. Chamen

Dimple B.
Manansala
Researcher

Joshua G. Blas



Researcher

Noted by:

RIAEN V. BAGUIO
Research Adviser

Approved by:

SHOGAR T. ECHAVEZ, MA
Math Teacher

Appendix 3a: Validation Sheet



Holy Cross College of Calinan, Inc
Davao-Bukidnon Highway, Calinan Pobalcion, Davao City

Research Assessment Tool and Validation Sheet

Name of Evaluator : Mr. Edzel S. Langga
 Degree : _____
 Position : Research and Publication Head *Math Teacher*
 Institution : Holy Cross College of Calinan, Inc
 To the Evaluator: Please check the appropriate box for your ratings.
 POINT EQUIVALENT: 1 – Poor 3 – Good 5 - Excellent
 2 - Fair 4 – Very Good

	Criteria/ Indicators	1	2	3	4	5
1	CLARITY OF DIRECTIONS AND ITEMS The vocabulary level, language structure and conceptual level of questions suit to level of respondents. The test directions and items are written in clear and understandable manner.				/	
2	PRESENTATION/ ORGANIZATION OF ITEMS The items are presented and organized in logical manner.				/	
3	SUITABILITY OF ITEMS The items appropriately represent the substance of the research. The questions are designed to determine the condition, knowledge, perception and attitudes that are supposed to be measured.				/	
4	ADEQUATENESS OF ITEMS PER CATEGORY The items represent the coverage of the research adequately. The number of questions per area category is representative enough of all the question needed for the research.				/	
5	ATTAINMENT OF PURPOSE The instrument as a whole fulfills the objectives for which it was constructed.				/	
6	OBJECTIVE Each item question requires only one specific answer or measure only one behavior and no aspect of questionnaire suggest bias on the part of the researcher.				/	
7	SCALE AND EVALUATION RATING SYSTEM The scale adapted is appropriate for the items.				/	

Comments and Suggestions: _____

edzel langga 1/3/2024
Signature Evaluator

Appendix 3b: Validation Sheet



Holy Cross College of Calinan, Inc
Davao-Bukidnon Highway, Calinan Pobalcion, Davao City

Research Assessment Tool and Validation Sheet

Name of Evaluator : Dr. Melina C. Gonzales

Degree : _____

Position : Research and Publication Head

Institution : Holy Cross College of Calinan, Inc

To the Evaluator: Please check the appropriate box for your ratings.

POINT EQUIVALENT: 1 – Poor 3 – Good 5 - Excellent
 2 - Fair 4 – Very Good

Criteria/ Indicators		1	2	3	4	5
1	CLARITY OF DIRECTIONS AND ITEMS The vocabulary level, language structure and conceptual level of questions suit to level of respondents. The test directions and items are written in clear and understandable manner.			/		
2	PRESENTATION/ ORGANIZATION OF ITEMS The items are presented and organized in logical manner.			/		
3	SUITABILITY OF ITEMS The items appropriately represent the substance of the research. The questions are designed to determine the condition, knowledge, perception and attitudes that are supposed to be measured.			/		
4	ADEQUATENESS OF ITEMS PER CATEGORY The items represent the coverage of the research adequately. The number of questions per area category is representative enough of all the question needed for the research.			/		
5	ATTAINMENT OF PURPOSE The instrument as a whole fulfills the objectives for which it was constructed.			/		
6	OBJECTIVE Each item question requires only one specific answer or measure only one behavior and no aspect of questionnaire suggest bias on the part of the researcher.			/		
7	SCALE AND EVALUATION RATING SYSTEM The scale adapted is appropriate for the items.			/		

Comments and Suggestions: Please see corrections in the paper/ques formate

Signature Evaluator

Appendix 4a: Letter to the Validator



HOLY CROSS COLLEGE OF CALINAN, INC
Davao- Bukidnon Highway, Calinan Poblacion, Davao City

December 22, 2023

Mr. Edzel S. Langga
 Math Teacher
 Holy Cross College of Calinan, Inc.

Dear Mr. Edzel S. Langga,

Greetings of peace and solidarity!

We, Jazyl Blaise Talip, Kyle Patrick Rinsulat, Pearl Emerald Chamen, Dimple Manansala and Joshua Blas, enrolled in the class of Miss Vallerie Joy T. Escolano conducting a research entitled: **THE RELATIONSHIP BETWEEN STUDENTS COMPREHENSION AND MATH PROBLEM-SOLVING SKILLS**. This study aims to determine the relationship between comprehension and math problem-solving skills of the participating school and will attempt to gather the responses from the respondents toward the following questions:

1. What is the demographic profile of the respondents in terms of:

1.1 sex;

1.2 age; and

1.3 section?

2. What is the comprehension level of the students in terms of:

2.1 decoding;

2.2 fluency;

2.3 vocabulary skills; and

2.4 background knowledge?

3. What is the level of math problem-solving skills of the students in terms of:

3.1 algebraic expression;

/ 3.2 linear equations;

3.3 basic operations of integers; and

3.4 percentage, rate, and base?

4. Is there a significant relationship between comprehension and math problem-solving skills of the students?

May we request your kind assistance in validating the questionnaire of the research study. Would you please fill out the attached validation sheet and give suggestions/comments for the improvement of our questionnaire.

Should you wish to know more about the study, please feel free to contact:

Jazyl Blaise Talip at 09484656745 or jaztalip@gmail.com

Thank you very much for your help.

Very truly yours,


Jazyl Blaise S. Talip
Researcher

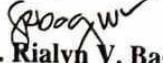

Kyle Patrick Q. Rinsulat
Researcher


Pearl Emerald A. Chamen
Researcher

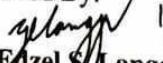

Dimples B. Manansala
Researcher


Joshua G. Blas
Researcher

Noted by:


Ms. Rialyn Y. Baguio
Research Adviser

Approved By:


Mr. Edzel S. Langga
Validator

Appendix 4b: Letter to the Validator



HOLY CROSS COLLEGE OF CALINAN, INC Davao- Bukidnon Highway, Calinan Poblacion, Davao City

December 22, 2023

Dr. Melina C. Gonzales
Research Publication Head
Holy Cross College of Calinan, Inc.

Dear Ma'am,

Greetings of peace and solidarity!

We, Jazyl Blaise Talip, Kyle Patrick Rinsulat, Pearl Emerald Chamen, Dimple Manansala and Joshua Blas, enrolled in the class of Miss Vallerie Joy T. Escolano conducting a research entitled: **THE RELATIONSHIP BETWEEN STUDENTS COMPREHENSION AND MATH PROBLEM-SOLVING SKILLS**. This study aims to determine the relationship between comprehension and math problem-solving skills of the participating school and will attempt to gather the responses from the respondents toward the following questions:

1. What is the demographic profile of the respondents in terms of:

1.1 sex;

1.2 age; and

1.3 section?

2. What is the comprehension level of the students in terms of:

2.1 decoding;

2.2 fluency;

2.3 vocabulary skills; and

2.4 background knowledge?

3. What is the level of math problem-solving skills of the students in terms of:

3.1 algebraic expression;

- 3.2 linear equations;
- 3.3 basic operations of integers; and
- 3.4 percentage, rate, and base?
4. Is there a significant relationship between comprehension and math problem-solving skills of the students?

May we request your kind assistance in validating the questionnaire of the research study. Would you please fill out the attached validation sheet and give suggestions/comments for the improvement of our questionnaire.

Should you wish to know more about the study, please feel free to contact:

Jazyl Blaise Talip at **09484656745** or **jaztalip@gmail.com**

Thank you very much for your help.

Very truly yours,


Jazyl Blaise S. Talip
 Researcher

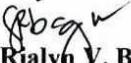

Kyle Patrick Q. Rinsulat
 Researcher


Pearl Emerald A. Chamen
 Researcher


Dimples B. Manansala
 Researcher


Joshua G. Blas
 Researcher

Noted by:


Ms. Rialyn V. Baguio
 Research Adviser

Approved By:


Dr. Melina C. Gonzales
 Validator

Appendix 5a: Survey Questionnaire



HOLY CROSS COLLEGE OF CALINAN, INC.
Davao- Bukidnon Highway, Calinan Poblacion, Davao City

SURVEY QUESTIONNAIRE

THE RELATIONSHIP BETWEEN STUDENTS' COMPREHENSION AND MATH PROBLEM-SOLVING SKILLS

We are conducting a correlational study of the students' comprehension and math problemsolving skills. Your response to this survey is crucial in providing the necessary information.

If you have any query about the questionnaire, please do not hesitate to approach any of the researchers. Your honest and sincere response and time given to answer the evaluation is greatly appreciated.

Thank you very much for your cooperation.

Instruction: Please check or supply the information needed in the space provided.

Name (Optional) _____

Part I: Demographic Profile

Age: _____

Sex [] Male [] Female

Section St. George [] St. Helen []

Part II. Level of math problem-solving skills of the students

Instruction: Read and understand each item. Write the letter that corresponds to your answer before each number.

____ 1. A monkey sits on a limb that is 25ft above the ground. He swings up to 10 ft high, climbs up 6 ft more and jumps down 13 ft. How far from the ground is the monkey now?

- a. 25 ft b. 28 ft c. 31 ft d. 54 ft

____ 2. A pair of pants went on a sale for 450.00 pesos. How much did Angel save on the purchase of 2 pairs if the regular price was 625.00 pesos?

- a. Php 175.00 b. Php 350.00 c. Php 450.00 d. Php 625.00

____ 3. Maria's business had a profit of 290.00 pesos in its first month, and a loss of 130.00 pesos in its second month. What is the total profit after the first two months?

- a. Php 420.00 b. Php 300.00 c. Php 160.00 d. Php 70.00

- ____ 4. If 228 honeybees of 668 fly out of the hive, how many honey bees are left now?
 a. 440 b. 428 c. 330 d. 225

____ 5. An elevator in a 10-storey building carried passengers from the ground floor up to the 9th floor. Starting on the 3rd floor, the elevator went 5 floors up, then 6 floors down, and went up again in 7 floors. On what floor is the elevator now?

- a. 3rd floor b. 5th floor c. 7th floor d. 9th floor
 ____ 6. While teaching integers to the class, Mrs. Sanchez uses her diet as an example. In January, Mrs. Sanchez lost 4 kilograms, and in February, she lost 2 more kilograms. Frustrated with herself in March, she gained 5 kilograms. Has Mrs. Sanchez still lost weight, or has she gained even more?

- a. Yes, she has still lost 4 kilograms b. Yes, she has still lost 1 kilogram
 c. Yes, she has gained 4 kilograms d. Yes, she has gained 1 kilogram
 ____ 7. Joana owes 35.00 pesos at a candy store. Each of her five friends will help her pay off her debt. How much will each friend pay?

- a. -7 b) 7 c. -6 d. 6
 ____ 8. Mrs. Lily Cruz has a bank balance of Php 2,100 pesos at the start of the month.

- After she deposits 300 pesos, what is her new balance?
 a. -2,400 pesos b. -1,800 pesos c. 2,400 pesos d. 1,800 pesos
 ____ 9. A submarine submerges at the rate of 5 m/min. If it descends from 20 m above the sea level, how long will it take to reach 250 m below sea level?

- a. 44 b. 54 c. 64 d. 74
 ____ 10. What is the change in temperature a customer in a grocery store experiences when they walk from the chilled vegetable section at 4°C to the frozen fish section which is set to -18°C?

- a. -14 b. 14 c.-22 d. 22
 ____ 11. When Steve woke up his temperature was 102° F. Two hours later it was 3° lower. What was his temperature then?

- a.-99 ° b. 99 ° c.-105 ° d. 105 °
 ____ 12. Rod deposited ₱245, 000 in the bank. At 3% simple interest per annum, how much will be his total savings after 2 years?

- a. ₱ 7 350.00 b. ₱ 14, 700.00 c. ₱ 147, 000.00 d. ₱ 259,700.00 ____ 13. A jacket was P500.00 last year and now it is at P399.95. About what percent is the decrease of the price?

- a. 2% b. 20% c.25% d.200%
 ____ 14. Mr. Casio got an 8% commission for selling a car for ₱750 000.00. How much commission did he get?

- a. ₱ 60, 000.00 b. ₱ 70,200.00 c. ₱ 75,000.00 d. ₱ 80,000.00 ____ 15. There are 18 roses in a bunch of 24 flowers. What percent of the flowers are roses?

- a. 18% b. 24% c. 60%
 d. 75%

- ____ 16. There are 40 students in Grade VI Palma. If 60% of them are saving money, how many students of Grade 6 Palma are saving money?

- a. 20 b. 24 c. 26 d. 28

- ____ 17. Jena was given ₱ 500.00 which she spent half of it in buying fruits. She was given another ₱ 250.00 which she bought chocolates for ₱ 50.00. What percent of her total money did she spend?
 a. 30% b. 40% c. 50% d. 60%
- ____ 18. Karla was able to read 90% of a 30-page article about Covid 19. How many pages did she read?
 a. 24 b. 25 c. 26 d. 27
- ____ 19. John spends ₱ 36.00 for lunch, which is 60% of her daily allowance. How much is his allowance?
 a. 60 b. 70 c. 80 d. 90
- ____ 20. Of the 85 volunteers in tree planting activity, 40% are teenagers. How many are teenagers?
 a. 14 b. 24 c. 34 d. 44
- ____ 21. A group of 12 female doctors which is 30% of all the volunteer doctors went to provide medical services to our community. How many volunteer doctors are there in all?
 a. 28 b. 30 c. 38 d. 40
- ____ 22. Instead of having a birthday party, Leah's parents prepared 150 packs of food for the needy children. If 60% of the food packs were given to the street children and the rest were given to the orphanage, how many children received food packs in the orphanage?
 a. 50 b. 60 c. 70 d. 80
- ____ 23. What is the perimeter of the rectangle, if the length of a rectangular flower garden is thrice a number increased by 6 and its width is a number decreased by 8?
 a. $3x+24$ b. $3x-24$ c. $8x+4$ d. $8x-4$
- ____ 24. Beverly has c chocolates and d drinks. Ethan has five fewer chocolates than Beverly, but twice as many drinks. Write an expression for Ethan's snacks.
 a. $c+5+2d$ b. $c-5-2d$ c. $c-5+2d$ d. $c+5-2d$
- ____ 25. Johnny takes h hours and m minutes to complete the typing job. His friend Andrew takes twice as long to finish typing. Write an algebraic expression for Andrew's typing speed.
 a. $2 h/2m$ b. $h + 2m$ c. $2h + m$ d. $2h + 2m$
- ____ 26. In a bowl of fruit, there are mangoes and b papaya. In a paper bag there are 5 mangoes and 9 papayas. Write the total number of fruits as an expression.
 a. $a + b + 5$ b. $a + b + 14$ c. $a + b + 9$ d. $a + b - 14$
- ____ 27. Maria Php 300 in her wallet. She bought 4 ribbons worth x pesos each. How much money is left in her wallet?
 a. $300+4x$ b. $300\div 4x$ c. $300-4x$ d. $300x-4$
- ____ 28. Alejandro wants to fence his rectangular lot. If the length of the lot is 3 meters longer than its width. What is the perimeter of the rectangular lot if its width is y meters?
 a. $4y+x$ b. $6y+4$ c. $4y-6$ d. $6y-4$
- ____ 29. Mary has 50 Mangoes. If she sells x mangoes per day for 7 days, how many mangoes will he have left? Write an expression?
 a. $50-7x$ b. $50 + 7x$ c. $7x - 50$ d. $7x + 50$

- ____ 30. What is the perimeter of an isosceles triangle whose two legs has the measurement of $x + 3$ and the base is x ?
 a. $3x + 6$ b. $x + 6$ c. $6 + 3x$ d. $6 + x$
- ____ 31. Angeline has 80 more pesos than Lily has. If c equals the amount of money Lily has, which of the following expressions represents the amount Angeline has?
 a. $80c$ b. $80 - c$ c. $c + 80$ d. $c - 80$
- ____ 32. In a box, there are x white chocolates and y dark chocolates. In another box, there are 5 white chocolates and 7 dark chocolates. What is the total number pieces of chocolates combined?
 a. $x + 12$ b. $y + 12$ c. $5x + 7y$ d. $x + y + 12$
- ____ 33. Emelio takes h hours and m minutes to complete a mini-triathlon. His friend Aguinaldo takes thrice as long to finish the race. Write an algebraic expression for Aguinaldo's race time.
 a. $3hm$ b. $3h + 3m$ c. $3h + m$ d. $h + 3m$
- ____ 34. Adrian has r red marbles and b blue marbles. Mark keeps losing his marble, and has half as many red marbles, and 5 less blue marbles than Adrian. Write an expression Mark's total marbles.
 a. $2r + b - 5$ b. $r2 + b + 5$ c. $r2 + b - 5$ d. $b2 + r - 5$
- ____ 35. If the length of a rectangular vegetable garden is twice a number increased by 3 and its width is a number decreased by 5. Write an algebraic expression to represent the length of the rectangle.
 a. $2x + 3$ b. $2(x + 3)$ c. $3x + 2$ d. $3(x + 2)$
- ____ 36. The sum of two numbers is 45. One of the numbers exceeds the other by 5. Find the numbers.
 a. 20 and 25 b. 15 and 30 c. 10 and 35 d. 5 and 40
- ____ 37. The difference between the two numbers is 48. The ratio of the two numbers is 9:5. What are the two numbers?
 a. 76 and 28 b. 84 and 36 c. 106 and 58 d. 125 and 77
- ____ 38. The perimeter (P) of a rectangular garden is twice the sum of length (L) and width (W). What is the perimeter of the garden if its length is 20 yards and its width is 15 yards?
 a. 35 yards b. 55 yards c. 60 yards d. 70 yards ____ 39.
- What are the measures of the angles, if the difference in the measures of two complementary angles is 18° ?
 a. 36 and 54 b. 46 and 64 c. 56 and 74 d. 66 and 84
- ____ 40. Angelo is 5 years younger than Ethan. Four years later, Ethan will be twice as old as Angelo. What is the present age of Ethan?
 4 b. 6 c. 8 d. 10
- ____ 41. Christian's father is 4 times as old as Christian. After 5 years, father will be three times as old as Christian. What is the present age of Christian's father?
 30 b. 35 c. 40 d. 45
- ____ 42. The cost of two tables and three chairs is Php 700.00. If the table costs Php 40.00 more than the chair, how much is the cost of the chair?
 a. 124 b. 134 c. 144 d. 154

- ____ 43. Carlo and Camille collect rocks at the river. Together they collected 95 rocks. Carlo collected 15 more rocks than Camille. How many rocks did Carlo collect?
 a. 35 b. 45 c. 55 d. 65
- ____ 44. Kris worked 5 more hours this week than she did last week. Her total hours for both weeks are 59. How many hours did she work this week?
 a. 22 b. 32 c. 42 d. 52

Part III: Level of comprehension of the students

Instruction: Use the scale below when rating each item in the table.

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

Decoding		1	2	3	4	5
1	I am confident in my ability to quickly and accurately recognize printed words					
2	I find it easy to process unfamiliar words when I encounter them while reading.					
3	When I read, I rarely struggle with sounding out words, and this helps me comprehend the text better.					
4	Based on my decoding skills, I feel confident in my ability that makes me understand text effectively					
5	I believe that my current level of decoding skills is at a proficient level for effective reading comprehension.					
Fluency		1	2	3	4	5
1	I can read with accuracy and rarely make mistakes while reading.					
2	I can read expressively and adjust my tone appropriately when needed.					
3	I can read at the right speed, neither too slow nor too fast.					
4	I find it easy to connect what I read with my prior knowledge.					
5	I can convey the meaning of what I read to others and understand literature fluently.					
Vocabulary Skills		1	2	3	4	5
1	I regularly come across and successfully learn new words when I read or listen to texts.					
2	I can use words appropriately in relation to their meanings.					
3	I can infer the meanings of unfamiliar words based on the context of a text.					
4	My vocabulary skills have improved with age and education.					
5	I am comfortable using words I encounter for the first time.					
Background Knowledge		1	2	3	4	5
1	My knowledge has expanded as I have advanced in my education and encountered a wider range of subjects.					
2	I use my knowledge to understand and interpret complex nonfiction literature effectively.					

3	Having knowledge about a topic helps me read, comprehend, and retain information from related texts.					
4	I make connections between the text I'm reading and my background knowledge and experiences to aid comprehension.					
5	I actively apply my knowledge, including language and information, to enhance text comprehension.					

Appendix 5b: Raw Data

Respondent	Age	Sex	Section	Decoding:					Mean Fluency:					Vocabulary Skills:					Mean Background Knowledge:					Mean Comprehension:					Algebraic expression			Linear Equation		Basic operation of integers		Percentage, rate & base		Score	
				Statement 1	Statement 2	Statement 3	Statement 4	Statement 5	Mean	Fluency:	Mean	Vocabulary Skills:	Mean	Background Knowledge:	Mean	Comprehension:	Algebraic expression	Linear Equation	Basic operation of integers	Percentage, rate & base	Score																		
1	12	F	St. Helen	4	4	4	4	4	4	2	3	3	2	3	2.6	3	4	3	4	2	3.2	3	4	4	4	4	3.8	3.4	3	2	8	4	17						
2	12	F	St. Helen	2	2	3	2	3	2.4	2	3	3	2	3	2.6	3	4	3	4	2	3.2	4	2	4	4	4	3.6	2.95	3	3	7	5	18						
3	13	F	St. Helen	2	1	2	3	2	2	4	3	3	4	2	3.2	4	3	3	4	3	3.4	4	2	4	4	4	3.6	3.05	5	1	8	2	16						
4	15	M	St. Helen	3	4	3	3	3	3.2	4	3	2	3	2	2.8	3	4	5	3	3	3.6	3	3	3	3	3	3.2	3.2	5	5	8	9	27						
5	12	M	St. Helen	3	2	2	2	5	2.8	5	5	5	4	4	5	4.6	5	4	4	4	2	3.8	2	5	3	2	4	3.2	3.6	3	4	3	1	11					
6	13	M	St. Helen	1	4	4	5	3	3.4	4	4	5	4	4	4	4.2	3	5	4	4	5	4.2	3	3	4	4	5	3.8	3.9	1	3	6	4	14					
7	12	F	St. Helen	2	3	2	1	3	2.2	3	3	3	5	3	3	3.4	2	3	3	3	3	2	2.6	3	3	3	3	3	3	2.8	7	2	10	4	23				
8	12	F	St. Helen	4	4	4	4	5	4.2	3	4	4	3	3	3.4	4	4	4	3	4	3.8	3	3	4	4	3	3.4	3.7	8	5	7	1	21						
9	12	F	St. Helen	4	3	4	3	3	3.4	2	4	4	3	3	3.2	4	3	4	3	4	3.6	4	3	3	3	3	3.2	3.35	7	8	7	5	27						
10	12	F	St. Helen	5	5	5	3	3	4.2	5	4	5	3	5	4.4	3	5	4	5	2	3.8	5	5	5	4	3	4.4	4.2	6	4	8	7	25						
11	13	F	St. Helen	2	2	3	2	3	2.4	2	3	3	2	4	2.8	3	4	3	3	4	3.4	3	3	3	3	4	3.2	2.95	5	3	9	3	20						
12	12	M	St. George	5	4	5	5	4	4.6	5	5	5	5	4	4.8	5	4	4	5	5	4.6	5	4	5	5	5	4.8	4.7	1	4	6	7	18						
13	13	F	St. George	4	3	4	3	4	3.6	3	4	4	3	4	3.6	4	3	4	2	4	3.4	3	4	5	5	5	4.4	3.75	6	3	8	3	20						
14	13	F	St. Helen	4	3	2	4	4	3.4	4	3	4	4	4	3.8	4	3	2	4	4	3.4	4	3	4	4	4	3.8	3.6	2	4	7	1	14						
15	12	F	St. Helen	3	3	4	3	3	3.2	3	4	4	3	3	3.4	3	3	4	3	3	3.2	3	4	3	3	4	3.4	3.3	2	5	8	4	19						
16	13	F	St. Helen	4	2	2	3	3	2.8	3	3	4	4	4	3	3.4	4	3	3	4	3	3.4	3	3	4	4	2	3.2	3.2	2	6	3	3	14					
17	12	F	St. George	4	3	4	3	3	3.4	4	4	4	4	4	4	4	5	4	3	4	4	4	3	5	3	3.6	3.75	3	3	3	4	13							
18	12	F	St. George	2	3	3	3	3	2.8	2	3	4	2	3	2.8	5	3	5	5	4	4	4.4	3	4	4	5	3	3.8	3.45	4	2	3	6	15					
19	13	F	St. George	3	1	4	5	4	3.4	3	3	2	4	3	3	4	2	3	4	2	3	2	4	2	3	4	3	3.1	4	2	4	1	11						

20	12 M	St. George	2	4	4	4	2	3.2	3	2	3	2	2	2.4	4	4	2	4	2	3.2	4	4	4	3	4	3.8	3.15		2	1	5	4	12	
21	13 M	St. Helen	3	2	4	2	3	2.8	5	5	3	3	4	4	4	3	2	3	3	4	3	3	4	4	3	4	3.6	3.35		4	2	8	5	19
22	12 F	St. Helen	3	3	3	3	2	2.8	4	3	3	2	2	2.8	3	2	3	3	2	2.6	3	3	3	3	3	3	2.8		4	3	0	5	12	
23	12 F	St. George	3	2	3	2	4	2.8	2	3	3	2	5	3	1	2	5	3	4	3	2	3	2	3	4	2.8	2.9		3	5	6	2	16	
24	13 M	St. Helen	4	5	4	5	4	4.4	5	4	5	4	5	4.6	4	5	4	5	4	4.4	5	4	5	4	5	4.6	4.5		2	3	7	4	16	
25	12 M	St. Helen	3	3	3	3	3	3	3	3	3	3	3	3	4	3	2	3	4	3.2	4	3	2	3	2	2.8	3		5	4	8	7	24	
26	13 M	St. George	1	1	1	1	1	1	4	4	4	4	1	3.4	4	4	1	1	1	2.2	4	3	3	1	3	2.8	2.35		4	3	2	1	10	
27	13 F	St. George	3	3	3	4	4	3.4	4	4	3	4	3	3.6	2	3	3	4	4	3.2	3	2	4	4	3	3.2	3.35		3	2	3	5	13	
28	13 M	St. George	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	4.8	5	5	5	5	5	5	4.95		4	5	9	3	21	
29	12 M	St. Helen	2	3	1	3	4	2.6	1	3	4	3	4	3	2	1	3	4	3	2.6	2	1	1	1	1	1.2	2.35		2	2	4	5	13	
30	12 M	St. Helen	2	2	1	2	1	1.6	1	2	1	1	1	1	1.2	3	2	2	1	3	2.2	3	1	2	1	2	1.8	1.7		2	2	6	2	12
31	14 M	St. George	1	5	3	3	4	3.2	3	4	2	1	4	2.8	4	1	5	3	1	2.8	1	5	3	1	4	2.8	2.9		1	0	4	3	8	
32	13 M	St. Helen	3	4	4	5	4	4	4	5	4	5	5	4.6	5	4	4	4	3	4	3	4	4	4	4	3.8	4.1		2	3	1	5	11	
33	13 F	St. Helen	3	3	2	4	3	3	2	3	2	3	3	2.6	3	3	2	2	2	2.4	3	2	2	3	3	2.6	2.65		1	2	8	6	17	
34	13 F	St. George	2	3	4	2	2	2.6	2	3	3	2	4	2.8	4	4	3	3	3	3.4	3	4	4	4	3	3.6	3.1		3	4	7	1	15	
35	13 M	St. George	3	1	5	2	4	3	2	4	1	3	5	3	3	2	4	1	3	2.6	1	4	2	5	3	3	2.9		4	3	6	5	18	
36	13 M	St. Helen	3	2	3	3	3	2.8	2	2	3	3	3	2.6	3	3	3	3	3	3	4	3	3	4	3	3.4	2.95		8	4	8	9	29	
37	12 F	St. Helen	2	4	5	2	3	3.2	5	4	5	3	3	4	3	5	3	4	3	3.6	4	4	4	3	3	3.6	3.6		2	1	5	2	10	
38	13 M	St. Helen	3	2	3	2	3	2.6	4	3	3	3	3	3.2	2	3	3	4	4	3.2	3	3	3	3	4	3.2	3.05		4	1	6	1	12	
39	13 M	St. George	5	5	5	5	5	5	5	5	5	4	5	4.8	5	5	5	5	5	5	5	5	5	5	5	4.95		2	2	5	3	12		
40	13 M	St. Helen	2	1	2	3	2	2	2	2	2	3	1	2	2	2	3	1	2	2.2	3	1	3	2	1	2	2.05		2	4	4	0	10	

41	12 M	St. Helen	3	2	1	3	3	2.4	5	3	1	2	2	2.6	3	2	1	2	3	2.2	4	1	3	1	2	2.2	2.35	3	1	2	1	7
42	12 F	St. George	4	4	3	5	4	4	4	5	4	4	3	4	4	4	4	5	4	4.2	4	4	5	3	4	4	4.05	6	2	6	4	18
43	12 F	St. George	2	3	2	3	2	2.4	4	4	4	3	3	3.6	4	5	4	5	4	4.4	4	4	5	3	4	4	3.6	5	5	6	2	18
44	12 F	St. Helen	4	4	3	3	4	3.6	4	4	4	4	3	3.8	4	4	3	4	4	3.8	4	3	4	4	4	3.8	3.75	1	5	9	5	20
45	12 M	St. Helen	3	1	1	1	4	2	4	2	3	4	4	3.4	2	4	2	4	4	3.2	4	2	4	4	3	3.4	3	4	4	7	4	19
46	13 F	St. George	3	4	4	3	4	3.6	4	3	3	4	3	3.4	3	3	3	3	4	3.2	3	3	4	4	3	3.4	3.4	0	2	7	4	13
47	13 F	St. George	3	3	3	4	4	3.4	3	5	5	3	3	4.2	5	4	4	5	5	4.6	5	5	5	5	5	5	4.3	3	2	7	3	15
48	14 M	St. George	3	4	3	2	3	3	2	3	4	5	4	3.6	5	4	3	4	3	3.8	4	4	5	5	4	4.4	3.7	4	3	3	6	16
49	12 M	St. Helen	4	3	4	3	4	3.6	5	4	4	4	3	4	4	3	2	4	4	3.4	4	4	4	5	4	4.2	3.8	3	0	5	4	12
50	12 M	St. Helen	4	3	2	3	5	3.4	5	3	4	2	3	3.4	4	3	3	4	5	3.8	4	5	2	4	3	3.6	3.55	3	5	2	1	11
51	13 M	St. Helen	3	2	1	3	2	2.2	1	2	3	4	3	2.6	2	3	3	5	3	3.2	5	4	3	3	4	3.8	2.95	4	0	0	2	6
52	13 F	St. George	3	3	3	2	2	2.6	4	3	4	3	3	3.4	5	3	3	4	3	3.6	3	3	4	3	3	3.2	3.2	2	2	8	6	18
53	12 F	St. George	3	2	5	3	2	3	4	3	5	4	2	3.6	4	3	3	4	5	3.8	4	3	4	3	4	3.6	3.5	5	3	5	5	18
54	12 M	St. Helen	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	3	6	2	12
55	13 F	St. George	3	3	5	3	3	3.4	3	4	3	3	2	3	3	2	3	3	3	2.8	4	2	3	4	5	3.6	3.2	4	6	5	4	19
56	13 M	St. George	1	2	3	5	3	2.8	3	2	3	2	3	2.6	2	4	3	3	1	2.6	4	3	4	1	2	2.8	2.7	1	4	6	1	12
57	11 M	St. George	2	4	3	4	5	3.6	4	4	4	4	3	3.8	4	4	4	4	4	4	4	5	4	4	4	4.2	3.9	5	2	6	5	18
58	12 F	St. George	2	3	1	2	2	2	1	2	3	2	1	1.8	5	4	1	3	1	2.8	5	3	5	5	4	4.4	2.75	8	4	7	3	22
59	13 F	St. Helen	3	3	4	4	4	3.6	4	4	4	4	3	3.8	3	3	4	4	3	3.4	4	4	4	4	4	4	3.7	7	6	8	3	24
60	12 F	St. Helen	2	2	3	2	2	2.2	2	3	2	4	3	2.8	3	2	1	2	2	2	2	2	3	2	3	2.4	2.35	4	4	4	1	13
61	13 M	St. George	3	3	2	2	3	2.6	3	2	3	3	2	2.6	3	2	3	4	3	3	3	4	4	4	3	3.6	2.95	2	1	7	2	12

62	12 M	St. George	3	4	5	5	4	4.2	5	5	4	4	4.6	4	4	3	4	4	3.8	4	4	4	4	4	4.15	2	2	6	2	12					
63	12 F	St. George	4	5	4	4	4	4.2	3	4	5	4	5	4.2	4	4	3	4	5	4	4	4	5	3	4	3.8	4.05	3	3	5	5	16			
64	12 M	St. George	4	1	4	3	5	3.4	4	2	4	2	1	2.6	1	2	1	4	3	2.2	1	5	3	2	3	2.8	2.75	2	2	4	2	10			
65	12 M	St. George	3	4	3	3	4	3.4	4	3	3	4	3	3.4	3	3	3	4	4	3.4	3	4	3	3	4	3.4	3.4	3	3	0	3	9			
66	13 M	St. George	5	2	2	4	3	3.2	3	3	3	2	2.8	4	5	4	3	3	3.8	1	2	4	5	1	2.6	3.1	1	1	3	2	7				
67	13 M	St. George	4	3	4	3	4	3.6	3	4	4	3	4	3.6	4	3	4	3	4	3.6	3	4	5	4	3	3.8	3.65	5	2	3	2	12			
68	12 M	St. George	3	4	3	5	3	3.6	3	3	2	4	4	3.2	2	3	2	4	2	2.6	4	4	3	4	5	4	3.35	4	3	2	2	11			
69	12 F	St. George	2	2	3	1	4	2.4	1	2	3	2	4	2.4	1	2	4	1	4	2.4	1	2	1	4	3	2.2	2.35	1	4	0	3	8			
70	13 M	St. George	4	3	5	5	4	4.2	3	3	4	3	4	3.4	4	3	4	4	4	5	4	4	3	3	4	4	3.6	3.8	4	1	0	2	7		
71	12 M	St. George	2	3	2	3	4	2.8	2	4	2	2	3	2.6	3	2	4	4	3	3.2	5	2	3	4	5	3.8	3.1	8	1	0	4	13			
72	13 M	St. Helen	3	3	4	3	3	3.2	3	4	3	4	3	3.4	3	4	2	5	2	3.2	4	3	3	3	3	3.2	3.25	8	2	2	4	16			
73	12 F	St. George	2	3	3	2	2	2.4	2	2	3	2	2	2.2	4	4	3	3	3	3.4	3	4	4	4	4	3.8	2.95	8	1	2	6	17			
			3	2.97	3.19	3.15	3.33	3.13	3.27	3.40	3.47	3.21	3.22	3.31	3.47	3.27	3.18	3.58	3.29	3.36	3.41	3.38	3.55	3.51	3.52	3.47	3.32	3.63	2.93	5.18	3.52	15.26			
				0.76				0.75			0.67									0.73	0.63						2.05	1.59	2.62	1.95	5.09				
	Age	Frequency Percentage	Decoding:			Fluency:			Vocabulary Skills:			Background Knowledge:			Level of Comprehension:			Algebraic Expression:			Linear Equation:			Basic Operation of Integers: base:			Percentage, rate and Level of Math Problem Solving:								
	11	1	1																																
	12	37	51	Mean	3.13			Mean	3.31			Mean	3.36		Mean	3.47	Mean	3.32	Mean	3.63	Mean	2.93	Mean	5.18	Mean	3.52	Mean	15.26							
	13	32	44	SE	0.088997			SE	0.087931			SE	0.078634		SE	0.084984272	SE	0.073548679	SE	0.240106243	Standard Error	0.186419405	Standard Error	0.306166	Standard E	0.228413	Standard E	0.596166							
	14	2	3	Median	3.2			Median	3.4			Median	3.4		Median	3.6	Median	3.25	Median	3	Median	3	Median	6	Median	3	Median	15							
	15	1	1	Mode	3.4			Mode	3.4			Mode	3.2		Mode	3.8	Mode	2.95	Mode	2	Mode	2	Mode	8	Mode	4	Mode	12							
	Total	73		SD	0.76			SD	0.75			SD	0.67		SD	0.73	SD	0.63	SD	2.05	SD	1.59	SD	2.62	SD	1.95	SD	5.09							

Appendix 6a: Level of Comprehension and Math Skills According to Sex

Responde	Sex	Decoding:			Mean	Fluency:			Mean	Vocabulary Skills:			Mean	Background Knowledge:			Mean	Comprehension	Algebraic	Linear Eq	aBasic oper	Percentage	Score								
1 F		4	4	4	4	4	2	3	3	2	3	2.6	3	4	3	4	2	3.2	3	4	4	4	3.8	3.4	3	2	8	4	17		
2 F		2	2	3	2	3	2.4	2	3	3	2	3	2.6	3	4	3	4	2	3.2	4	2	4	4	4	3.6	2.95	3	3	7	5	18
3 F		2	1	2	3	2	2	4	3	3	4	2	3.2	4	3	3	4	3	3.4	4	2	4	4	4	3.6	3.05	5	1	8	2	16
4 F		2	3	2	1	3	2.2	3	3	5	3	3	3.4	2	3	3	3	2	2.6	3	3	3	3	3	3	2.8	7	2	10	4	23
5 F		4	4	4	4	5	4.2	3	4	4	3	3	3.4	4	4	4	4	3	3.8	3	3	4	4	3	3.4	3.7	8	5	7	1	21
6 F		4	3	4	3	3	3.4	2	4	4	3	3	3.2	4	3	4	3	4	3.6	4	3	3	3	3	3.2	3.35	7	8	7	5	27
7 F		5	5	5	3	3	4.2	5	4	5	3	5	4.4	3	5	4	5	2	3.8	5	5	5	4	3	4.4	4.2	6	4	8	7	25
8 F		2	2	3	2	3	2.4	2	3	3	2	4	2.8	3	4	3	3	4	3.4	3	3	3	3	4	3.2	2.95	5	3	9	3	20
9 F		4	3	4	3	4	3.6	3	4	4	3	4	3.6	4	3	4	2	4	3.4	3	4	5	5	5	4.4	3.75	6	3	8	3	20
10 F		4	3	2	4	4	3.4	4	3	4	4	4	3.8	4	3	2	4	4	3.4	4	3	4	4	4	3.8	3.6	2	4	7	1	14
11 F		3	3	4	3	3	3.2	3	4	4	3	3	3.4	3	3	4	3	3	3.2	3	4	3	3	4	3.4	3.3	2	5	8	4	19
12 F		4	2	2	3	3	2.8	3	3	4	4	3	3.4	4	3	3	4	3	3.4	3	3	4	4	2	3.2	3.2	2	6	3	3	14
13 F		4	3	4	3	3	3.4	4	4	4	4	4	4	5	4	3	4	4	4	3	4	5	3	3.6	3.75	3	3	3	4	13	
14 F		2	3	3	3	3	2.8	2	3	4	2	3	2.8	5	3	5	5	4	4.4	3	4	4	5	3	3.8	3.45	4	2	3	6	15
15 F		3	1	4	5	4	3.4	3	3	2	4	3	3	4	2	3	4	2	3	2	4	2	3	4	3	3.1	4	2	4	1	11
16 F		3	3	3	3	2	2.8	4	3	3	2	2	2.8	3	2	3	3	2	2.6	3	3	3	3	3	2.8	4	3	0	5	12	

17 F	3	2	3	2	4	2.8	2	3	3	2	5	3	1	2	5	3	4	3	2	3	2	3	4	2.8	2.9		3	5	6	2	16
18 F	3	3	3	4	4	3.4	4	4	3	4	3	3.6	2	3	3	4	4	3.2	3	2	4	4	3	3.2	3.35		3	2	3	5	13
19 F	3	3	2	4	3	3	2	3	3	2.6	3	3	2	2	2	2.4	3	2	2	3	3	3	2.6	2.65		1	2	8	6	17	
20 F	2	3	4	2	2	2.6	2	3	3	2	4	2.8	4	4	3	3	3.4	3	4	4	4	3	3.6	3.1		3	4	7	1	15	
21 F	2	4	5	2	3	3.2	5	4	5	3	3	4	3	5	3	4	3.6	4	4	4	4	3	3	3.6	3.6		2	1	5	2	10
22 F	4	4	3	5	4	4	4	5	4	4	3	4	4	4	5	4	4.2	4	4	5	3	4	4	4.05		6	2	6	4	18	
23 F	2	3	2	3	2	2.4	4	4	4	3	3	3.6	4	5	4	5	4.4	4	4	5	3	4	4	3.6		5	5	6	2	18	
24 F	4	4	3	3	4	3.6	4	4	4	3	3.8	4	4	3	4	4	3.8	4	3	4	4	4	3.8	3.75		1	5	9	5	20	
25 F	3	4	4	3	4	3.6	4	3	3	4	3	3.4	3	3	3	3	4	3.2	3	3	3	4	3	3.4	3.4		0	2	7	4	13
26 F	3	3	3	4	4	3.4	3	5	5	3	4.2	5	4	4	5	5	4.6	5	5	5	5	5	5	4.3		3	2	7	3	15	
27 F	3	3	3	2	2	2.6	4	3	4	3	3.4	5	3	3	4	3	3.6	3	3	3	4	3	3	3.2	3.2		2	2	8	6	18
28 F	3	2	5	3	2	3	4	3	5	4	2	3.6	4	3	3	4	3.8	4	3	4	3	4	3.6	3.5		5	3	5	5	18	
29 F	3	3	5	3	3	3.4	3	4	3	3	2	3	3	2	3	3	2.8	4	2	3	4	5	3.6	3.2		4	6	5	4	19	
30 F	2	3	1	2	2	2	1	2	3	2	1	1.8	5	4	1	3	1	2.8	5	3	5	5	4	4.4	2.75		8	4	7	3	22
31 F	3	3	4	4	4	3.6	4	4	4	3	3.8	3	3	4	4	3	3.4	4	4	4	4	4	4	3.7		7	6	8	3	24	
32 F	2	2	3	2	2	2.2	2	3	2	4	3	2.8	3	2	1	2	2	2	2	2	3	2	3	2.4	2.35		4	4	4	1	13
33 F	4	5	4	4	4	4.2	3	4	5	4	5	4.2	4	4	3	4	5	4	4	5	3	4	3	3.8	4.05		3	3	5	5	16
34 F	2	2	3	1	4	2.4	1	2	3	2	4	2.4	1	2	4	1	4	2.4	1	2	1	4	3	2.2	2.35		1	4	0	3	8
35 F	2	3	3	2	2	2.4	2	2	3	2	2	2.2	4	4	3	3	3.4	3	4	4	4	4	3.8	2.95		8	1	2	6	17	
						3.09						3.27					3.38							3.53	3.32		4	3.40	5.94	3.4	17.00
						0.64						0.60					0.59							0.57	0.48		2.15	1.64	2.45	1.66	4.20

Respondent ID	Sex	Decoding:		Mean		Fluency:		Mean		Vocabulary Skills:		Mean		Background Knowledge:		Mean		Level of Comprehension:		Algebraic	Linear	Integers	PRB	Scores								
		Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	PRB	Final Score						
1 M	M	3	4	3	3	3.2	4	3	2	3	2	2.8	3	4	5	3	3	3.6	3	3	3	3	4	3.2	3.2	5	5	8	9	27		
2 M	M	3	2	2	2	5	2.8	5	5	4	4	5	4.6	5	4	4	4	2	3.8	2	5	3	2	4	3.2	3.6	3	4	3	1	11	
3 M	M	1	4	4	5	3	3.4	4	4	5	4	4.2	3	5	4	4	5	4.2	3	3	4	4	5	3.8	3.9	1	3	6	4	14		
4 M	M	5	4	5	5	4	4.6	5	5	5	5	4.8	5	4	4	5	5	4.6	5	4	5	5	5	4.8	4.7	1	4	6	7	18		
5 M	M	2	4	4	4	2	3.2	3	2	3	2	2.4	4	4	2	4	2	3.2	4	4	4	3	4	3.8	3.15	2	1	5	4	12		
6 M	M	3	2	4	2	3	2.8	5	5	3	3	4	4	3	2	3	3	4	3	3	4	4	3	4	3.6	3.35	4	2	8	5	19	
7 M	M	4	5	4	5	4	4.4	5	4	5	4	4.6	4	5	4	5	4	4.4	5	4	5	4	5	4.6	4.5	2	3	7	4	16		
8 M	M	3	3	3	3	3	3	3	3	3	3	3	4	3	2	3	4	3.2	4	3	2	3	2	2.8	3	5	4	8	7	24		
9 M	M	1	1	1	1	1	1	4	4	4	4	1	3.4	4	4	1	1	1	2.2	4	3	3	1	3	2.8	2.35	4	3	2	1	10	
10 M	M	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	4.8	5	5	5	5	5	5	4.95	4	5	9	3	21		
11 M	M	2	3	1	3	4	2.6	1	3	4	3	4	3	2	1	3	4	3	2.6	2	1	1	1	1	1.2	2.35	2	2	4	5	13	
12 M	M	2	2	1	2	1	1.6	1	2	1	1	1	1.2	3	2	2	1	3	2.2	3	1	2	1	1	2	1.8	1.7	2	2	6	2	12
13 M	M	1	5	3	3	4	3.2	3	4	2	1	4	2.8	4	1	5	3	1	2.8	1	5	3	1	4	2.8	2.9	1	0	4	3	8	
14 M	M	3	4	4	5	4	4	4	5	4	5	4.6	5	4	4	4	3	4	3	4	4	4	4	3.8	4.1	2	3	1	5	11		
15 M	M	3	1	5	2	4	3	2	4	1	3	5	3	3	2	4	1	3	2.6	1	4	2	5	3	3	2.9	4	3	6	5	18	
16 M	M	3	2	3	3	3	2.8	2	2	3	3	3	2.6	3	3	3	3	3	3	4	3	3	4	3	3.4	2.95	8	4	8	9	29	
17 M	M	3	2	3	2	3	2.6	4	3	3	3	3	3.2	2	3	3	4	4	3.2	3	3	3	4	3	3.2	3.05	4	1	6	1	12	
18 M	M	5	5	5	5	5	5	5	5	4	5	5	4.8	5	5	5	5	5	5	5	5	5	5	5	4.95	2	2	5	3	12		
19 M	M	2	1	2	3	2	2	2	2	3	1	2	2	3	1	2	3	2	2.2	3	1	3	2	1	2	2.05	2	4	4	0	10	

20 M	3	2	1	3	3	2.4	5	3	1	2	2	2.6	3	2	1	2	3	2.2	4	1	3	1	2	2.2	2.35	3	1	2	1	7	
21 M	3	1	1	1	4	2	4	2	3	4	4	3.4	2	4	2	4	4	3.2	4	2	4	4	3	3.4	3	4	4	7	4	19	
22 M	3	4	3	2	3	3	2	3	4	5	4	3.6	5	4	3	4	3.8	4	4	5	5	4	4.4	3.7	4	3	3	6	16		
23 M	4	3	4	3	4	3.6	5	4	4	4	3	4	4	3	2	4	4	3.4	4	4	4	5	4	4.2	3.8	3	0	5	4	12	
24 M	4	3	2	3	5	3.4	5	3	4	2	3	3.4	4	3	3	4	5	3.8	4	5	2	4	3	3.6	3.55	3	5	2	1	11	
25 M	3	2	1	3	2	2.2	1	2	3	4	3	2.6	2	3	3	5	3	3.2	5	4	3	3	4	3.8	2.95	4	0	0	2	6	
26 M	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	3	6	2	12
27 M	1	2	3	5	3	2.8	3	2	3	2	3	2.6	2	4	3	3	1	2.6	4	3	4	1	2	2.8	2.7	1	4	6	1	12	
28 M	2	4	3	4	5	3.6	4	4	4	4	3	3.8	4	4	4	4	4	4	4	5	4	4	4	4.2	3.9	5	2	6	5	18	
29 M	3	3	2	2	3	2.6	3	2	3	3	2	2.6	3	2	3	4	3	3	3	4	4	4	3	3.6	2.95	2	1	7	2	12	
30 M	3	4	5	5	4	4.2	5	5	5	4	4	4.6	4	4	3	4	4	3.8	4	4	4	4	4	4	4.15	2	2	6	2	12	
31 M	4	1	4	3	5	3.4	4	2	4	2	1	2.6	1	2	1	4	3	2.2	1	5	3	2	3	2.8	2.75	2	2	4	2	10	
32 M	3	4	3	3	4	3.4	4	3	3	4	3	3.4	3	3	3	4	4	3.4	3	4	3	3	4	3.4	3.4	3	3	0	3	9	
33 M	5	2	2	4	3	3.2	3	3	3	3	2	2.8	4	5	4	3	3	3.8	1	2	4	5	1	2.6	3.1	1	1	3	2	7	
34 M	4	3	4	3	4	3.6	3	4	4	3	4	3.6	4	3	4	3	4	3.6	3	4	5	4	3	3.8	3.65	5	2	3	2	12	
35 M	3	4	3	5	3	3.6	3	3	2	4	4	3.2	2	3	2	4	2	2.6	4	4	3	4	5	4	3.35	4	3	2	2	11	
36 M	4	3	5	5	4	4.2	3	3	4	3	4	3.4	4	3	4	4	5	4	4	3	3	4	4	4	3.6	3.8	4	1	0	2	7
37 M	2	3	2	3	4	2.8	2	4	2	2	3	2.6	3	2	4	4	3	3.2	5	2	3	4	5	3.8	3.1	8	1	0	4	13	
38 M	3	3	4	3	3	3.2	3	4	3	4	3	3.4	3	4	2	5	2	3.2	4	3	3	3	3	3.2	3.25	8	2	2	4	16	
						3.17						3.35						3.33						3.43	3.32	3.29	2.50	4.47	3.39	13.66	
						1.23						0.86						0.73						0.83	0.73	1.86	1.39	2.53	2.16	5.25	

Appendix 6b: Level of Comprehension and Math Skills According to Age

Respondent ID	Age	Decoding:				Mean Fluency:				Vocabulary Skills:				Background Knowledge:				Comprehension				Algebraic		Linear Eq		Basic oper		Percentage Score			
		Mean	Fluency	Mean	Vocabulary Skills	Mean	Background Knowledge	Mean	Comprehension	Algebraic	Linear Eq	Basic oper	Percentage																		
1	12	4	4	4	4	4	2	3	3	2	3	2.6	3	4	3	4	2	3.2	3	4	4	4	3.8	3.4	3	2	8	4	17		
2	12	2	2	3	2	3	2.4	2	3	3	2	3	2.6	3	4	3	4	2	3.2	4	2	4	4	3.6	2.95	3	3	7	5	18	
3	12	3	2	2	2	5	2.8	5	5	4	4	5	4.6	5	4	4	4	2	3.8	2	5	3	2	4	3.2	3.6	3	4	3	1	11
4	12	2	3	2	1	3	2.2	3	3	5	3	3	3.4	2	3	3	3	2	2.6	3	3	3	3	3	2.8	7	2	10	4	23	
5	12	4	4	4	4	5	4.2	3	4	4	3	3	3.4	4	4	4	3	4	3.8	3	3	4	4	3	3.4	3.7	8	5	7	1	21
6	12	4	3	4	3	3	3.4	2	4	4	3	3	3.2	4	3	4	3	4	3.6	4	3	3	3	3	3.2	3.35	7	8	7	5	27
7	12	5	5	5	3	3	4.2	5	4	5	3	5	4.4	3	5	4	5	2	3.8	5	5	5	4	3	4.4	4.2	6	4	8	7	25
8	12	5	4	5	5	4	4.6	5	5	5	5	4	4.8	5	4	4	5	5	4.6	5	4	5	5	5	4.8	4.7	1	4	6	7	18
9	12	3	3	4	3	3	3.2	3	4	4	3	3	3.4	3	3	4	3	3	3.2	3	4	3	3	4	3.4	3.3	2	5	8	4	19
10	12	4	3	4	3	3	3.4	4	4	4	4	4	4	5	4	3	4	4	4	3	4	3	5	3	3.6	3.75	3	3	3	4	13
11	12	2	3	3	3	3	2.8	2	3	4	2	3	2.8	5	3	5	5	4	4.4	3	4	4	5	3	3.8	3.45	4	2	3	6	15
12	12	2	4	4	4	2	3.2	3	2	3	2	2	2.4	4	4	2	4	2	3.2	4	4	4	3	4	3.8	3.15	2	1	5	4	12
13	12	3	3	3	3	2	2.8	4	3	3	2	2	2.8	3	2	3	3	2	2.6	3	3	3	3	3	3	2.8	4	3	0	5	12
14	12	3	2	3	2	4	2.8	2	3	3	2	5	3	1	2	5	3	4	3	2	3	2	3	4	2.8	2.9	3	5	6	2	16
15	12	3	3	3	3	3	3	3	3	3	3	3	3	4	3	2	3	4	3.2	4	3	2	3	2	2.8	3	5	4	8	7	24

16	12	2	3	1	3	4	2.6	1	3	4	3	4	3	2	1	3	4	3	2.6	2	1	1	1	1.2	2.35		2	2	4	5	13	
17	12	2	2	1	2	1	1.6	1	2	1	1	1	1.2	3	2	2	1	3	2.2	3	1	2	1	2	1.8	1.7		2	2	6	2	12
18	12	2	4	5	2	3	3.2	5	4	5	3	3	4	3	5	3	4	3	3.6	4	4	4	3	3	3.6	3.6		2	1	5	2	10
19	12	3	2	1	3	3	2.4	5	3	1	2	2	2.6	3	2	1	2	3	2.2	4	1	3	1	2	2.2	2.35		3	1	2	1	7
20	12	4	4	3	5	4	4	4	5	4	4	3	4	4	4	4	5	4	4.2	4	4	5	3	4	4	4.05		6	2	6	4	18
21	12	2	3	2	3	2	2.4	4	4	4	3	3	3.6	4	5	4	5	4	4.4	4	4	5	3	4	4	3.6		5	5	6	2	18
22	12	4	4	3	3	4	3.6	4	4	4	4	3	3.8	4	4	3	4	4	3.8	4	3	4	4	4	3.8	3.75		1	5	9	5	20
23	12	3	1	1	1	4	2	4	2	3	4	4	3.4	2	4	2	4	4	3.2	4	2	4	4	3	3.4	3		4	4	7	4	19
24	12	4	3	4	3	4	3.6	5	4	4	4	3	4	4	3	2	4	4	3.4	4	4	4	5	4	4.2	3.8		3	0	5	4	12
25	12	4	3	2	3	5	3.4	5	3	4	2	3	3.4	4	3	3	4	5	3.8	4	5	2	4	3	3.6	3.55		3	5	2	1	11
26	12	3	2	5	3	2	3	4	3	5	4	2	3.6	4	3	3	4	5	3.8	4	3	4	3	4	3.6	3.5		5	3	5	5	18
27	12	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3		1	3	6	2	12
28	12	2	3	1	2	2	2	1	2	3	2	1	1.8	5	4	1	3	1	2.8	5	3	5	5	4	4.4	2.75		8	4	7	3	22
29	12	2	2	3	2	2	2.2	2	3	2	4	3	2.8	3	2	1	2	2	2	2	2	3	2	3	2.4	2.35		4	4	4	1	13
30	12	3	4	5	5	4	4.2	5	5	5	4	4	4.6	4	4	3	4	4	3.8	4	4	4	4	4	4	4.15		2	2	6	2	12
31	12	4	5	4	4	4	4.2	3	4	5	4	5	4.2	4	4	3	4	5	4	4	5	3	4	3	3.8	4.05		3	3	5	5	16
32	12	4	1	4	3	5	3.4	4	2	4	2	1	2.6	1	2	1	4	3	2.2	1	5	3	2	3	2.8	2.75		2	2	4	2	10
33	12	3	4	3	3	4	3.4	4	3	3	4	3	3.4	3	3	3	4	4	3.4	3	4	3	3	4	3.4	3.4		3	3	0	3	9
34	12	3	4	3	5	3	3.6	3	3	2	4	4	3.2	2	3	2	4	2	2.6	4	4	3	4	5	4	3.35		4	3	2	2	11
35	12	2	2	3	1	4	2.4	1	2	3	2	4	2.4	1	2	4	1	4	2.4	1	2	1	4	3	2.2	2.35		1	4	0	3	8
36	12	2	3	2	3	4	2.8	2	4	2	2	2	3	2.6	3	2	4	4	3.2	5	2	3	4	5	3.8	3.1		8	1	0	4	13

37	12	2	3	3	2	2	2.4	2	2	3	2	2	2.2	4	4	3	3	3.4	3	4	4	4	4	3.8	2.95		8	1	2	6	17		
Responde	tAge	Decoding:																															
1	11	2	4	3	4	5	3.6	4	4	4	4	4	3	3.8	4	4	4	4	4	4	4	4	4	4.2	3.9		5	2	6	5	18		
Responde	tAge	Decoding:																															
1	13	2	1	2	3	2	2	2	4	3	3	4	2	3.2	4	3	3	4	3	3.4	4	2	4	4	4	3.6	3.05		5	1	8	2	16
2	13	1	4	4	5	3	3.4	4	4	5	4	4	4	4.2	3	5	4	4	5	4.2	3	3	4	4	5	3.8	3.9		1	3	6	4	14
3	13	2	2	3	2	3	2.4	2	3	3	2	4	2	2.8	3	4	3	3	4	3.4	3	3	3	4	3.2	2.95		5	3	9	3	20	
4	13	4	3	4	3	4	3.6	3	4	4	4	3	4	3.6	4	3	4	2	4	3.4	3	4	5	5	5	4.4	3.75		6	3	8	3	20
5	13	4	3	2	4	4	3.4	4	3	4	4	4	4	3.8	4	3	2	4	4	3.4	4	3	4	4	4	3.8	3.6		2	4	7	1	14
6	13	4	2	2	3	3	2.8	3	3	4	4	4	3	3.4	4	3	3	4	3	3.4	3	3	4	4	2	3.2	3.2		2	6	3	3	14
7	13	3	1	4	5	4	3.4	3	3	2	4	3	3	4	2	3	4	2	3	2	4	2	3	4	3	3.1		4	2	4	1	11	
8	13	3	2	4	2	3	2.8	5	5	3	3	4	4	4	3	2	3	3	4	3	3	4	4	3	4	3.6	3.35		4	2	8	5	19
9	13	4	5	4	5	4	4.4	5	4	5	4	5	4	4.6	4	5	4	5	4	4.4	5	4	5	4	5	4.6	4.5		2	3	7	4	16
10	13	1	1	1	1	1	1	4	4	4	4	4	1	3.4	4	4	1	1	1	2.2	4	3	3	1	3	2.8	2.35		4	3	2	1	10
11	13	3	3	3	4	4	3.4	4	4	3	4	3	3.6	2	3	3	4	4	4	3.2	3	2	4	4	3	3.2	3.35		3	2	3	5	13
12	13	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	4.95		4	5	9	3	21
13	13	3	4	4	5	4	4	4	5	4	5	5	4.6	5	4	4	4	4	3	4	3	4	4	4	4	3.8	4.1		3	1	5	11	
14	13	3	3	2	4	3	3	2	3	2	3	3	2.8	3	3	2	2	2	2.4	3	2	2	3	3	2.6	2.65		1	2	8	6	17	
15	13	2	3	4	2	2	2.6	2	3	3	2	4	2.8	4	4	3	3	3.4	3	4	4	4	3	3.6	3.1		3	4	7	1	15		

16	13	3	1	5	2	4	3	2	4	1	3	5	3	3	2	4	1	3	2.6	1	4	2	5	3	3	2.9		4	3	6	5	18
17	13	3	2	3	3	3	2.8	2	2	3	3	3	2.6	3	3	3	3	3	3	4	3	3	4	3	3.4	2.95	8	4	8	9	29	
18	13	3	2	3	2	3	2.6	4	3	3	3	3	3.2	2	3	3	4	4	3.2	3	3	3	3	4	3.2	3.05	4	1	6	1	12	
19	13	5	5	5	5	5	5	5	5	4	5	5	4.8	5	5	5	5	5	5	5	5	5	5	5	5	4.95	2	2	5	3	12	
20	13	2	1	2	3	2	2	2	2	3	1	2	2	3	1	2	3	2	2.2	3	1	3	2	1	2	2.05	2	4	4	0	10	
21	13	3	4	4	3	4	3.6	4	3	3	4	3	3.4	3	3	3	3	4	3.2	3	3	4	4	3	3.4	3.4	0	2	7	4	13	
22	13	3	3	3	4	4	3.4	3	5	5	5	3	4.2	5	4	4	5	5	4.6	5	5	5	5	5	5	4.3	3	2	7	3	15	
23	13	3	2	1	3	2	2.2	1	2	3	4	3	2.6	2	3	3	5	3	3.2	5	4	3	3	4	3.8	2.95	4	0	0	2	6	
24	13	3	3	3	2	2	2.6	4	3	4	3	3	3.4	5	3	3	4	3	3.6	3	3	4	3	3	3.2	3.2	2	2	8	6	18	
25	13	3	3	5	3	3	3.4	3	4	3	3	2	3	3	2	3	3	3	2.8	4	2	3	4	5	3.6	3.2	4	6	5	4	19	
26	13	1	2	3	5	3	2.8	3	2	3	2	3	2.6	2	4	3	3	1	2.6	4	3	4	1	2	2.8	2.7	1	4	6	1	12	
27	13	3	3	4	4	4	3.6	4	4	4	4	3	3.8	3	3	4	4	3	3.4	4	4	4	4	4	4	3.7	7	6	8	3	24	
28	13	3	3	2	2	3	2.6	3	2	3	3	2	2.6	3	2	3	4	3	3	3	4	4	4	3	3.6	2.95	2	1	7	2	12	
29	13	5	2	2	4	3	3.2	3	3	3	3	2	2.8	4	5	4	3	3	3.8	1	2	4	5	1	2.6	3.1	1	1	3	2	7	
30	13	4	3	4	3	4	3.6	3	4	4	3	4	3.6	4	3	4	3	4	3.6	3	4	5	4	3	3.8	3.65	5	2	3	2	12	
31	13	4	3	5	5	4	4.2	3	3	4	3	4	3.4	4	3	4	4	5	4	4	3	3	4	4	3.6	3.8	4	1	0	2	7	
32	13	3	3	4	3	3	3.2	3	4	3	4	3	3.4	3	4	2	5	2	3.2	4	3	3	3	3	3.2	3.25	8	2	2	4	16	
							3.16						3.41						3.39							3.54	3.38	3.44	2.72	5.59	3.31	14.90
Respondent	Age	Decoding:					Mean	Fluency:					Mean	Vocabulary Skills:					Mean	Background Knowledge:					Mean	Comprehension			Algebraic	Linear	Basic Ops	Percentage Scores
1	14	1	5	3	3	4	3.2	3	4	2	1	4	2.8	4	1	5	3	1	2.8	1	5	3	1	4	2.8	2.9	1	0	4	3	8	
2	14	3	4	3	2	3	3	2	3	4	5	4	3.6	5	4	3	4	3	3.8	4	4	5	5	4	4.4	3.7	4	3	3	6	16	

								3.1					3.2					3.3					3.6	3.3		2.5	1.5	3.5	4.5	12	
Responde	t	Age	Decoding:			Mean	Fluency:			Mean	Vocabulary Skills:			Mean	Background Knowledge:			Mean	Comprehension		Algebraic	Linear	Basic Ope	Percentage Scores							
1		15	3	4	3	3	3	3.2	4	3	2	3	2	2.8	3	4	5	3	3.6	3	3	3	3	4	3.2	3.2	5	5	8	9	27
																								0					0		

Appendix 7: Reliability Result

```

RELIABILITY /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12
Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q2 1 Q22 Q23 Q24 Q25 Q26 Q27 Q28 Q29
Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q4 5 Q46
Q47 Q48 Q49 Q50 /SCALE ('ALL VARIABLES') ALL /MODEL=ALPHA
/STATISTICS=DESCRIPTIVE
SCALE /SUMMARY=TOTAL
MEANS VARIANCE.

```

Reliability

Notes

Output Created	27-JAN-2024 19:48:27
Comments	
Input	Active Dataset DataSet1
	Filter <none>
	Weight <none>
	Split File <none>
N of Rows in Working Data File	30
	Matrix Input
Missing Value Handling	Definition of Missing User-defined missing values are treated as missing.
	Cases Used Statistics are based on all cases with valid data for all variables in the procedure.

Syntax	<pre> RELIABILITY /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24 Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49 Q50 /SCALE ('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPT IVE SCALE /SUMMARY=TOTAL MEANS VARIANCE. </pre>
--------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Notes

Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.02

[DataSet1]

Warnings

Each of the following component variables has zero variance and is removed from the scale: Q50

The determinant of the covariance matrix is zero or approximately zero. Statistics based on its inverse matrix cannot be computed and they are displayed as system missing values.

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded ^a	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.605	.570	49

Item Statistics

	Mean	Std. Deviation	N
Q1	.60	.498	30
Q2	.80	.407	30
Q3	.30	.466	30
Q4	.93	.254	30
Q5	.97	.183	30
Q6	.90	.305	30
Q7	.53	.507	30
Q8	.90	.305	30

Q9	.37	.490	30
Q10	.03	.183	30
Q11	.03	.183	30
Q12	.10	.305	30
Q13	.53	.507	30
Q14	.63	.490	30
Q15	.23	.430	30
Q16	.47	.507	30
Q17	.50	.509	30
Q18	.20	.407	30
Q19	.60	.498	30
Q20	.43	.504	30
Q21	.33	.479	30
Q22	.30	.466	30
Q23	.33	.479	30
Q24	.40	.498	30
Q25	.47	.507	30
Q26	.20	.407	30
Q27	.77	.430	30
Q28	.63	.490	30
Q29	.70	.466	30

Q30	.63	.490	30
Q31	.43	.504	30
Q32	.67	.479	30
Q33	.57	.504	30
Q34	.63	.490	30
Q35	.47	.507	30
Q36	.70	.466	30
Q37	.17	.379	30
Q38	.20	.407	30

Item Statistics

	Mean	Std. Deviation	N
Q39	.73	.450	30
Q40	.23	.430	30
Q41	.43	.504	30
Q42	.47	.507	30
Q43	.33	.479	30
Q44	.33	.479	30
Q45	.13	.346	30
Q46	.40	.498	30
Q47	.33	.479	30

Q48	.20	.407	30
Q49	.37	.490	30

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance
Item Means	.462	.033	.967	.933	29.000	.056
Item Variances	.200	.033	.259	.225	7.759	.004

Summary Item Statistics

Item Means	49
Item Variances	49

N of Items

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q1	22.03	23.344	.092	.	.604
Q2	21.83	22.695	.302	.	.588
Q3	22.33	25.333	-.323	.	.635
Q4	21.70	23.183	.322	.	.593
Q5	21.67	23.540	.260	.	.598
Q6	21.73	22.823	.383	.	.587

Q7	22.10	22.921	.176	.	.596
Q8	21.73	23.099	.287	.	.592
Q9	22.27	24.754	-.197	.	.627
Q10	22.60	24.455	-.252	.	.614
Q11	22.60	24.593	-.328	.	.616
Q12	22.53	24.809	-.286	.	.622
Q13	22.10	24.093	-.064	.	.617
Q14	22.00	23.586	.043	.	.608
Q15	22.40	23.972	-.029	.	.612
Q16	22.17	21.661	.448	.	.572
Q17	22.13	21.016	.592	.	.558
Q18	22.43	23.357	.130	.	.600
Q19	22.03	21.757	.436	.	.573
Q20	22.20	21.338	.524	.	.565
Q21	22.30	25.666	-.383	.	.641
Q22	22.33	26.368	-.533	.	.650
Q23	22.30	24.493	-.145	.	.622
Q24	22.23	25.289	-.300	.	.636

Q25	22.17	20.695	.667	.	.551
Q26	22.43	23.978	-.028	.	.611
Q27	21.87	22.051	.445	.	.576
Q28	22.00	23.034	.161	.	.598
Q29	21.93	23.306	.113	.	.602
Q30	22.00	24.138	-.072	.	.617
Q31	22.20	22.786	.206	.	.594
Q32	21.97	22.516	.283	.	.587
Q33	22.07	22.961	.169	.	.597
Q34	22.00	22.069	.374	.	.579
Q35	22.17	20.695	.667	.	.551
Q36	21.93	21.237	.600	.	.561

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q37	22.47	24.051	-.043	.	.611
Q38	22.43	22.806	.273	.	.590
Q39	21.90	22.645	.277	.	.589
Q40	22.40	24.317	-.111	.	.618

Q41	22.20	25.614	-.360	.	.641
Q42	22.17	21.454	.494	.	.567
Q43	22.30	22.010	.399	.	.577
Q44	22.30	25.528	-.356	.	.639
Q45	22.50	23.983	-.020	.	.609
Q46	22.23	24.392	-.123	.	.622
Q47	22.30	21.321	.561	.	.563
Q48	22.43	22.116	.458	.	.577
Q49	22.27	21.513	.502	.	.568

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
22.63	24.033	4.902	49

```

RELIABILITY /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12
Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q2 2 Q23 Q24 Q25 Q26 Q27 Q28 Q29 Q30
Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q45 Q4 6 Q47
Q48 Q49 Q50 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA
/STATISTICS=DESCRIPTIVE
SCALE /SUMMARY=TOTAL
MEANS VARIANCE.

```

Reliability**Notes**

Output Created

27-JAN-2024 20:04:40

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
N of Rows in Working Data File		30
	Matrix Input	
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the procedure.
Syntax	<pre> RELIABILITY /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q22 Q23 Q24 Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49 Q50 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPT IVE SCALE </pre>	

	/SUMMARY=TOTAL MEANS VARIANCE.
Resources	Processor Time
	Elapsed Time

Warnings

Each of the following component variables has zero variance and is removed from the scale: Q50

The determinant of the covariance matrix is zero or approximately zero. Statistics based on its inverse matrix cannot be computed and they are displayed as system missing values.

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded ^a	0	.0
Total		30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.641	.607	48

Item Statistics

	Mean	Std. Deviation	N
Q1	.60	.498	30
Q2	.80	.407	30
Q3	.30	.466	30
Q4	.93	.254	30
Q5	.97	.183	30
Q6	.90	.305	30
Q7	.53	.507	30
Q8	.90	.305	30
Q9	.37	.490	30
Q10	.03	.183	30
Q11	.03	.183	30
Q12	.10	.305	30
Q13	.53	.507	30
Q14	.63	.490	30
Q15	.23	.430	30

Q16	.47	.507	30
Q17	.50	.509	30
Q18	.20	.407	30
Q19	.60	.498	30
Q20	.43	.504	30
Q22	.30	.466	30
Q23	.33	.479	30

Item Statistics

	Mean	Std. Deviation	N
Q24	.40	.498	30
Q25	.47	.507	30
Q26	.20	.407	30
Q27	.77	.430	30
Q28	.63	.490	30
Q29	.70	.466	30
Q30	.63	.490	30
Q31	.43	.504	30
Q32	.67	.479	30
Q33	.57	.504	30
Q34	.63	.490	30

Q35	.47	.507	30
Q36	.70	.466	30
Q37	.17	.379	30
Q38	.20	.407	30
Q39	.73	.450	30
Q40	.23	.430	30
Q41	.43	.504	30
Q42	.47	.507	30
Q43	.33	.479	30
Q44	.33	.479	30
Q45	.13	.346	30
Q46	.40	.498	30
Q47	.33	.479	30
Q48	.20	.407	30
Q49	.37	.490	30

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance
Item Means	.465	.033	.967	.933	29.000	.057
Item Variances	.199	.033	.259	.225	7.759	.005

Summary Item Statistics

Item Means	48	
Item Variances	48	N of Items

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q1	21.70	25.114	.061	.	.643
Q2	21.50	24.328	.292	.	.627
Q3	22.00	26.966	-.313	.	.668
Q4	21.37	24.861	.293	.	.631
Q5	21.33	25.195	.238	.	.635
Q6	21.40	24.386	.394	.	.625
Q7	21.77	24.461	.189	.	.633
Q8	21.40	24.662	.300	.	.629
Q9	21.93	26.478	-.209	.	.662
Q10	22.27	26.064	-.232	.	.648
Q11	22.27	26.202	-.305	.	.650
Q12	22.20	26.510	-.299	.	.657
Q13	21.77	25.702	-.057	.	.652
Q14	21.67	25.126	.061	.	.643
Q15	22.07	25.582	-.023	.	.647
Q16	21.83	23.316	.427	.	.614
Q17	21.80	22.648	.570	.	.602

Q18	22.10	25.059	.108	.	.639
Q19	21.70	23.252	.451	.	.612
Q20	21.87	22.809	.541	.	.605
Q22	22.00	28.069	-.531	.	.681
Q23	21.97	26.033	-.122	.	.655
Q24	21.90	27.059	-.317	.	.670
Q25	21.83	22.075	.699	.	.591
Q26	22.10	25.541	-.010	.	.646
Q27	21.53	23.637	.441	.	.616
Q28	21.67	24.644	.161	.	.635
Q29	21.60	24.869	.125	.	.638
Q30	21.67	25.816	-.078	.	.653
Q31	21.87	24.326	.218	.	.631
Q32	21.63	24.102	.283	.	.626
Q33	21.73	24.409	.201	.	.632
Q34	21.67	23.609	.381	.	.618
Q35	21.83	22.213	.668	.	.594
Q36	21.60	22.662	.628	.	.600
Q37	22.13	25.706	-.048	.	.647

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q38	22.10	24.369	.282	.	.628
Q39	21.57	24.254	.273	.	.627
Q40	22.07	25.789	-.071	.	.650
Q41	21.87	27.361	-.370	.	.674
Q42	21.83	22.902	.516	.	.607
Q43	21.97	23.482	.421	.	.616
Q44	21.97	27.206	-.354	.	.671
Q45	22.17	25.661	-.033	.	.646
Q46	21.90	26.024	-.119	.	.656
Q47	21.97	22.723	.593	.	.602
Q48	22.10	23.748	.442	.	.617
Q49	21.93	23.168	.478	.	.611

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
22.30	25.666	5.066	48

RELIABILITY /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13
 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q2 3 Q24 Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32
 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q45 Q46 Q4 7 Q48 Q49 Q50
 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA

/STATISTICS=DESCRIPTIVE SCALE
 /SUMMARY=TOTAL MEANS VARIANCE.

Reliability

Notes	
Output Created	27-JAN-2024 20:06:28
Comments	
Input	Active Dataset: DataSet1 Filter: <none> Weight: <none> Split File: <none>
	N of Rows in Working Data File: 30 Matrix Input:
Missing Value Handling	Definition of Missing: User-defined missing values are treated as missing. Cases Used: Statistics are based on all cases with valid data for all variables in the procedure.

Syntax	<pre> RELIABILITY /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q23 Q24 Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q41 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49 Q50 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPT IVE SCALE /SUMMARY=TOTAL MEANS VARIANCE.</pre>
Resources	<p>Processor Time 00:00:00.06</p> <hr/> <p>Elapsed Time 00:00:00.05</p>

Warnings

Each of the following component variables has zero variance and is removed from the scale: Q50

The determinant of the covariance matrix is zero or approximately zero. Statistics based on its inverse matrix cannot be computed and they are displayed as system missing values.

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded ^a	0	.0
Total		30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.681	.650	47

Item Statistics

	Mean	Std. Deviation	N
Q1	.60	.498	30
Q2	.80	.407	30
Q3	.30	.466	30
Q4	.93	.254	30
Q5	.97	.183	30
Q6	.90	.305	30
Q7	.53	.507	30
Q8	.90	.305	30
Q9	.37	.490	30
Q10	.03	.183	30
Q11	.03	.183	30
Q12	.10	.305	30
Q13	.53	.507	30
Q14	.63	.490	30

Q15	.23	.430	30
Q16	.47	.507	30
Q17	.50	.509	30
Q18	.20	.407	30
Q19	.60	.498	30
Q20	.43	.504	30
Q23	.33	.479	30
Q24	.40	.498	30

Item Statistics

	Mean	Std. Deviation	N
Q25	.47	.507	30
Q26	.20	.407	30
Q27	.77	.430	30
Q28	.63	.490	30
Q29	.70	.466	30
Q30	.63	.490	30
Q31	.43	.504	30
Q32	.67	.479	30
Q33	.57	.504	30
Q34	.63	.490	30
Q35	.47	.507	30

Q36	.70	.466	30
Q37	.17	.379	30
Q38	.20	.407	30
Q39	.73	.450	30
Q40	.23	.430	30
Q41	.43	.504	30
Q42	.47	.507	30
Q43	.33	.479	30
Q44	.33	.479	30
Q45	.13	.346	30
Q46	.40	.498	30
Q47	.33	.479	30
Q48	.20	.407	30
Q49	.37	.490	30

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance
Item Means	.468	.033	.967	.933	29.000	.058
Item Variances	.199	.033	.259	.225	7.759	.005

Summary Item Statistics

		N of Items
Item Means	47	
Item Variances	47	

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q1	21.40	27.490	.063	.	.684
Q2	21.20	26.579	.316	.	.669
Q3	21.70	29.390	-.304	.	.705
Q4	21.07	27.168	.316	.	.673
Q5	21.03	27.551	.253	.	.677
Q6	21.10	26.714	.400	.	.668
Q7	21.47	26.878	.177	.	.677
Q8	21.10	26.990	.311	.	.672
Q9	21.63	28.792	-.183	.	.699
Q10	21.97	28.516	-.246	.	.688
Q11	21.97	28.654	-.316	.	.690
Q12	21.90	28.990	-.309	.	.696
Q13	21.47	28.051	-.044	.	.691
Q14	21.37	27.413	.081	.	.683

Q15	21.77	28.047	-.036	.	.688
Q16	21.53	25.499	.451	.	.658
Q17	21.50	24.879	.578	.	.649
Q18	21.80	27.407	.117	.	.680
Q19	21.40	25.628	.435	.	.659
Q20	21.57	25.013	.556	.	.651
Q23	21.67	28.437	-.117	.	.694
Q24	21.60	29.490	-.308	.	.707
Q25	21.53	24.257	.711	.	.639
Q26	21.80	27.959	-.013	.	.687
Q27	21.23	25.978	.435	.	.662
Q28	21.37	26.999	.163	.	.677
Q29	21.30	27.183	.138	.	.679
Q30	21.37	28.240	-.079	.	.693
Q31	21.57	26.599	.234	.	.673
Q32	21.33	26.437	.284	.	.670
Q33	21.43	26.806	.193	.	.675
Q34	21.37	25.895	.388	.	.663
Q35	21.53	24.464	.667	.	.642

Q36	21.30	24.907	.633	.	.648
Q37	21.83	28.144	-.054	.	.688
Q38	21.80	26.717	.282	.	.671

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q39	21.27	26.478	.300	.	.669
Q40	21.77	28.185	-.066	.	.690
Q41	21.57	29.840	-.368	.	.711
Q42	21.53	25.292	.494	.	.655
Q43	21.67	25.816	.415	.	.661
Q44	21.67	29.678	-.352	.	.708
Q45	21.87	27.982	-.009	.	.685
Q46	21.60	28.455	-.119	.	.695
Q47	21.67	24.920	.610	.	.648
Q48	21.80	26.097	.435	.	.663
Q49	21.63	25.551	.460	.	.658

Scale Statistics

Mean	Variance	Std. Deviation	N of Items

22.00	28.069	5.298	47
-------	--------	-------	----

```

RELIABILITY /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13
Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q2 3 Q24 Q25 Q26   Q27 Q28 Q29 Q30 Q31 Q32
Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q42 Q43 Q44 Q45 Q46 Q47 Q4 8 Q49 Q50
/SCALE('ALL VARIABLES') ALL /MODEL=ALPHA
/STATISTICS=DESCRIPTIVE SCALE
/SUMMARY=TOTAL MEANS VARIANCE.

```

Reliability

Notes

Output Created	27-JAN-2024 20:07:34	
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	30
	Matrix Input	
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the procedure.

Syntax	RELIABILITY /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q23 Q24 Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q42 Q43 Q44 Q45 Q46 Q47 Q48 Q49 Q50 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPT IVE SCALE /SUMMARY=TOTAL MEANS VARIANCE.
Resources	Processor Time
	Elapsed Time

Warnings

Each of the following component variables has zero variance and is removed from the scale: Q50

The determinant of the covariance matrix is zero or approximately zero. Statistics based on its inverse matrix cannot be computed and they are displayed as system missing values.

Scale: ALL VARIABLES Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded ^a	0	.0
Total		30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.711	.677	46

Item Statistics

	Mean	Std. Deviation	N
Q1	.60	.498	30
Q2	.80	.407	30
Q3	.30	.466	30
Q4	.93	.254	30
Q5	.97	.183	30
Q6	.90	.305	30
Q7	.53	.507	30
Q8	.90	.305	30
Q9	.37	.490	30
Q10	.03	.183	30
Q11	.03	.183	30
Q12	.10	.305	30
Q13	.53	.507	30
Q14	.63	.490	30
Q15	.23	.430	30

Q16	.47	.507	30
Q17	.50	.509	30
Q18	.20	.407	30
Q19	.60	.498	30
Q20	.43	.504	30
Q23	.33	.479	30
Q24	.40	.498	30

Item Statistics

	Mean	Std. Deviation	N
Q25	.47	.507	30
Q26	.20	.407	30
Q27	.77	.430	30
Q28	.63	.490	30
Q29	.70	.466	30
Q30	.63	.490	30
Q31	.43	.504	30
Q32	.67	.479	30
Q33	.57	.504	30
Q34	.63	.490	30
Q35	.47	.507	30

Q36	.70	.466	30
Q37	.17	.379	30
Q38	.20	.407	30
Q39	.73	.450	30
Q40	.23	.430	30
Q42	.47	.507	30
Q43	.33	.479	30
Q44	.33	.479	30
Q45	.13	.346	30
Q46	.40	.498	30
Q47	.33	.479	30
Q48	.20	.407	30
Q49	.37	.490	30

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance
Item Means	.469	.033	.967	.933	29.000	.059
Item Variances	.198	.033	.259	.225	7.759	.005

Summary Item Statistics

Item Means	46
Item Variances	46

N of Items

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q1	20.97	29.275	.059	.	.714
Q2	20.77	28.254	.328	.	.700
Q3	21.27	31.375	-.335	.	.733
Q4	20.63	28.999	.284	.	.704
Q5	20.60	29.352	.230	.	.707
Q6	20.67	28.575	.359	.	.701
Q7	21.03	28.723	.158	.	.708
Q8	20.67	28.713	.316	.	.702
Q9	21.20	30.648	-.193	.	.727
Q10	21.53	30.257	-.224	.	.716
Q11	21.53	30.395	-.292	.	.718
Q12	21.47	30.809	-.314	.	.724
Q13	21.03	29.689	-.019	.	.718
Q14	20.93	29.030	.108	.	.711
Q15	21.33	30.023	-.078	.	.719
Q16	21.10	27.197	.451	.	.690
Q17	21.07	26.547	.579	.	.682

Q18	21.37	29.275	.091	.	.711
Q19	20.97	27.344	.431	.	.692
Q20	21.13	26.671	.560	.	.684
Q23	21.23	30.185	-.109	.	.722
Q24	21.17	31.247	-.297	.	.733
Q25	21.10	25.955	.702	.	.675
Q26	21.37	29.757	-.019	.	.716
Q27	20.80	27.614	.452	.	.693
Q28	20.93	28.754	.161	.	.708
Q29	20.87	28.878	.149	.	.708
Q30	20.93	29.926	-.061	.	.720
Q31	21.13	28.257	.248	.	.703
Q32	20.90	28.231	.271	.	.702
Q33	21.00	28.345	.231	.	.704
Q34	20.93	27.306	.448	.	.691
Q35	21.10	26.093	.673	.	.676
Q36	20.87	26.671	.613	.	.682
Q37	21.40	29.834	-.033	.	.716
Q38	21.37	28.516	.267	.	.703

Item-Total Statistics

Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q39	20.83	28.144	.313	.

Q40	21.33	29.885	-.049	.	.718
Q42	21.10	26.783	.533	.	.685
Q43	21.23	27.495	.421	.	.693
Q44	21.23	31.426	-.338	.	.734
Q45	21.43	29.771	-.013	.	.714
Q46	21.17	30.282	-.126	.	.724
Q47	21.23	26.530	.624	.	.681
Q48	21.37	27.826	.431	.	.695
Q49	21.20	27.200	.469	.	.690

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
21.57	29.840	5.463	46

RELIABILITY /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q2 3 Q24 Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q42 Q43 Q45 Q46 Q47 Q48 Q4 9 Q50 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPTIVE SCALE /SUMMARY=TOTAL MEANS VARIANCE.

Reliability**Notes**

Output Created	27-JAN-2024 20:11:59
Comments	

Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working File	30
	Matrix Input	
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the procedure.
Syntax		RELIABILITY /VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q23 Q24 Q25 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q42 Q43 Q45 Q46 Q47 Q48 Q49 Q50 /SCALE('ALL VARIABLES') ALL /MODEL=ALPHA /STATISTICS=DESCRIPT IVE SCALE /SUMMARY=TOTAL MEANS VARIANCE.
Resources	Processor Time	00:00:00.02

Elapsed Time	00:00:00.08
--------------	-------------

Warnings

Each of the following component variables has zero variance and is removed from the scale: Q50

The determinant of the covariance matrix is zero or approximately zero. Statistics based on its inverse matrix cannot be computed and they are displayed as system missing values.

Scale: ALL VARIABLES

Case Processing Summary

	N	%
Cases	Valid	30
		100.0
	Excluded ^a	0
		.0
	Total	30
		100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.734	.700	45

Item Statistics

	Mean	Std. Deviation	N
Q1	.60	.498	30
Q2	.80	.407	30
Q3	.30	.466	30

Q4	.93	.254	30
Q5	.97	.183	30
Q6	.90	.305	30
Q7	.53	.507	30
Q8	.90	.305	30
Q9	.37	.490	30
Q10	.03	.183	30
Q11	.03	.183	30
Q12	.10	.305	30
Q13	.53	.507	30
Q14	.63	.490	30
Q15	.23	.430	30
Q16	.47	.507	30
Q17	.50	.509	30
Q18	.20	.407	30
Q19	.60	.498	30
Q20	.43	.504	30
Q23	.33	.479	30
Q24	.40	.498	30

Item Statistics

	Mean	Std. Deviation	N
Q25	.47	.507	30

Q26	.20	.407	30
Q27	.77	.430	30
Q28	.63	.490	30
Q29	.70	.466	30
Q30	.63	.490	30
Q31	.43	.504	30
Q32	.67	.479	30
Q33	.57	.504	30
Q34	.63	.490	30
Q35	.47	.507	30
Q36	.70	.466	30
Q37	.17	.379	30
Q38	.20	.407	30
Q39	.73	.450	30
Q40	.23	.430	30
Q42	.47	.507	30
Q43	.33	.479	30
Q45	.13	.346	30
Q46	.40	.498	30

Q47	.33	.479	30
Q48	.20	.407	30
Q49	.37	.490	30

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance
Item Means	.472	.033	.967	.933	29.000	.060
Item Variances	.197	.033	.259	.225	7.759	.005

Summary Item Statistics

Item Means	45
Item Variances	45

N of Items

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q1	20.63	30.792	.070	.	.737
Q2	20.43	29.840	.320	.	.725
Q3	20.93	32.961	-.327	.	.755
Q4	20.30	30.562	.285	.	.729
Q5	20.27	30.961	.213	.	.731

Q6	20.33	30.161	.350	.	.726
Q7	20.70	30.286	.158	.	.733
Q8	20.33	30.230	.329	.	.726
Q9	20.87	32.395	-.217	.	.751
Q10	21.20	31.890	-.241	.	.740
Q11	21.20	31.959	-.274	.	.741
Q12	21.13	32.326	-.286	.	.746
Q13	20.70	31.183	-.002	.	.741
Q14	20.60	30.731	.084	.	.736
Q15	21.00	31.793	-.114	.	.744
Q16	20.77	28.599	.474	.	.715
Q17	20.73	27.926	.603	.	.708
Q18	21.03	30.723	.119	.	.734
Q19	20.63	28.861	.433	.	.718
Q20	20.80	28.234	.549	.	.711
Q23	20.90	31.955	-.140	.	.747
Q24	20.83	32.695	-.266	.	.754
Q25	20.77	27.426	.704	.	.702
Q26	21.03	31.413	-.033	.	.740

Q27	20.47	29.223	.434	.	.719
Q28	20.60	30.317	.161	.	.732
Q29	20.53	30.533	.131	.	.734
Q30	20.60	31.421	-.043	.	.742
Q31	20.80	29.821	.246	.	.728
Q32	20.57	29.771	.272	.	.727
Q33	20.67	29.747	.259	.	.727
Q34	20.60	28.869	.440	.	.718
Q35	20.77	27.426	.704	.	.702
Q36	20.53	28.257	.596	.	.710
Q37	21.07	31.513	-.054	.	.740
Q38	21.03	30.033	.275	.	.727

Item-Total Statistics

Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	
Q39	20.50	29.638	.324	.	.724
Q40	21.00	31.448	-.043	.	.741
Q42	20.77	28.185	.554	.	.711
Q43	20.90	29.059	.414	.	.719
Q45	21.10	31.403	-.025	.	.738

Q46	20.83	31.799	-.110	.	.746
Q47	20.90	27.955	.639	.	.707
Q48	21.03	29.275	.451	.	.719
Q49	20.87	28.602	.493	.	.715

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
21.23	31.426	5.606	45

Item-Total Statistics

Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q1	20.63	.070	.	.737

Appendix 8: Editor's Certificate



HOLY CROSS COLLEGE OF CALINAN, INC

Davao- Bukidnon Highway, Calinan Poblacion, Davao City

RESEARCH AND PUBLICATION OFFICE

CERTIFICATION

This is to certify that the research paper of **Jazyl Blaise Talip, Kyle Patrick Rinsulat, Pearl Emerald Chamen, Dimple Manansala and Joshua Blas**, entitled **THE**

RELATIONSHIP BETWEEN STUDENTS' COMPREHENSION AND MATH PROBLEM-SOLVING SKILLS has undergone the editing process and been approved by the undersigned.

This certification is issued upon the request by the researcher on June 3, 2025.

MARILYN C. BRAGANZA, MA.
Editor

CURRICULUM VITAE

PERSONAL INFORMATION

Name: Jazyl Blaise Talip

Age: 18 years old

Date of Birth: December 14, 2005



Place of Birth: Calinan Davao City

Address: Purok 3A Dacudao, Calinan, Davao City

Sex: Female

Civil Status: Single

Citizenship: Filipino

Religion: Roman Catholic

Father's Name: Marlo Talip Occupation: Farmer

Mother's Name: Cheryl Talip Occupation: OFW

EDUCATIONAL BACKGROUND

	School	Year Graduated
Intermediate:	General Roxas Central Elementary School	2018
Junior High School:	Dacudao National High School	2021
Senior High School:	Holy Cross College of Calinan, Inc.	2024
Track:	Academic Track	

CURRICULUM VITAE

PERSONAL INFORMATION

Name: Kyle Patrick Q. Rinsulat

Age: 18 years old

Date of Birth: February 3, 2005

Place of Birth: Davao City

Address: Km.20, Purok. 2B, Los Amigos, Tugbok, Davao City

Sex: Male

Civil Status: Single

Citizenship: Filipino

Religion: Roman Catholic

Father's Name: John Philip V. Rinsulat

Occupation: Civil Engineer

Mother's Name: Virginia Q. Rinsulat

Occupation: Food Supervisor

EDUCATIONAL BACKGROUND

	School	Year Graduated
Intermediate:	Philippine Nikkei Jin Kai	2018
Junior High School:	Holy Cross College of Calinan, Inc.	2021
Senior High School:	Holy Cross College of Calinan, Inc.	2024
Track:	Academic Track	



CURRICULUM VITAE



PERSONAL INFORMATION

Name: Pearl Emerald A. Chamen

Age: 17 years old

Date of Birth: October 31, 2006

Place of Birth: Davao City

Address: Purok 8 Dacudao, Calinan, Davao City

Sex: Female

Civil Status: Single

Citizenship: Filipino

Religion: Roman Catholic

Father's Name: Johnriel G. Chamen

Occupation: Agriculturist

Mother's Name: Melanie A. Chamen

Occupation: Teacher

EDUCATIONAL BACKGROUND

	School	Year Graduated
Intermediate:	Tugbok Central Elementary School	2018
Junior High School:	Tugbok National High School	2021
Senior High School:	Holy Cross College of Calinan, Inc.	2024
Track:	Academic Track	

CURRICULUM VITAE

PERSONAL INFORMATION

Name: Dimple B. Manansala

Age: 18 years old

Date of Birth: November 3, 2005



Place of Birth: General Santos City

Address: Purok 22, Francisco Subdivision, Calinan, Davao City

Sex: Female

Civil Status: Single

Citizenship: Filipino

Religion: Iglesia Ni Cristo

Father's Name: Orlando V. Manansala

Occupation: Businessman

Mother's Name: Wilma M. Bautista

Occupation: Housewife

EDUCATIONAL BACKGROUND

	School	Year Graduated
Intermediate:	Holy Cross College of Calinan, Inc.	2018
Junior High School:	Holy Cross College of Calinan, Inc.	2021
Senior High School:	Holy Cross College of Calinan, Inc.	2024
Track:	Academic Track	

CURRICULUM VITAE

PERSONAL INFORMATION

Name: Joshua G. Blas

Age: 17 years old

Date of Birth: February 24, 2006



Place of Birth: Davao City

Address: Purok 38 Abayon Village, Calinan, Davao City

Sex: Male

Civil Status: Single

Citizenship: Filipino

Religion: Alliance

Father's Name: Nicol B. Blas

Occupation: OFW & Businessman

Mother's Name: Nelyn G. Blas

Occupation: Businesswoman

EDUCATIONAL BACKGROUND

School	Year Graduated
Intermediate: Calinan Central Elementary School	2018
Junior High School: Calinan National High School	2021
Senior High School: Holy Cross College of Calinan, Inc.	2024

CURRICULUM VITAE

Track: Academic Track