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DETERMINANTS OF NUMERACY IN MATHEMATICS COMPETENCY AND SKILLS DEVELOPMENT

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ABSTRACT

This thesis entitled, "Determinants of Numeracy in Mathematics Competency and Skills Development," was conducted to determine the relationship between numeracy skills and mathematics competency and mathematical skills development. Specifically, it aimed to identify the level of key determinants of numeracy, learners' competence, and learners' mathematical skills development. It also measured the relationship between the determinants of numeracy skills and mathematics competence, as well as the relationship between the determinants of numeracy skills and mathematical skills.

Descriptive method of the research is used to be able to observe a large mass of target population and make required conclusions about the variables. The primary respondents are the selected one hundred seventy-six Grade 11 – students of Nicolas L. Galvez Memorial Integrated National High School, Bay, Laguna, S.Y. 2023-2024.

The level of determinants of numeracy skills in terms of learning environment, motivation and interest, and curriculum design are very high while the level of determinants of numeracy skills in terms of parental involvement, individual differences, and peer influence are high. Furthermore, the levels of mathematics competence and mathematical skills development are all very high. In addition, a relationship between the development of mathematical skills and numeracy as well as mathematics competence was found.

The mathematics competence and mathematical skills development have significant relationship on numeracy skills. Therefore, both the null hypotheses are rejected. This means that these various factors influencing one's numeracy skills play a crucial role in enhancing their overall proficiency in mathematics. Also, learners can experience significant improvements in their mathematical abilities and skill acquisition.

Based on these results, it is recommended that educators and researchers explore the relationship between various determinants of numeracy skills and their impacts to enhance students' mathematical proficiency. This deeper investigation can provide valuable insights for designing effective interventions. Longitudinal studies should be conducted to understand the long-term effects of these determinants, tracking students over time to identify developmental processes and the persistence of these effects. Additionally, comparative analyses across different demographic and socio-economic groups are necessary to ensure the findings are broadly applicable. The role of evolving technologies, such as educational applications and virtual learning environments, should also be examined to determine their influence on the impact of numeracy skill determinants.

KEYWORDS: *Determinants; Mathematics Competency; Skills Development*

1. INTRODUCTION

Numeracy, the ability to understand and work with numbers effectively, is a foundational skill essential for success in various aspects of life, including education, employment, and daily decision-making. In the realm of education, numeracy forms the bedrock upon which mathematical competency and skills development are built. However, despite its significance, there remains a considerable gap in understanding the key determinants that contribute to the acquisition and enhancement of numeracy skills among learners.

Across the globe, mathematics competency and skill development are essential parts of curriculum that lay the groundwork for future career prospects and academic achievement. The foundation of mathematical proficiency is numeracy, or the capacity to comprehend and manipulate numbers. Numeracy affects daily decision-making and problem-solving skills in addition to academic achievement. The factors that determine numeracy and how it affects general mathematical proficiency are still intricate and multidimensional, despite their significance, and they demand further research.

Research in pedagogy and educational psychology has identified several elements that influence numeracy abilities. These factors might be either internal or external, such as parental engagement, the quality of education, socioeconomic level, and working memory and logical thinking. The interaction of these variables produces a dynamic and demanding environment for teachers and students, highlighting the necessity of focused tactics to improve the development of numeracy. It is essential to comprehend the factors that influence numeracy to create educational interventions and policies that work. Teachers can use differentiated instruction and resources that meet the requirements of students with different learning styles by recognizing and addressing the obstacles to numeracy. Furthermore, understanding the cognitive and contextual factors that impact numeracy can help with curriculum design, guaranteeing inclusive and successful learning environments.

To address this imperative, this comprehensive study focused on the key determinants of numeracy in Math competency and skills development at Nicolas L. Galvez Memorial Integrated National High School, aiming to shed

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light on the determinants, mathematical skills, and competence in Mathematics.

1.1 Statement of the Problem

This study sought to answer the following:

1. What is the level of key determinants of numeracy in terms of:
   - 1.1 Parental Involvement;
   - 1.2 Learning Environment;
   - 1.3 Motivation & Interest;
   - 1.4 Individual Differences;
   - 1.5 Peer Influence; and
   - 1.6 Curriculum Design?
2. What is the level of the mathematics competency in terms of:
   - 2.1 Mathematical Fluency;
   - 2.2 Speed and Accuracy;
   - 2.3 Interpretation Skills;
   - 2.4 Calculation Skills; and
   - 2.5 Representation Skills?
3. What is the level of the mathematical skills development in terms of:
   - 3.1 Critical Thinking;
   - 3.2 Communication;
   - 3.3 Information Literacy;
   - 3.4 Digital Literacy;
   - 3.5 Collaboration; and
   - 3.6 Creativity?
4. Is there a significant relationship between the key determinants of numeracy skills and mathematics competency?
5. Is there a significant relationship between the key determinants of numeracy skills and mathematical skills development?

2. METHODOLOGY

The descriptive method was used as the research design to describe, analyze, and interpret data on the relationship of determinants of numeracy skills and mathematical skills and competence in Mathematics among the selected Grade 11 Senior High School students of Nicolas L. Galvez Memorial Integrated National High School.

According to Regoniel (2015), the quantitative approach relies on data to generalize about a phenomenon. Because the acquired data is used to describe a phenomenon, it can be gathered through surveys and questionnaires. The output serves as the foundation for the study's results and generalizations.

3. RESULTS AND DISCUSSION

This chapter discusses the statistical treatment data presented in tables which are supported by analysis and interpretation. Tables are arranged depending on the order of specific objectives of the study.

Level of Determinants of Numeracy Skills

The determinants of numeracy skills refer to the various factors that influence an individual's proficiency in Mathematics. Understanding these determinants is crucial for designing effective interventions aimed at improving numeracy skills and fostering mathematical competence.

In this study, determinants were described as parental involvement, learning environment, motivation and interest, individual differences, peer influence, and curriculum design. Likewise, statements, mean, standard deviation, and remarks were also presented.

Level of Determinants of Numeracy Skills in terms of Parental Involvement

Table 1 illustrates the level of determinants of numeracy skills in terms of parental involvement. The result was *high* as evidenced by the grand (M=3.24).

The respondents *strongly agree* in the statement, *"Having parents who show interest and support in my mathematical learning motivates me to excel in numeracy",* which gained the highest mean (M=3.40, SD=0.60). On the other hand, the respondents *agree* in the statements, *"The students believe that their parents' involvement in their numeracy education greatly influences their skills in mathematics"* and *"Interacting with their parents about mathematical concepts outside of school helps them reinforce their understanding and confidence in mathematics",* which gained the least (M=3.15, SD=0.61) and (M=3.15, SD=0.63), respectively. This insinuates that they develop their numeracy skills through the involvement of their parents.

Table 1. Level of Determinants of Numeracy in terms of Parental Involvement

STATEMENTS	*MEAN*	*SD*	*REMARKS*
The students believe that their parents' involvement in their numeracy education greatly influences their skills in mathematics.	3.15	0.61	Agree
Having parents who show interest and support in their mathematical learning motivates them to excel in numeracy.	3.40	0.60	Strongly Agree
Interacting with their parents about mathematical concepts outside of school helps them reinforce their understanding and confidence in mathematics.	3.15	0.63	Agree
When their parents are actively engaged in their numeracy education, the students feel more encouraged to ask questions and seek help when needed.	3.21	0.61	Agree
The students notice that when their parents engage in activities that involve numeracy, such as puzzles or budgeting, it enhances their own numeracy skills and makes learning more enjoyable.	3.29	0.71	Strongly Agree
Weighted Mean		*3.24*	
SD		*0.64*	
Verbal Interpretation		*High*	

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He also outlined how children's accomplishments are positively impacted by parental involvement at home. Additionally, creating supportive environment where they can feel encouraged on exploring interests and talents can significantly develop their overall growth. Parents can empower them to thrive academically and personally by nurturing a culture of open communication and mutual respect.

Table 2. Level of the determinants of numeracy skills in terms of Learning Environment

STATEMENTS	*MEAN*	*SD*	*REMARKS*
The learning environment significantly impacts their numeracy skills development.	3.40	0.61	Strongly Agree
When the learning environment is conducive to collaboration and discussion, they find it easier to understand mathematical concepts.	3.39	0.60	Strongly Agree
A supportive and encouraging learning environment motivates them to actively engage with numerical tasks.	3.47	0.63	Strongly Agree
Clear and well-organized learning spaces enhance their focus and concentration, leading to improved numeracy skills.	3.46	0.61	Strongly Agree
The students believe that a positive and stimulating learning environment fosters their curiosity and interest in numeracy, ultimately enhancing their mathematical abilities.	3.36	0.71	Strongly Agree
Weighted Mean		*3.42*	
SD		*0.59*	
Verbal Interpretation		*Very High*	

Table 2 illustrates the level of determinants of numeracy skills in terms of learning environment. Likewise, statements, mean, standard deviation, and remarks were also presented. The respondents *strongly agree* in the statement, "*A supportive and encouraging learning environment motivates them to actively engage with numerical tasks.",* which gained the highest mean (M=3.47, SD=0.63). On the other hand, the respondents *agree* in the statements, *"They believe that a positive and stimulating learning environment fosters their curiosity and interest in numeracy, ultimately enhancing their mathematical abilities.",* which gained the least (M=3.36, SD=0.71). Moreover, the result was *very high* as evidenced by the grand (M=3.42). This further means that the respondents affirmed that learning environment is a determinant of numeracy skills.

According to Footprints (2022), the classroom ought to be a lively and interesting environment for the pupils. He also said that an excessive amount of structure can hinder creativity, and an insufficient amount of structure can result in lack of focus and distractions. Conversely, a classroom with warm, fresh air might produce a feeling favorable for education (Burke and Samide, 2013).

Table 3. Level of the determinants of numeracy skills in terms of Motivation and Interest

STATEMENTS	*MEAN*	*SD*	*REMARKS*
The student's motivation to learn and improve their numeracy skills greatly influences their success in mathematics.	3.47	0.55	Strongly Agree
They find numerical concepts interesting and engaging, which enhances their willingness to learn and explore mathematical ideas.	3.21	0.66	Agree
When they are genuinely interested in a numerical topic, they are more likely to dedicate time and effort to understanding it thoroughly.	3.39	0.64	Strongly Agree
Their level of motivation directly impacts their perseverance when faced with challenging mathematical problems.	3.24	0.57	Agree
They notice a positive correlation between their interest in numeracy and their overall performance in mathematical tasks.	3.18	0.60	Agree
Weighted Mean		*3.30*	
SD		*0.61*	
Verbal Interpretation		*Very High*	

Table 3 illustrates the level of determinants of numeracy skills in terms of motivation and interest. Likewise, statements, mean, standard deviation, and remarks were also presented.

The respondents *strongly agree* in the statement, "*Student's motivation to learn and improve their numeracy skills greatly influences their success in mathematics.",* which gained the highest mean (M=3.47, SD=0.55) while the respondents *agree* in the statements, *"They notice a positive correlation between their interest in numeracy and their overall performance in mathematical tasks",* which gained the least (M=3.18, SD=0.60). This insinuates that the respondents believe that motivation and interest is crucial in their learning in Mathematics. The result was *very high* as evidenced by the grand (M=3.30).

Level of the Determinants of Numeracy Skills in term of Individual Differences

Table 4 illustrates the level of determinants of numeracy skills in terms of individual differences. Likewise, statements, mean, standard deviation, and remarks were also presented.

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Table 4. Level of the determinants of numeracy skills in terms of Individual Differences

STATEMENTS	*MEAN*	*SD*	*REMARKS*
The students believe that natural aptitude influences their numeracy skills.	3.12	0.54	Agree
Their personal experiences and background shapes their understanding of numerical concepts.	3.13	0.67	Agree
They find certain numerical concepts easier to grasp than others due to their individual differences.	3.03	0.65	Agree
Cultural factors have played a role in shaping their numeracy abilities.	3.16	0.60	Agree
They notice that their cognitive style affects how they approach and excel in numeracy tasks.	3.13	0.63	Agree
Weighted Mean		*3.11*	
SD		*0.62*	
Verbal Interpretation		*High*	

The respondents *agree* in the statement, "*Cultural factors have played a role in shaping their numeracy abilities",* which gained the highest mean (M=3.16, SD=0.60). Also, the respondents *agree* in the statements, *"They notice a positive correlation between their interest in numeracy and their overall performance in mathematical tasks",* which gained the least (M=3.03, SD=0.65). This insinuates that the respondents believe that individual difference is a factor of numeracy skills. The result was *high* as evidenced by the grand (M=3.11).

The development of numeracy abilities is also influenced by sociodemographic factors, such as parental education, cultural background, and socioeconomic status (SES). Due to their access to resources, educational opportunities, and nurturing family environments, children from higher SES families and with more educated parents typically have superior numeracy skills.

Table 5. Level of the determinants of numeracy skills in terms of Peer Influence

STATEMENTS	*MEAN*	*SD*	*REMARKS*
The students are influenced by their peers' attitudes towards numeracy, which affects their own motivation to improve.	3.20	0.70	Agree
The encouragement and support they receive from peers positively impact their numeracy skills.	3.27	0.65	Strongly Agree
They often discuss numerical concepts with their peers, which enhances their understanding and proficiency.	3.08	0.68	Agree
Comparing their numeracy abilities with those of their peers motivates them to strive for improvement.	3.10	0.71	Agree
Peer collaboration and group activities have played a significant role in developing their numeracy skills.	3.24	0.66	Agree
Weighted Mean		*3.18*	
SD		*0.68*	
Verbal Interpretation		*High*	

Table 5 illustrates the level of determinants of numeracy skills in terms of peer influence. Likewise, statements, mean, standard deviation, and remarks were also presented.

The respondents *strongly agree* in the statement, "*The encouragement and support they receive from peers positively impact their numeracy skills",* which gained the highest mean (M=3.27, SD=0.65). While, the respondents *agree* in the statements, *"They often discuss numerical concepts with their peers, which enhances their understanding and proficiency",* which gained the least (M=3.08, SD=0.68). The result was *high* as evidenced by the grand (M=3.18). This further means that the respondents upheld that peer influence is a determinant of numeracy skills.

Table 6. Level of the determinants of numeracy skills in terms of Curriculum Design

STATEMENTS	*MEAN*	*SD*	*REMARKS*
The structure and organization of the curriculum directly impact the student's ability to grasp numerical concepts.	3.13	0.58	Agree
The relevance of the curriculum content to real-life situations greatly influences their motivation to learn numeracy skills.	3.19	0.57	Agree
Clear explanations and examples provided in the curriculum significantly enhance their understanding of numerical concepts.	3.44	0.61	Strongly Agree
The variety of teaching methods used in the curriculum cater to different learning styles, making it easier for them to comprehend numeracy topics.	3.36	0.60	Strongly Agree
The curriculum's emphasis on problem-solving and critical thinking has helped them develop practical numeracy skills that they can apply in various situations.	3.26	0.59	Strongly Agree

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Weighted Mean	*3.27*
SD	*0.60*
Verbal Interpretation	*Very High*

Table 6 illustrates the level of determinants of numeracy skills in terms of curriculum design. Likewise, statements, mean, standard deviation, and remarks were presented.

The respondents *strongly agree* in the statement, "*Clear explanations and examples provided in the curriculum significantly enhance their understanding of numerical concepts",* which gained the highest mean (M=3.44, SD=0.61). While, the respondents *agree* in the statements, *"The structure and organization of the curriculum directly impact their ability to grasp numerical concepts.",* which gained the least (M=3.13, SD=0.58). The result was *very high* as evidenced by the grand (M=3.27). This further means that the respondents believed that curriculum design is a determinant of numeracy skills.

Level of Mathematics Competency

In this study, Mathematics competencies were described as Mathematical fluency, speed and accuracy, interpretation skills, calculation skills, and representation skills. Statements, mean, standard deviation, and remarks were also presented.

Level of Mathematics Competency in terms of Mathematical Fluency

Table 7 illustrates the level of Mathematics competency in terms of mathematical fluency. Likewise, statements, mean, standard deviation, and remarks were also presented.

Table 7. Level of Mathematics competency in terms of Mathematical Fluency

STATEMENTS	***MEAN***	***SD***	***REMARKS***
The students believe that being fluent in mathematical concepts and procedures is crucial for their competence in mathematics.	3.26	0.59	Strongly Agree
Practicing regularly helps them develop a strong foundation in mathematical skills, leading to greater fluency.	3.37	0.63	Strongly Agree
They find that the more fluent they become in mathematics, the easier it is for them to tackle complex problems efficiently.	3.29	0.59	Strongly Agree
Confidence in their mathematical fluency allows them to approach new mathematical challenges with a sense of readiness and assurance.	3.26	0.61	Strongly Agree
Improving their mathematical fluency is an ongoing process, and they actively seek opportunities to strengthen their skills through practice and application.	3.30	0.62	Strongly Agree
Weighted Mean		*3.30*	
SD		*0.61*	
Verbal Interpretation		*Very High*	

The respondents *strongly agree* with all the statements and the statement, "*Practicing regularly helps them develop a strong foundation in mathematical skills, leading to greater fluency",* gained the highest mean (M=3.37, SD=0.63). While, the respondents also *strongly agree* in the statements, *"They believe that being fluent in mathematical concepts and procedures is crucial for their competence in mathematics"* and *"Confidence in their mathematical fluency allows them to approach new mathematical challenges with a sense of readiness and assurance",* which gained the least (M=3.26, SD=0.59) and (M=3.26, SD=0.61), respectively.

Table 8. Level of Mathematics competency in terms of Speed and Accuracy

STATEMENTS	***MEAN***	***SD***	***REMARKS***
The students believe that being able to solve mathematical problems quickly and accurately is essential for demonstrating competence in mathematics.	3.28	0.61	Strongly Agree
Striving for both speed and accuracy in their mathematical work motivates them to continuously improve their skills.	3.27	0.65	Strongly Agree
Achieving high levels of speed and accuracy in mathematical tasks boosts their confidence in mathematical abilities.	3.16	0.70	Agree
They recognize that practicing regularly helps them develop the speed and accuracy needed to excel in mathematics.	3.32	0.64	Strongly Agree
Balancing speed and accuracy in their mathematical work allows them to efficiently tackle challenging problems and showcase proficiency in mathematics.	3.32	0.57	Strongly Agree
Weighted Mean		*3.27*	
SD		*0.64*	
Verbal Interpretation		*Very High*	

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Table 8 illustrates the level of Mathematics competency in terms of speed and accuracy. Likewise, statements, mean, standard deviation, and remarks were also presented.

The respondents *strongly agree* in the statement, "*They recognize that practicing regularly helps me develop the speed and accuracy needed to excel in mathematics"* and *"Balancing speed and accuracy in their mathematical work allows them to efficiently tackle challenging problems and showcase proficiency in mathematics"*, which gained the highest mean (M=3.32, SD=0.63) and (M=3.32, SD=0.57), respectively. While, the respondents *agree* in the statement, *"Achieving high levels of speed and accuracy in mathematical tasks boosts their confidence in mathematical abilities",* which gained the least (M=3.16, SD=0.70). The result was *very high* as evidenced by the grand (M=3.27). This insinuates that the respondents believe that speed and accuracy is a factor of numeracy in Mathematics competency.

Level of Mathematics Competency in terms of Interpretation Skills

Table 9 illustrates the level of Mathematics competency in terms of interpretation skills. Likewise, statements, mean, standard deviation, and remarks were also presented.

Table 9. Level of Mathematics competency in terms of Interpretation Skills

STATEMENTS	*MEAN*	*SD*	*REMARKS*
The students believe that their ability to interpret mathematical information accurately greatly influences their competence in mathematics.	3.27	0.52	Strongly Agree
Applying interpretation skills allows them to understand the meaning and significance of numerical data and mathematical concepts.	3.32	0.54	Strongly Agree
Developing strong interpretation skills enables them to extract relevant information from mathematical problems and apply appropriate strategies for solving them.	3.31	0.59	Strongly Agree
They recognize that refining interpretation skills is essential for effectively communicating mathematical ideas and solutions.	3.23	0.65	Agree
Improving interpretation skills empowers them to analyze complex mathematical problems with confidence and precision, enhancing overall competence in mathematics.	3.35	0.57	Strongly Agree
Weighted Mean		*3.30*	
SD		*0.57*	
Verbal Interpretation		*Very High*	

The respondents *strongly agree* in the statement, "*Improving interpretation skills empowers them to analyze complex mathematical problems with confidence and precision, enhancing overall competence in mathematics.",* which gained the highest mean (M=3.35, SD=0.57). While, the respondents *agree* in the statement, *"They recognize that refining their interpretation skills is essential for effectively communicating mathematical ideas and solutions",* which gained the least (M=3.23, SD=0.65). The result was *very high* as evidenced by the grand (M=3.30). This insinuates that the respondents believe that interpretation skill is a factor of numeracy in competence in Mathematics.

Table 10. Level of Mathematics competency in terms of Calculation Skills

STATEMENTS	*MEAN*	*SD*	*REMARKS*
The students believe that honing their calculation skills is fundamental to their competence in mathematics.	3.32	0.59	Strongly Agree
Practicing mathematical calculations regularly helps improve their speed and accuracy.	3.42	0.59	Strongly Agree
Having strong calculation skills enables them to efficiently solve mathematical problems across various domains.	3.34	0.56	Strongly Agree
They recognize that mastering different calculation methods and techniques enhances their problem-solving abilities in mathematics.	3.34	0.63	Strongly Agree
Improving their calculation skills not only boosts their confidence in tackling mathematical challenges but also lays a solid foundation for their overall competence in mathematics.	3.38	0.63	Strongly Agree
Weighted Mean		*3.36*	
SD		*0.60*	
Verbal Interpretation		*Very High*	

Table 10 illustrates the level of competency in Mathematics in terms of calculation skills. Likewise, statements, mean, standard deviation, and remarks were also presented.

The respondents *strongly agree* with all the statement and the statement, "*Practicing mathematical calculations regularly*

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helps me improve my speed and accuracy", which gained the highest mean (M=3.42, SD=0.59). While, the respondents also *strongly agree* in the statement, *"I believe that honing my calculation skills is fundamental to my competence in mathematics",* which gained the least (M=3.32, SD=0.59).

The result was *very high* as evidenced by the grand (M=3.36). This insinuates that the respondents believe that calculation skill is a factor of numeracy in competence in Mathematics.

Level of Mathematics Competency in terms of Representation Skills

Table 11 illustrates the level of Mathematics competency in terms of representation skills. Statements, mean, standard deviation, and remarks were also presented.

Table 11. Level of Mathematics competency in terms of Representation Skills

STATEMENTS	*MEAN*	*SD*	*REMARKS*
The students believe that developing strong representation skills is crucial for their competence in mathematics.	3.30	0.57	Strongly Agree
Utilizing various visual and symbolic representations helps them grasp mathematical concepts more effectively.	3.24	0.57	Agree
Improving their ability to interpret and create mathematical representations enhances problem-solving skills in mathematics.	3.35	0.58	Strongly Agree
They recognize that representing mathematical ideas in different forms allows them to communicate their understanding more clearly.	3.34	0.67	Strongly Agree
Enhancing their representation skills empowers them to approach mathematical problems from multiple perspectives, facilitating deeper insights and improving their overall competence in mathematics.	3.39	0.54	Strongly Agree
Weighted Mean		*3.32*	
SD		*0.57*	
Verbal Interpretation		*Very High*	

The respondents *strongly agree* with all the statement and the statement, "*Enhancing their representation skills empowers them to approach mathematical problems from multiple perspectives, facilitating deeper insights and improving their overall competence in mathematics"*, which gained the highest mean (M=3.39, SD=0.54). While, the respondents *agree* in the statement, *"Utilizing various visual and symbolic representations helps them grasp mathematical concepts more effectively",* which gained the least (M=3.24, SD=0.57). The result was *very high* as evidenced by the grand (M=3.32). This insinuates that the respondents believe that representation skill is a factor of numeracy in competence in Mathematics.

Furthermore, studies indicate that being proficient in mathematical representation improves conceptual understanding, problem-solving abilities, and communication. Students can develop better understanding and comprehension by mastering these skills, which enable them to translate abstract mathematical concepts into tangible images. Furthermore, developing a wide variety of representation techniques enables students to tackle mathematical problems from several angles, encouraging adaptability and flexibility in their problem-solving toolkit.

Level of Mathematical Skills Development

Mathematical skills are conceptualized as a separate area that includes verbal components (number knowledge, counting, and reasoning) and non-verbal components (notation, reasoning, and computation).

In this study, mathematical skills development was described as critical thinking, communication, information literacy, digital literacy, collaboration, and creativity.

Level of Mathematical Skills Development in terms of Critical Thinking

Table 12 illustrates the level of mathematical skills development in terms of critical thinking. Statements, mean, standard deviation, and remarks were presented.

Table 12. Level of mathematical skills development in terms of Critical Thinking

STATEMENTS	*MEAN*	*SD*	*REMARKS*
The students believe that their ability to think critically directly influences their proficiency in mathematical skills.	3.27	0.62	Strongly Agree
Engaging in problem-solving tasks encourages them to apply critical thinking strategies to solve numerical problems.	3.26	0.68	Strongly Agree
When faced with complex mathematical problems, they rely on critical thinking to analyze and evaluate different approaches.	3.15	0.65	Agree
Exploring multiple solution paths and evaluating their effectiveness is a key aspect of how they develop their numeracy skills.	3.33	0.58	Strongly Agree
Reflecting on their thought processes and seeking alternative perspectives helps them refine their mathematical reasoning and enhance overall numeracy abilities.	3.31	0.54	Strongly Agree

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Weighted Mean	*3.26*
SD	*0.62*
Verbal Interpretation	*Very High*

The respondents *strongly agree* in the statement, "*Exploring multiple solution paths and evaluating their effectiveness is a key aspect of how they develop their numeracy skills.",* which gained the highest mean (M=3.33, SD=0.58). While, the respondents *agree* in the statements, *"When faced with complex mathematical problems, they rely on critical thinking to analyze and evaluate different approaches.",* which gained the least (M=3.15, SD=0.65). The result was *very high* as evidenced by the grand (M=3.26). This insinuates that the respondents believe that critical thinking is a factor of numeracy in Mathematical skills.

Table 13. Level of mathematical skills in terms of Communication

STATEMENTS	***MEAN***	***SD***	***REMARKS***
The students believe that their ability to communicate mathematical concepts effectively is essential for improving their numeracy skills.	3.27	0.61	Strongly Agree
Explaining mathematical ideas to others helps solidify their own understanding of numerical concepts.	3.30	0.64	Strongly Agree
Engaging in discussions about mathematical problems with peers enhances their problem-solving skills and numerical fluency.	3.23	0.62	Agree
Presenting their solutions and reasoning processes to others encourages them to organize thoughts and articulate mathematical concepts clearly.	3.27	0.65	Strongly Agree
Actively listening to others' explanations of mathematical concepts deepens their understanding and facilitates their learning of numeracy skills.	3.40	0.58	Strongly Agree
Weighted Mean		*3.30*	
SD		*0.62*	
Verbal Interpretation		*Very High*	

Table 13 illustrates the level of mathematical skills in terms of communication.

The respondents *strongly agree* in the statement, "*Actively listening to others' explanations of mathematical concepts deepens their understanding and facilitates their learning of numeracy skills",* which gained the highest mean (M=3.40, SD=0.58). While, the respondents *agree* in the statements, *"Engaging in discussions about mathematical problems with peers enhances their problem-solving skills and numerical fluency",* which gained the least (M=3.23, SD=0.62). The result was *very high* as shown by the grand (M=3.30). This insinuates that the respondents believe that communication is a factor of numeracy in Mathematical skills development.

Table 14. Level of mathematical skills development in terms of Information Literacy

STATEMENTS	***MEAN***	***SD***	***REMARKS***
The students believe that being able to critically evaluate numerical information is crucial for improving their mathematical skills.	3.38	0.59	Strongly Agree
Searching for and identifying reliable sources of numerical data is an important aspect of developing their numeracy abilities.	3.27	0.58	Strongly Agree
They actively seek out diverse sources of numerical information to deepen their understanding of mathematical concepts.	3.19	0.55	Agree
Evaluating the credibility and relevance of numerical information enhances their problem-solving skills in mathematics.	3.30	0.58	Strongly Agree
Applying information literacy skills allows them to make informed decisions and solve mathematical problems more effectively.	3.32	0.58	Strongly Agree
Weighted Mean		*3.29*	
SD		*0.58*	
Verbal Interpretation		*Very High*	

Table 14 illustrates the level of mathematical skills development in terms of information literacy. Statements, mean, standard deviation, and remarks were also presented.

The respondents *strongly agree* in the statement, "*The students believe that being able to critically evaluate numerical information is crucial for improving their mathematical skills",* which gained the highest mean (M=3.38, SD=0.59). While, the respondents *agree* in the statements, *"They actively seek out diverse sources of numerical information to deepen their understanding of mathematical concepts.",* which gained the least (M=3.19, SD=0.55). The result was *very high* as evidenced by the grand (M=3.29). This insinuates that the respondents believe that information literacy is a factor of numeracy in Mathematical skills.

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Level of Mathematical Skills Development in terms of Digital Literacy

Table 15 illustrates the level of mathematical skills development in terms of digital literacy. Statements, mean, standard deviation, and remarks were also presented.

Table 15. Level of mathematical skills development in terms of Digital Literacy

STATEMENTS	*MEAN*	*SD*	*REMARKS*
The students recognize that proficiency in digital tools and platforms is essential for enhancing their mathematical skills.	3.26	0.65	Strongly Agree
Using digital resources such as online tutorials and educational apps has positively impacted their understanding of numerical concepts.	3.37	0.65	Strongly Agree
They actively seek out and utilize digital tools that help them practice and reinforce mathematical skills.	3.31	0.66	Strongly Agree
Employing digital technologies allows them to explore complex mathematical concepts in more interactive and engaging ways.	3.36	0.59	Strongly Agree
Integrating digital literacy into their mathematical learning process has improved their ability to adapt to new mathematical challenges and technologies.	3.30	0.54	Strongly Agree
Weighted Mean		*3.32*	
SD		*0.62*	
Verbal Interpretation		*Very High*	

The respondents *strongly agree* with all the statements and the statement, "*Using digital resources such as online tutorials and educational apps has positively impacted their understanding of numerical concepts",* gained the highest mean (M=3.37, SD=0.65). While, the respondents also *strongly agree* in the statement, *"The students actively seek out diverse sources of numerical information to deepen their understanding of mathematical concepts.",* which gained the least (M=3.26, SD=0.65). The result was *very high* as evidenced by the grand (M=3.32).

Table 16. Level of mathematical skills development in terms of Collaboration

STATEMENTS	*MEAN*	*SD*	*REMARKS*
The students find that collaborating with peers on mathematical problems enhances their understanding of numerical concepts.	3.32	0.63	Strongly Agree
Working in a group allows them to gain different perspectives and approaches to solving mathematical problems.	3.29	0.61	Strongly Agree
They believe that discussing mathematical concepts with others helps them develop their problem-solving skills and numerical fluency.	3.38	0.59	Strongly Agree
Collaborative learning activities provide them with opportunities to verbalize their mathematical reasoning and receive constructive feedback.	3.35	0.57	Strongly Agree
Engaging in group projects and peer discussions encourages them to think critically about mathematical problems and improves their overall numeracy skills.	3.36	0.60	Strongly Agree
Weighted Mean		*3.34*	
SD		*0.60*	
Verbal Interpretation		*Very High*	

Table 16 illustrates the level of mathematical skills development in terms of collaboration. Statements, mean, standard deviation, and remarks were also presented.

The respondents *strongly agree* with all the statements and the statement, "*The students believe that discussing mathematical concepts with others helps them develop their problem-solving skills and numerical fluency",* gained the highest mean (M=3.38, SD=0.59). While, the respondents also *strongly agree* in the statement, *"Working in a group allows them to gain different perspectives and approaches to solving mathematical problems",* which gained the least (M=3.29, SD=0.61). The result was *very high* as evidenced by the grand (M=3.34). This insinuates that the respondents believe that collaboration is a factor of numeracy in Mathematical skills.

Level of Mathematical Skills Development in terms of Creativity

Table 17 illustrates the level of mathematical skills in terms of creativity. Statements, mean, standard deviation, and remarks were also presented.

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Table 17. Level of mathematical skills development in terms of Creativity

STATEMENTS	*MEAN*	*SD*	*REMARKS*
The students believe that tapping into their creativity enhances their ability to solve mathematical problems.	3.30	0.57	Strongly Agree
Exploring different approaches and thinking outside the box is essential for advancing their numeracy skills.	3.33	0.63	Strongly Agree
They often find innovative ways to approach mathematical problems, which contributes to their understanding of numerical concepts.	3.27	0.54	Strongly Agree
Integrating creative thinking into their mathematical learning process allows them to see connections between different mathematical concepts.	3.30	0.61	Strongly Agree
Leveraging creativity in mathematical tasks not only makes learning more enjoyable but also improves their problem-solving skills and numerical fluency.	3.25	0.57	Strongly Agree
Weighted Mean		*3.29*	
SD		*0.58*	
Verbal Interpretation		*Very High*	

The respondents *strongly agree* with all the statements and the statement, "*Exploring different approaches and thinking outside the box is essential for advancing their numeracy skills",* gained the highest mean (M=3.33, SD=0.63). While, the respondents also *strongly agree* in the statement, *"Leveraging creativity in mathematical tasks not only makes learning more enjoyable but also improves their problem-solving skills and numerical fluency",* which gained the least (M=3.25, SD=0.57). The result was *very high* as evidenced by the grand (M=3.34). This insinuates that the respondents believe that creativity is a factor of numeracy in Mathematical skills.

Teachers may foster creativity in mathematics and enable students to become creative problem solvers and critical thinkers by giving them opportunity to participate in open-ended, exploratory activities and to convey mathematical ideas in a variety of ways. Likewise, fostering a classroom culture that celebrates experimentation and embraces failure as part of the learning process empowers students to take risks and explore innovative solutions to complex mathematical problems. Through these dynamic teaching methods, educators can nurture a generation of adaptable thinkers prepared to tackle the challenges of tomorrow's world.

Significant Relationship Between the Determinants of Numeracy Skills Development and Mathematics Competency

Table 18 illustrates the significant relationship between the determinants of numeracy skills and Mathematics competency. The determinants of numeracy skills were described as parental involvement, learning environment, motivation and interest, individual differences, peer influence, and curriculum design. While, mathematics competencies were described as mathematical fluency, speed and accuracy, interpretation skills, calculation skills, and representation skills

Table 18. Significant Relationship between the determinants of numeracy skills development and mathematics Competency

Determinants of Numeracy Skills (IV)	**Mathematics Competency (DV)**				
	Mathematical Fluency	**Speed and Accuracy**	**Interpretation Skills**	**Calculation Skills**	**Representation Skills**
Parental Involvement:					
Pearson Correlation	0.497	0.394	0.371	0.362	0.428
p-value	0.000*	0.000*	0.000*	0.000*	0.000*
N	176	176	176	176	176
Learning Environment:					
Pearson Correlation	0.511	0.467	0.469	0.548	0.550
p-value	0.000*	0.000*	0.000*	0.000*	0.000*
N	176	176	176	176	176
Motivation & Interest:					
Pearson Correlation	0.529	0.429	0.516	0.484	0.504
p-value	0.000*	0.000*	0.000*	0.000*	0.000*
N	176	176	176	176	176
Individual Differences:					
Pearson Correlation	0.428	0.508	0.425	0.441	0.436
p-value	0.000*	0.000*	0.000*	0.000*	0.000*
N	176	176	176	176	176
Peer Influence:					
Pearson Correlation	0.483	0.465	0.421	0.547	0.579

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p-value	0.000*	0.000*	0.000*	0.000*	0.000*
N	176	176	176	176	176
Curriculum Design:					
Pearson Correlation	0.502	0.424	0.553	0.517	0.623
p-value	0.000*	0.000*	0.000*	0.000*	0.000*
N	176	176	176	176	176

*Note: * p < .05*

It can be seen from the table above that the determinants of numeracy skills have a *relationship* with mathematics competency. The determinants of numeracy skills were parental involvement, learning environment, motivation and interest, individual differences, peer influence, and curriculum design obtained the r-value (0.362 to 0.623) and p-value (0.000*) which were lower than 0.05 level of significance. The null hypothesis stating that there is no significant relationship between the numeracy skills and mathematics competency was rejected. This meant that the alternative hypothesis was accepted and that these determinants may influence the competence in Mathematics of the students.

Significant Relationship Between the Determinants of Numeracy Skills Development and Mathematical Skills

Table 19 illustrates the significant relationship between the determinants of numeracy skills and mathematical skills. The determinants of numeracy skills were described as parental involvement, learning environment, motivation and interest, individual differences, peer influence, and curriculum design. While mathematical skills development was described as critical thinking, communication, information literacy, digital literacy, collaboration, and creativity.

Table 19. Significant Relationship between the determinants of numeracy skills development and mathematical skills

Determinants of Numeracy Skills (IV)	Mathematical Skills (DV)					
	Critical Thinking	Communication	Information Literacy	Digital Literacy	Collaboration	Creativity
Parental Involvement:						
Pearson Correlation	0.473	0.553	0.437	0.270	0.487	0.439
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
N	176	176	176	176	176	176
Learning Environment:						
Pearson Correlation	0.524	0.522	0.494	0.444	0.504	0.372
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
N	176	176	176	176	176	176
Motivation & Interest:						
Pearson Correlation	0.598	0.461	0.466	0.450	0.391	0.431
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
N	176	176	176	176	176	176
Individual Differences:						
Pearson	0.479	0.461	0.466	0.450	0.391	0.431
Correlation	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
p-value	176	176	176	176	176	176
N						
Peer Influence:						
Pearson Correlation	0.499	0.631	0.497	0.411	0.642	0.412
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
N	176	176	176	176	176	176
Curriculum Design:						
Pearson Correlation	0.550	0.526	0.542	0.547	0.479	0.541
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*
N	176	176	176	176	176	176

*Note: * p < .05*

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It can be seen from the table above that the determinants of numeracy skills have a *relationship* with mathematical skills development. The determinants of numeracy skills were parental involvement, learning environment, motivation and interest, individual differences, peer influence, and curriculum design obtained the r-value (0.270 to 0.598) and p-value (0.000*) which were lower than 0.05 level of significance. The null hypothesis stating that there is no significant relationship between numeracy skills and mathematical skills development was rejected. This meant that the alternative hypothesis was accepted and that these determinants may influence the mathematical skills development of the students.

4. CONCLUSION AND RECOMMENDATIONS

Considering the results of the study, the following conclusions were drawn:

1. Based on the findings of the study, it can be concluded that there was a significant relationship between the numeracy skills and mathematics competence of the students. This verified that these determinants of numeracy increase the competence of the learners in mathematics. Thus, the null hypothesis was rejected.

2. It can be concluded also that there is a significant relationship between numeracy skills and mathematical skills development. This verified that these determinants help the learners increase their mathematical skills development. Thus, the null hypothesis was rejected.

Based on the conclusion driven, the researcher formulated the following recommendations.

1. For the mathematics teachers to investigate deeper into the relations between determinants of numeracy skills and their impact on mathematical proficiency. Through this, it may lead to providing insights into designing targeted interventions for improving students' performance.

2. For the heads of Mathematics Department to conduct longitudinal studies to examine long-term effects of determinants of numeracy to skills and competence in Mathematics. Tracking students over a period can help identify developmental processes and assess the persistence of the observed relationship between determinants and outcomes.

3. For the future researchers to conduct comparative analyses across diverse demographic groups and socio-economic backgrounds to ascertain the generalizability of findings and to investigate the role of evolving technologies, such as educational applications, virtual learning environments, and adaptive learning platforms, in reducing or intensifying the impact of determinants of numeracy skills.

REFERENCE

1. *Footprints. (2022). How to Create A Positive Learning Environment. Retrieved from Vancouver, BC, Canada, V6P 5Z2.: https://www.footprintsrecruiting.com/teacher-community/blog/how-create-positive-learningenvironment*