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HOME NUMERACY PRACTICES AND ATTITUDES TOWARDS LEARNING MATHEMATICS AS PREDICTORS OF ACADEMIC PERFORMANCE OF STUDENTS

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ABSTRACT
This quantitative study investigated the predictive significance of home numeracy practices and attitudes towards learning mathematics on the academic performance of grade 7 students from four public secondary schools in Santo Tomas District, Division of Davao del Norte. Three hundred two respondents were identified using stratified random sampling. Two adopted, validated survey questionnaires and one researcher-made test were utilized in the study to gather data, which were then analyzed using mean, standard deviation, Pearson-r and multiple regression analysis. The results demonstrated that the home numeracy practices both informal and formal are high, student's attitudes towards learning mathematics are high and their academic performance are low. The data also demonstrated that home numeracy practices and attitudes towards learning mathematics are not statistically significant predictors of academic performance. This study underscores the importance of strengthening students' mathematical foundations through active home engagement and fostering positive attitudes toward learning mathematics. The findings highlighted the need to encourage positive attitudes and home numeracy practices to improve students' academic performance. Teachers may include home numeracy activities and encourage the students about the importance of a positive mindset in mathematics. This strategy should be given top priority by DepEd officials in the teaching of mathematics. Future research should investigate how home numeracy practices and attitudes towards learning mathematics affect students' academic performance as well as practical implementation strategies.

KEYWORDS: *academic performance, home numeracy practices, attitudes toward learning mathematics, grade 7 students, descriptive and correlational design, Davao del Norte, Philippines*

1. INTRODUCTION

Mathematics has a significant and distinct role in the school curriculum as it is crucial for improving the quality of life for individuals. However, it is known that most students consider mathematics complicated (Estrellado, 2021). Although mathematics is highly regarded and recognized as a prerequisite for most subjects, students' poor achievement and lack of interest in mathematics remain significant issues in schools in developed and developing countries. Despite its importance, mathematics is among the most challenging subjects' students perceive (Akhter & Akhter, 2018). Poor achievement in mathematics calls for improving the quality of education to avoid deterioration (Chand et al., 2021). Researchers concluded that the effects of the learning environment at home and attitudes toward learning were more significant predictors of effective learning (Sanchal & Sharma, 2017).

In the United States of America, it becomes clear that students struggle to get access to learning opportunities. According to projections, children's math learning is up to 50% worse than during a pre-pandemic normal school year (Kuhfeld et al.,2019 as cited in Haser et al., 2022). In Tanzania, students' performance in mathematics is poor. One of the most critical elements is the idea that mathematics is complex. The factors above have led to students' negative attitudes about the topic and hampered their interest, resulting in low performance despite their weak mathematical backgrounds (Kihwele and Mkomwa, 2022). Similarly, in Italy, it is also highlighted that the Covid-19 outbreak, and the school closings significantly negatively impacted students' math performance. Suggested steps include implementing corrective actions to mitigate existing challenges, providing support to students at high risk of falling behind, and fostering the continued learning of children who are already performing well (Contini et al., 2022).

On a national scale, the Philippines recorded the lowest scores in PISA (2018), reflecting the outcomes of the National Achievement Test, which indicated low proficiency levels in mathematics. Furthermore, the shift to an educational setting during the pandemic hurt

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the mathematics performance of learners (Dargo & Dimas, 2021). Learners have a negative attitude toward understanding the lesson, solving problems, performing better, and enjoying distance learning (Bringula et al., 2021).

In Davao del Norte, Santo Tomas District has been affected due to the pandemic and continually extended its effort for face-to-face education. One of the many issues teachers encounter with resuming face-to-face classes is the learners' poor academic performance due to poor numeracy skills. According to the districts' proficiency level on the quarterly exams, some students need more mathematical mastery. According to the district's report on proficiency levels, 60% of grade 7 students failed their first quarter exam in math during the school year 2022–2023. Additionally, data from the least-mastered competencies of students during the first quarter exam school year 2022–2023 revealed that while some students are performing well in mathematics, most lack the learning attitude to make them thrive in mathematics. Thus, the researcher believed this problem relates to the extended school closure that deprived the learners of adequate numeracy activities and experiences. Their home needed more resources, and their parents needed to be aware of the different activities for their children to develop calculation skills.

This study explores the relationship between home numeracy practices, attitudes toward learning mathematics, and the student's academic performance. Most studies on students' mathematic performance have been led concerning such issues, including learning attitudes (Hwang & Son, 2021: Wakhata et al., 2022) and home literacy (Tzuriel & Mandel, 2020; Dulay et al., 2019). However, the literature disregards learning attitudes and home numeracy and how they may significantly influence and relate to students' post-pandemic mathematics performance. Additionally, there was limited published research on the same subjects from a national or local perspective. Thus, the researcher believed that this study would be distinctive as it will study learning attitudes, home numeracy practices, and mathematics performance in the context of post-pandemic, considering the learning gaps in mathematics. Smile Foundation (2020) and Ghosh (2022) indicated that post-pandemic learning gaps must be prioritized through evaluations, assessments, and recovery programs that can help students adapt to the current learning environment. Positive feelings in the learning of mathematics can help cultivate a favorable disposition towards the subject, resulting in enhanced performance. Conversely, negative feelings towards the subject can also lead to a decline in performance (Capuno et al., 2019).

2. OBJECTIVES

This study aimed to determine whether home numeracy practices and attitudes towards learning mathematics significantly predict the academic performance of grade 7 students during the school year 2022-2023. Specifically, this study sought to find out:

1) The level of home numeracy practices, in terms of:
   1.1 informal home numeracy practices;
   1.2 formal/basic home numeracy practices; and
   1.3 formal/advanced home numeracy practices.
2) The level of attitudes towards learning mathematics, in terms of:
   2.1 confidence in mathematics;
   2.2 importance of mathematics; and
   2.3 engagement in mathematics.
3) The level of academic performance of students in terms of their Test Scores on the Researcher-made Test?
4) The significant relationship between:
   4.1 home numeracy practices and academic performance of students.
   4.2 attitudes towards learning mathematics and academic performance of students.
5) Whether home numeracy practices and attitudes towards learning mathematics significantly predict academic performance.

3. HYPOTHESES

1. There is no significant relationship between home numeracy practices and academic performance of students.
2. There is no significant relationship between attitudes towards learning mathematics and academic performance of students.
3. Home numeracy practices and attitudes towards learning mathematics do not significantly predict the academic performance of students.

4. METHODOLOGY

The study adopted a quantitative research design incorporating both descriptive and correlational methods was utilized. The study involved 1,225 Grade 7 students from four public secondary schools in Santo Tomas District, Davao del Norte. A stratified random sampling technique was employed to ensure proportional representation across schools and performance levels. Sample sizes were determined based on school populations and past academic performance, with consent obtained from participants and relevant

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authorities. Three research instruments were used, including a questionnaire for home numeracy practices, a questionnaire for attitudes towards learning mathematics, and an assessment of academic performance aligned with Department of Education guidelines. These instruments underwent expert review, validation, and piloting to ensure reliability and relevance. Additionally, the Cronbach alpha value was calculated to assess the internal consistency of the items within the instruments, confirming their reliability. The questionnaire for Home Numeracy Practices yielded coefficient values of 0.814 indicating a good internal consistency. The questionnaire for Attitudes towards Learning Mathematics yielded a coefficient value of 0.823 indicating a good internal consistency. The reliability of the academic performance was calculated using the Spearman-Brown formula with a correlation coefficient (r) of 0.727, yields a reliability score of approximately 0.842. Data collection involved obtaining permissions, seeking consent from participants, administering questionnaires, and processing collected data. Ethical considerations were paramount, with steps taken to protect participants' privacy, ensure voluntary participation, and mitigate risks.

5. STATISTICAL TOOLS

Statistical tools such as mean, standard deviation, Pearson r, and multiple regression analysis were employed to analyze the data, examining relationships between variables and predicting academic performance based on home numeracy practices and attitudes towards learning mathematics. The research adhered to ethical guidelines, ensuring social value, informed consent, protection of vulnerable participants, risk mitigation, privacy and confidentiality, transparency, researcher qualification, adequacy of facilities, and community involvement. These measures safeguarded participants' rights and facilitated the ethical conduct of the study.

6. RESULTS

Level of Home Numeracy Practices

Table 1

Level of Home Numeracy Practices

Indicators	SD	Mean	Descriptive Equivalent
Informal Home Numeracy Practices	1.15	3.50	High
Formal/Basic Home Numeracy Practices	1.18	3.64	High
Formal/Advanced Home Numeracy Practices	1.19	3.36	Moderate
Overall	**1.17**	**3.50**	**High**

Grade 7 students exhibit varying levels of engagement in different categories of home numeracy practices. They show a high involvement in both informal and formal/basic practices, indicating a strong foundation in basic mathematical concepts. However, their engagement in formal/advanced home numeracy practices is moderate, suggesting room for improvement in more complex mathematical tasks. Overall, the students demonstrate extensive engagement in a broad spectrum of numeracy-related activities, emphasizing the significance of nurturing home-based numeracy practices for their overall mathematical growth and proficiency.

Level of Attitudes towards Learning Mathematics

Table 2

Level of Attitudes towards Learning Mathematics

Indicators	SD	Mean	Descriptive Equivalent
Confidence in Mathematics	1.12	3.24	Moderate
Importance of Mathematics	1.05	3.92	High
Engagement in Mathematics	1.11	3.27	Moderate
Overall Mean	**1.09**	**3.48**	**High**

The data indicates a positive outlook on learning mathematics among grade 7 students, with a high level of recognition of its importance and a moderate level of confidence and engagement. This suggests that while there is room for improvement in certain areas, most students are receptive to mathematics education and its practical applications. These findings provide valuable insights for educators and curriculum developers to enhance the teaching and learning experiences in mathematics for grade 7 students.

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Level of Academic Performance of Students in terms of Test Scores on the Researcher-made Test

Table 3

Level of Academic Performance of Students in terms of Test Scores on the Researcher-made Test

Variable	SD	Mean	Descriptive Equivalent
Academic Performance	10.38	37.38	Low

Table 3 displays the level of academic performance among students, as measured by their test scores on the Researcher-made Test. The data indicates a mean test score of 37.38 with a standard deviation of 10.38. This places the overall academic performance in the "Low" category, suggesting that, on average, students have achieved relatively lower scores on the Test. This assessment of academic performance will serve as a crucial reference point for understanding the relationship between home numeracy practices, attitudes toward learning mathematics, and students' actual academic achievements. Further analysis will help identify the factors that may contribute to these low academic performance scores and provide insights into potential areas for improvement in mathematics education.

Significance of the Relationship Between the Variables

Table 4

Significance of the Relationship Between the Variables

Variables Correlated	r	p-value	Decision on H_0	Decision on Relationship
Home Numeracy Practices & Academic Performance	0.133	0.021	Rejected	Significant
Attitudes toward Learning Mathematics & Academic Performance	0.124	0.031	Rejected	Significant

Table 4 elucidates the significance of the relationships between home numeracy practices, attitudes towards learning mathematics, and academic performance through detailed statistical analysis. For the relationship between home numeracy practices and academic performance, the correlation coefficient (r) is reported as 0.133 with a p-value of 0.021. This correlation coefficient suggests a positive but modest relationship between home numeracy practices and academic performance, indicating that increases in engagement with home numeracy activities are associated with slight improvements in academic performance. The statistical significance of this relationship is confirmed by the rejection of the null hypothesis (H_0), which asserts a meaningful association between these variables.

Similarly, the relationship between attitudes towards learning mathematics and academic performance is characterized by a correlation coefficient (r) of 0.124 and a p-value of 0.031, indicating a similarly positive but slight association. This suggests that students with more favorable attitudes towards learning mathematics tend to perform slightly better academically. The rejection of the null hypothesis for this relationship as well underscores its statistical significance.

The observed relationships between home numeracy practices and academic performance, as well as attitudes towards learning mathematics and academic performance, align with existing research findings in the field. The statistically significant correlation coefficients (r) and the rejection of the null hypotheses (Ho) confirm that both home numeracy practices and attitudes towards learning mathematics are crucial factors in students' academic performance. The significant relationships identified between home numeracy practices and academic performance (r=0.133, p=0.021) and attitudes toward learning mathematics and academic performance (r=0.124, p=0.031) in this study are not isolated findings. They echo the conclusions of Kiwanuka et al. (2020), who emphasized the critical role of a positive disposition towards mathematics in enhancing students' academic outcomes. This research suggests that fostering a supportive and mathematically rich environment at home can significantly impact students' engagement and achievement in mathematics.

Regression Analysis on Home Numeracy Practices and Attitudes towards Learning Mathematics as Predictors of Academic Performance of Students

This section delves into a regression analysis to evaluate how home numeracy practices and attitudes towards learning mathematics serve as predictors of students' academic performance. The findings revealed that home numeracy practices have an unstandardized regression coefficient (β) of 1.542 with a standard error of 1.183, yielding a standardized coefficient (Beta) of 0.091. The p-value of 0.193, derived from a t-statistic of 1.304, serves as the basis for decision-making regarding the null hypothesis. Given that this p-value exceeds the $\alpha = 0.05$ threshold, it indicates the observed positive association between home numeracy practices and academic

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performance, while noted, does not achieve statistical significance. Consequently, the null hypothesis is not rejected based on this analysis. Similarly, attitudes towards learning mathematics, with an unstandardized regression coefficient (β) of 1.762, a standard error of 1.733, and a Beta of 0.071, produced a t-statistic of 1.017 and a p-value of 0.310. This further suggests that although there is a measurable relationship, it does not suffice as a statistically significant predictor of academic performance.

Both variables, therefore, were determined not to be rejected in terms of their predictive value, indicating that despite a detectable relationship, these factors cannot be considered direct or strong predictors of academic performance. This is further underscored by an adjusted r-square value of 0.014, indicating that the model explains only a modest portion of the variance in academic performance, hinting at the influence of other, unaccounted variables.

The overall significance of the model, as indicated by an f-ratio of 3.215 and a p-value of 0.042, suggests that while the model can predict academic performance to a certain extent, its predictive power is limited. This highlights the need for cautious interpretation of the results. The model's ability to predict the dependent variable (DV), despite the independent variables (IVs) not being strong predictors, can be attributed to the combined effect of the variables within the model. This suggests that, although individually the IVs might not show strong predictive capabilities, their collective contribution within the model reaches statistical significance, indicating a modest but significant ability to predict academic performance. It is important to consider that the model accounts for a portion of the variance in academic performance, suggesting the presence of other influential factors not captured by the current IVs.

Table 5

Regression Analysis on Home Numeracy Practices and Attitudes towards Learning Mathematics as Predictors of Academic Performance of Students

Independent Variable	Unstandardized Coefficients		Standardized Coefficients	t-stat	p-value	Decision@ α = 0.05
	β	Standard Error	Beta			
(Constant)	25.962	4.897		5.302	0.006	
Home Numeracy Practices	1.542	1.183	0.091	1.304	0.193	Not Rejected
Attitudes toward Learning Mathematics	1.762	1.733	0.071	1.017	0.310	Not Rejected

Dependent Variable: Academic Performance ***Adjusted R Square***: 0.014
F-ratio: 3.215 ***p-value***: 0.042

The regression analysis explored the predictive value of home numeracy practices and attitudes towards learning mathematics on academic performance, revealing that while these factors show a relationship with academic performance, they do not qualify as strong predictors. This conclusion, grounded in statistical analysis, dovetails with broader educational research on student engagement and attitudes towards mathematics, as reflected in the observations from Table 11 regarding Grade 7 students.

6. DISCUSSION OF FINDINGS

Level of Home Numeracy Practices. The level of home numeracy practices among grade 7 students reveals varying degrees of engagement in different categories. Firstly, students exhibit a high level of involvement in informal home numeracy practices, which encompass a broad range of numeracy-related interactions, indicating a strong foundation in basic mathematical concepts and skills. Similarly, students also display a high commitment to formal/basic home numeracy practices, which involve more structured and foundational mathematical skills like arithmetic operations and number comprehension. However, when it comes to formal/advanced home numeracy practices, which include more complex mathematical tasks such as three-digit arithmetic and working with larger numerical values, students' engagement is categorized as moderate. This suggests that while some students actively participate in these advanced activities, there is room for improvement in this category. Overall, when considering all home numeracy practices together,

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grade 7 students demonstrate a highly extensive level of engagement, reflecting their active involvement in a wide spectrum of numeracy-related activities that contribute to a well-rounded foundation in mathematics.

In summary, the assessment of home numeracy practices among grade 7 students underscores varying degrees of engagement across different categories. Notably, students demonstrate a high level of involvement in informal home numeracy practices, aligning with the research of Mutaf-Yildiz et al. (2018) and Harris and Petersen (2019) on the positive impact of home-based mathematical interactions. Similarly, their active commitment to formal/basic home numeracy practices resonates with the findings of Clerkin and Gilligan (2018) and Casey and Fell (2018), emphasizing the importance of structured mathematical activities. However, in the domain of formal/advanced home numeracy practices, as discussed in Table 3, students' engagement is categorized as moderate, reflecting the need for further emphasis on advanced mathematical tasks, as observed in this study. Overall, the comprehensive engagement across these numeracy categories demonstrates grade 7 students' active involvement in a broad spectrum of mathematical activities, emphasizing the pivotal role of nurturing home-based numeracy practices to foster a well-rounded foundation in mathematics.

Level of Attitudes towards Learning Mathematics. The moderate level of self-assurance, along with some students expressing nervousness or discomfort about mathematics, resonates with existing literature emphasizing the multifaceted nature of attitudes towards math (Kiwanuka et al., 2020). Moreover, the high level of recognition of mathematics' importance and its value in everyday life and future endeavors corresponds with previous research underlining the significance of fostering a positive disposition toward math (Kiwanuka et al., 2020). Additionally, the moderate level of overall engagement, coupled with some students expressing dislike or boredom, supports the idea that engagement in mathematics is a multifaceted concept (Maamin et al., 2021). These results reflect students' diverse attitudes and highlight the need to address the needs of those who find mathematics less appealing, in line with the notion that engagement strategies can enhance interest in mathematics (Sen, 2022). In summary, these findings underscore the importance of nurturing positive attitudes and engagement in mathematics education and provide valuable insights for educators and curriculum developers to enhance grade 7 students' learning experiences in mathematics.

Level of Academic Performance of Students in terms of Test Scores on the Researcher-made Test. The level of academic performance among students, as evidenced by their test scores on the Researcher-made Test, is depicted in Table 9. The data reveals a mean test score of 37.38, accompanied by a standard deviation of 10.38. These statistics place the overall academic performance in the "Low" category, suggesting that, on average, students have attained relatively lower scores on the Researcher-made Test. This assessment of academic performance aligns with the concerns raised by several authors in the existing literature, including Kuhfeld et al. (2022), Kihwele and Mkomwa (2022), and Contini et al. (2022), who have highlighted challenges in mathematics education and the negative impact of the pandemic on students' math performance. This finding underscores the pressing need for educational interventions and strategies to address the observed low academic performance and enhance mathematics education for grade 7 students.

Significance of the Relationship Between the Variables. Table 10 elucidates the significance of the relationships between home numeracy practices, attitudes towards learning mathematics, and academic performance through detailed statistical analysis. For the relationship between home numeracy practices and academic performance, the correlation coefficient (r) is reported as 0.133 with a p-value of 0.021. This correlation coefficient suggests a positive but modest relationship between home numeracy practices and academic performance, indicating that increases in engagement with home numeracy activities are associated with slight improvements in academic performance. The statistical significance of this relationship is confirmed by the rejection of the null hypothesis (H_0), which asserts a meaningful association between these variables.

Similarly, the relationship between attitudes towards learning mathematics and academic performance is characterized by a correlation coefficient (r) of 0.124 and a p-value of 0.031, indicating a similarly positive but slight association. This suggests that students with more favorable attitudes towards learning mathematics tend to perform slightly better academically. The rejection of the null hypothesis for this relationship as well underscores its statistical significance.

While the r-values indicate positive associations, they also imply that these relationships, though statistically significant, are modest in strength. This modesty suggests that while home numeracy practices and attitudes towards learning mathematics contribute to academic performance, they do so to a limited extent.

These results show how the ways families use numbers at home and how they feel about learning math can really affect how well students do in school. The statistical significance of these relationships emphasizes the importance of nurturing a positive mathematical environment at home and encouraging constructive attitudes towards mathematics among students.

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However, the small correlation numbers and the discussion about the r-square value show that doing well in math at school is affected by many different things. This means that teachers and parents should think about using many ways to help improve how students do in math.

The observed relationships between home numeracy practices and academic performance, as well as attitudes towards learning mathematics and academic performance, align with existing research findings in the field. The statistically significant correlation coefficients (r) and the rejection of the null hypotheses (Ho) confirm that both home numeracy practices and attitudes towards learning mathematics are crucial factors in students' academic performance. The significant relationships identified between home numeracy practices and academic performance ($r=0.133$, $p=0.021$) and attitudes toward learning mathematics and academic performance ($r=0.124$, $p=0.031$) in this study are not isolated findings. They echo the conclusions of Kiwanuka et al. (2020), who emphasized the critical role of a positive disposition towards mathematics in enhancing students' academic outcomes. This research suggests that fostering a supportive and mathematically rich environment at home can significantly impact students' engagement and achievement in mathematics.

Similarly, the work of Maamin et al. (2021) on the multifaceted nature of engagement in mathematics provides a broader context for understanding the importance of attitudes toward mathematics. Their findings underscore that engagement is not solely about the amount of time spent on mathematical activities but also involves emotional and cognitive aspects, which are influenced by both home numeracy practices and attitudes toward the subject.

The research conducted by Cho & Hwang (2019) reinforces the conclusions of the current study, emphasizing the importance of addressing the challenges and negative perceptions students hold towards mathematics. Through an investigation into multi-ethnic students' motivation in mathematics using the expectancy-value theory, a complex array of influential factors such as parental support, peer assessment, and previous experiences has been identified. These insights align with the assertion that enhancing home numeracy practices and fostering positive attitudes towards mathematics are crucial for making the subject more accessible and engaging. Cho & Hwang's findings underscore the contextual nature of motivation and advocate for interventions tailored to the diverse backgrounds and experiences of students. This correlation between their research and the findings of the current study highlights the critical role of a supportive educational environment in transforming students' experiences and outcomes in mathematics.

Lastly, the potential of engagement strategies to enhance interest in mathematics, as highlighted by Sen (2022), complements the findings of the current study. It suggests that educational interventions focusing on both the home environment and the cultivation of positive attitudes toward mathematics can be effective in improving students' academic achievements in mathematics.

Regression Analysis on Home Numeracy Practices and Attitudes towards Learning Mathematics as Predictors of Academic Performance of Students. This section delves into a regression analysis to evaluate how home numeracy practices and attitudes towards learning mathematics serve as predictors of students' academic performance. The findings revealed that home numeracy practices have an unstandardized regression coefficient (β) of 1.542 with a standard error of 1.183, yielding a standardized coefficient (Beta) of 0.091. The p-value of 0.193, derived from a t-statistic of 1.304, serves as the basis for decision-making regarding the null hypothesis. Given that this p-value exceeds the $\alpha = 0.05$ threshold, it indicates the observed positive association between home numeracy practices and academic performance, while noted, does not achieve statistical significance. Consequently, the null hypothesis is not rejected based on this analysis. Similarly, attitudes towards learning mathematics, with an unstandardized regression coefficient (β) of 1.762, a standard error of 1.733, and a Beta of 0.071, produced a t-statistic of 1.017 and a p-value of 0.310. This further suggests that although there is a measurable relationship, it does not suffice as a statistically significant predictor of academic performance.

Both variables, therefore, were determined not to be rejected in terms of their predictive value, indicating that despite a detectable relationship, these factors cannot be considered direct or strong predictors of academic performance. This is further underscored by an adjusted r-square value of 0.014, indicating that the model explains only a modest portion of the variance in academic performance, hinting at the influence of other, unaccounted variables.

The overall significance of the model, as indicated by an f-ratio of 3.215 and a p-value of 0.042, suggests that while the model can predict academic performance to a certain extent, its predictive power is limited. This highlights the need for cautious interpretation of the results. The model's ability to predict the dependent variable (DV), despite the independent variables (IVs) not being strong predictors, can be attributed to the combined effect of the variables within the model. This suggests that, although individually the IVs might not show strong predictive capabilities, their collective contribution within the model reaches statistical significance, indicating a

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modest but significant ability to predict academic performance. It is important to consider that the model accounts for a portion of the variance in academic performance, suggesting the presence of other influential factors not captured by the current IVs.

In summary, although associations between home numeracy practices and attitudes towards learning mathematics with academic performance have been identified, this study does not establish them as robust predictors within the analysis context. The results advocate for a broader investigation into the complex array of factors contributing to academic performance, suggesting that educational success is likely influenced by a multitude of variables beyond those examined in this research. A nuanced understanding of these dynamics is crucial for developing more effective educational strategies and interventions aimed at enhancing academic outcomes.

The regression analysis explored the predictive value of home numeracy practices and attitudes towards learning mathematics on academic performance, revealing that while these factors show a relationship with academic performance, they do not qualify as strong predictors. This conclusion, grounded in statistical analysis, dovetails with broader educational research on student engagement and attitudes towards mathematics, as reflected in the observations from Table 11 regarding Grade 7 students.

The literature underscores the importance of engagement in mathematics for enhancing learning efficiency, acquiring mathematical knowledge, and maintaining interest in the subject. The multifaceted nature of engagement—spanning motivation, achievement, confidence, and emotions—suggests a complex interplay between internal and external factors in shaping academic outcomes (Maamin et al., 2021; Nayir, 2015; Sen, 2022). This perspective is crucial for interpreting the modest predictive values obtained for home numeracy practices and attitudes towards learning mathematics. It suggests that while these factors are undoubtedly influential, their effects are interwoven with a broader array of determinants of engagement and performance.

The relationship between home numeracy practices and academic performance, as indicated by the regression analysis, aligns with the understanding that engagement is a dynamic and ongoing process. The role of home numeracy practices in fostering an early foundation for mathematical understanding is acknowledged; however, the findings imply that their direct impact on academic performance, especially as measured in formal educational settings, may be moderated by other factors such as classroom experiences and individual student attributes (Attard & Holmes, 2020; Skilling et al., 2016).

Similarly, the analysis of attitudes towards learning mathematics highlights the importance of emotional and cognitive engagement in the learning process. The modest predictive value of attitudes towards academic performance echoes the literature's emphasis on the emotional and motivational dimensions of engagement in mathematics (Sen, 2022). This suggests that while attitudes are crucial for fostering a positive learning environment, their impact on academic performance is part of a complex matrix of influences, including pedagogical approaches, classroom dynamics, and individual student resilience.

The findings from the regression analysis, viewed in light of the comprehensive literature review, point towards the critical role of educators in recognizing and nurturing the diverse aspects of student engagement. The evidence supports the need for a holistic approach to teaching mathematics, one that goes beyond traditional measures of academic performance to include a focus on creating supportive home environments, cultivating positive attitudes, and implementing engaging instructional strategies (Wang, 2016; Imms & Byers, 2017).

7.CONCLUSIONS

The findings of this study underscore the significance of home numeracy practices and positive attitudes towards learning mathematics in shaping students' academic performance. It was evident that students exhibited a strong presence of both informal and formal home numeracy practices, highlighting the role of everyday activities in fostering mathematical skills. Additionally, the study observed positive attitudes among students towards learning mathematics, reflecting a favorable disposition towards mathematical education. However, despite these encouraging factors, the study revealed a concerning trend of low academic performance among students in mathematics. Notably, students who demonstrated high levels of home numeracy practices and positive attitudes towards learning mathematics were more likely to perform better academically. Both factors were found to contribute positively to students' academic performance, emphasizing the importance of nurturing these aspects in educational settings.

Based on the study's findings and conclusions, several recommendations are proposed to enhance students' mathematical proficiency and academic performance. Firstly, it is recommended for students to integrate mathematics into daily tasks and activities, such as cooking, shopping, and budgeting, to reinforce learning outside the classroom. Additionally, fostering a positive attitude towards mathematics can enhance motivation and resilience, leading to improved academic outcomes. Teachers are encouraged to provide

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remedial classes and incorporate at-home numeracy practices into their instruction to support struggling students and reinforce learning. The Department of Education should provide guidance to educators on adapting at-home numeracy practices to cater to diverse learning styles and levels of skill. Creating a welcoming and inclusive classroom environment that promotes a passion for mathematics is also crucial. Finally, future research should explore additional factors beyond numeracy practices and attitudes that influence academic performance in mathematics, such as personalized learning methods and longitudinal studies tracking the impact of various interventions over time. By implementing these recommendations, educators and policymakers can work towards improving students' mathematical proficiency and academic success.

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