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THE INFLUENCE OF MATHEMATICS SELF-EFFICACY AND READING COMPREHENSION PROFICIENCY ON MATHEMATICS PROFICIENCY AMONG GRADE 10 STUDENTS OF PRIVATE SCHOOLS OF MANIKI

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ABSTRACT
The study investigates how mathematics self-efficacy and reading comprehension proficiency affect mathematics proficiency among grade 10 students in private schools of Maniki. A quantitative, descriptive-correlational design was used, with 183 randomly selected students surveyed on the three variables. The results indicated that students had high levels of mathematics self-efficacy, reading comprehension proficiency, and mathematics proficiency. It was found that a significant relationship exists between mathematics self-efficacy and mathematics proficiency, while no significant relationship was observed between reading comprehension proficiency and mathematics proficiency. Additionally, the domains of mathematics self-efficacy, including mastery experiences, vicarious experiences, verbal persuasion, and psychological states, were found to significantly influence students' mathematics proficiency. However, the domains of reading comprehension proficiency – literal comprehension, inferential understanding, and creative understanding – did not significantly impact mathematics proficiency. These findings suggest that mathematics self-efficacy plays a significant role in enhancing mathematics proficiency among grade 10 students.

KEYWORDS: *Mathematics Self-Efficacy, Reading Comprehension, Mathematics Proficiency, Grade 10 Students,*

INTRODUCTION
The insufficient mathematical skills of students continue to be a major cause for concern in today's society. Mathematics proficiency is an important aspect in obtaining success in Western countries, and bad mathematical abilities have a bigger influence on an individual's life prospects than weak reading and writing skills. Because of the important economic and societal implications, it is crucial to completely understand the learning and performance processes involved in mathematics. When children continuously struggle with mathematics, they may experience feelings of inadequacy and accept that they are not good enough. In contrast, successful experiences can help children acquire a favorable attitude toward mathematics (Park et al., 2018).

In United States, several studies and articles have highlighted kids' deteriorating mathematical problem-solving skills. According to the 2015 Programme for International Student Assessment (PISA), global student performance in mathematics has remained constant or declined over time. According to the PISA results, students from various countries, particularly developed nations, struggle to effectively apply their mathematical knowledge to real-world issues. This is a big challenge for global educational systems to address and enhance mathematical problem-solving skills to meet the demands of the modern world. (Pont et al., 2023).

In Mindoro, Philippines, more than half of the students have poor mathematical skills when compared to their counterparts in other parts of the world. The results showed that junior high school students in Mindoro continue to face persistent difficulties with mathematics performance, as indicated by notable score differences. Additionally, research showed that the majority of children, regardless of grade level, struggle to understand basic mathematical ideas, which leads to persistently low mean scores across grade levels and indicates a pervasive problem with student performance in mathematics (Hernandez et al., 2024).

Understanding and improving mathematics proficiency is crucial for societal progress. In an era where technological advancements are reshaping industries, a workforce proficient in mathematics is essential for innovation and economic growth. This knowledge is particularly relevant in the context of comprehensive educational reforms aimed at enhancing students' holistic academic development. Numerous studies highlight the importance of strong reading skills for comprehending word problems in

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mathematics (e.g., Fuchs et al., 2018; Kim & Wagner, 2018).

This study's findings may have practical implications for educators, policymakers, and curriculum developers. By identifying the mediating role of reading comprehension proficiency, interventions can be designed to holistically enhance students' mathematical abilities. If reading comprehension proficiency is found to mediate the relationship between mathematics self-efficacy and proficiency, interventions targeting both mathematics and reading skills may be necessary to optimize educational outcomes.

While there are many studies that have investigated the direct relationship between mathematics self-efficacy and proficiency, but there may be a scarcity of research exploring the mediating factors that influence this relationship. The proposed study aims to fill this gap by examining the role of reading comprehension proficiency as a potential mediator. Additionally, most of the existing studies have focused on elementary and middle school students such as the study of Syamsu et al. (2022) titled "Assessing students' self-efficacy when solve mathematical problem based on gender", and "Self-efficacy and mathematical ability: A meta-analysis of studies conducted in Indonesia" of Suparman and Sulhadi (2022), and there is a gap in research on this topic for high school and college-level mathematics students. Therefore, there is a need for research that analyzes the mediating effect of reading comprehension proficiency and the relationship between mathematics self-efficacy and mathematics proficiency, grade 10 students.

STATEMENT OF THE PROBLEM

The purpose of this study was to examine the influence of mathematics self-efficacy and reading comprehension proficiency on mathematics proficiency among grade 10 students in private schools of Maniki, Kapalong, Davao del Norte. Specifically, the study aimed to address the following objectives:

1. To determine the level of mathematics self-efficacy of grade 10 students in terms of:
   - 1.1 Mastery experiences
   - 1.2 Vicarious experiences
   - 1.3 Verbal persuasions
   - 1.4 Psychological states
2. To determine the level of reading comprehension proficiency of grade 10 students in terms of:
   - 2.1 Literal comprehension dimension
   - 2.2 Inferential understanding dimension
   - 2.3 Creative understanding dimension
3. To determine the level of mathematics proficiency of grade 10 students.
4. To assess the significant relationships between:
   - 4.1 Mathematics self-efficacy and mathematics proficiency
   - 4.2 Reading comprehension proficiency and mathematics proficiency
5. To examine which domain of mathematics self-efficacy and reading comprehension can significantly influence mathematics proficiency.

METHODOLOGY RESEARCH DESIGN

This study utilized a quantitative, non-experimental research design, employing descriptive correlational techniques to examine the relationships between variables. In this context, correlational research helps to identify if and how two variables are connected, without manipulating the participants' environment. It is a common approach because it does not require controlling many other factors and allows researchers to explore potential links between variables. The independent variables in this study are mathematics self-efficacy and reading comprehension proficiency, while the dependent variable is mathematics proficiency. The study seeks to determine the relationships between mathematics self-efficacy and mathematics proficiency, as well as between reading comprehension proficiency and mathematics proficiency among grade 10 students. This approach provides insights into the connections between these variables, though it does not establish cause-and-effect relationships.

STATISTICAL TREATMENT OF DATA

The following statistical tools were utilized to calculate the data in this study in lieu of testing the researcher's objectives at a 0.05 level of significance.

Mean. This was used to determine the significant relationship technology integration and learning attitudes among the respondents.

Pearson-r. this was used to determine the significant relationship between technology integration and learning attitudes among the respondents.

Regression. This was used to determine the indicator(s) of technology integration that can significantly influence learning attitudes of the

RESEARCH RESPONDENTS

The respondents of this study were Grade 10 students of private schools located at the Municipality of Kapalong, Province of Davao del Norte. To ensure an accurate distribution of samples, the researcher employed stratified random sampling, utilizing proportional allocation, through Slovin's formula with a margin of error of 0.05. In stratified random sampling, the population is partitioned into subgroups called "strata". From within each stratum, uniform random sampling is used to select a per-stratum sample. All per-stratum samples are combined to derive the stratified random sample (Nguyen et al, 2020). The criterion of selecting the respondents is the following: the respondents must be a bonafide student of private schools within the research locale and they must be a grade 10 student of the school year 2023-2024.

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RESULTS AND DISCUSSION : The following are the results of the study.

Table 1
Summary on the Level of Mathematics Self-Efficacy

Mathematics Self Efficacy	Mean	Description
Mastery Experiences	3.34	Moderate
Vicarious Experiences	3.68	High
Verbal persuasion	4.09	High
Psychological States	3.72	High
Overall	**3.71**	**High**

The overall level of mathematics self-efficacy among grade 10 students was assessed in terms of mastery experiences, vicarious experiences, verbal persuasions, and psychological states. The data showed that the mean level of mathematics self-efficacy for grade 10 students was 3.71, which is considered high, indicating that students often perceive themselves as confident in their mathematics abilities. Among the indicators, verbal persuasion had the highest mean score of 4.09, classified as "high," suggesting that students frequently express their self-efficacy through verbal encouragement. On the other hand, mastery experiences had the lowest mean of 3.34, indicating a moderate level of self-efficacy, suggesting that students occasionally feel confident based on past achievements. Vicarious experiences received a mean score of 3.68, indicating a high level, meaning that students often draw confidence from observing others' successes. Lastly, psychological states had a mean score of 3.72, also considered high, highlighting that emotions such as confidence or anxiety play a significant role in how students perceive their mathematics self-efficacy.

Table 2
Summary on the Level of Reading Comprehension Proficiency

Reading Comprehension Proficiency	Mean	Description
Literal Comprehension Dimension	3.64	High
Inferential Understanding Dimension	3.47	High
Creative Understanding Dimension	3.73	High
Overall	**3.61**	**High**

The overall level of reading comprehension proficiency among grade 10 students was assessed in terms of literal comprehension, inferential understanding, and creative understanding. The average score for reading comprehension proficiency was 3.71, considered high, meaning that students often demonstrate strong reading skills. The creative understanding dimension had the highest mean score of 3.73, indicating that students frequently show creativity and insight when interpreting texts. The inferential understanding dimension had the lowest mean score of 3.47, still high, suggesting that students sometimes show strong skills in making inferences from texts. The literal comprehension dimension had a mean of 3.64, also high, indicating that students often excel in understanding and interpreting the basic meaning of texts. Overall, students show a high level of reading comprehension proficiency across all areas.

Table 3
Level of Mathematics Proficiency

DV	Frequency	Percentage	Mean	Description
3	5	2.73 %		
4	3	1.64%		
5	8	4.37%		
6	14	7.65%		
7	24	13.12%		
8	25	13.66%		
9	26	14.21%	**9.43**	**Good**
10	18	9.84%		
11	18	9.84%		
12	12	6.56%		
13	12	6.56%		
14	3	1.64%		
15	5	2.73%		

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16	2	1.09%
17	2	1.09%
18	3	1.64%
19	2	1.09%
20	1	0.55%
TOTAL	**183**	**100%**

The level of mathematics proficiency of grade 10 students was measured through a test questionnaire with 20 items to test their number skills. The response of the 183 respondents was presented and analyzed above.

The level of mathematics proficiency of the grade 10 students is presented, analyzed, and interpreted. The summary of the data is shown in Table 11. The list of scores ranges from 3 to 20 with an overall average score of 9.43 out of 20, or qualitatively interpreted as good. Further, almost one-fourth of the test takers were able to get a score of above the median score, which is 12.5. The score with the highest frequency is 9 which was obtained by 26 students. On the contrary, the score with the least frequency is the perfect score, 20, which was obtained by only 1 student each.

There were 8 students (4.37%) whose scores fall under the poor level (1-4) of mathematics proficiency; 71 students (38.8%) whose scores fall under the fair level (5-8); 74 students (40.45%) under the good level (9-12), which can be labeled as the average level; 22 students (12.02%) under the very good level (13-16); and 8 students (4.37%) under the excellent level (17-20).

Hence, the summary of results stipulates that the mathematical proficiency of grade 10 students was good. This indicates that grade 10 students possess a number skill at an average level, that still need further guidance and support to advance their skills in this area.

Table 4
Significant Relationship between Mathematics Self-Efficacy and Mathematics Proficiency

Variable	Mean	R-Value	P-Value	Decision
Mathematics Self-Efficacy Mathematics Proficiency	3.71 9.43	.712	<.001	H_o Rejected

The relationship between mathematics self-efficacy and mathematics proficiency of grade 10 students is significant, with r (181) = .712, p<.001. Since the probability value (p<.001) is less than the level of significance (α=0.05), the null hypothesis is being rejected in this context. This means that there is a significant relationship between mathematics self-efficacy and mathematics proficiency of students. In other words, a high level of mathematics self-efficacy tends to be associated with a high level of mathematics proficiency of students.

Table 5
Significant Relationship between Reading Comprehension Proficiency and Mathematics Proficiency

Variable	Mean	R-Value	P-Value	Decision
Reading Comprehension Proficiency Mathematics Proficiency	3.61 9.43	.130	.078	H_o Accepted

The correlation between reading comprehension proficiency and mathematics proficiency in grade 10 students is not significant, r (181) = .130, p=.078. Since the probability value (p=.078) is greater than the level of significance (α=0.05), the null hypothesis is being accepted in this context. This means that there is no significant relationship between reading comprehension proficiency and mathematics proficiency of grade 10 students. In other words, higher level of reading comprehension proficiency tends to be associated with greater level of mathematics proficiency of grade 10 students.

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Table 6
Domain/s of Mathematics Self-Efficacy That Can Considerably Influence Mathematics Proficiency

Independent Variables	Unstandardized Coefficients		Standardized Coefficients	P-Value	Decision @=0.05
	Beta	Std. Error	Beta		
(Constant)	9.432	0.247			
Mastery experiences	1.706	0.443	0.347	< .001	**H_o Rejected**
Vicarious experiences	-0.361	0.446	-0.071	0.419	**H_o Accepted**
Verbal persuasions	-0.211	0.488	-0.04	0.665	**H_o Accepted**
Psychological states	-0.058	0.438	-0.012	0.895	**H_o Accepted**
Dependent Variable:					
Mathematics Proficiency					

Note: R= 0.297, =0.088, F-ratio= 4.306 P-value= .002

Table 6 revealed the significant influence of domains of mathematics self-efficacy that can considerably influence the mathematics proficiency of grade 10 students. The results showed that mastery experiences, a domain of mathematics self-efficacy, appear to be a statistically significant predictor of the level of mathematics proficiency of grade 10 students, (β=1.706, p< .001). At 0.05 level of significance, the null hypothesis is rejected. The positive beta value indicates that for all units increase of mastery experiences, the level of mathematics proficiency of grade 10 students will also increase by 1.706 units.

The p-values for the remaining three domains, vicarious experiences (β=0.361, p=0.419), verbal persuasions (β=-0.211, p=0.665), and psychological states (β=-0.058, p=0.895). At 0.05 level of significance, the p-values of the 3 domains exceeded 0.05. This suggests that the three domains which are vicarious experiences, verbal persuasions, and psychological states do not have significant influence on mathematics proficiency of grade 10 students.

Moreover, mathematics self-efficacy explained a significant proportion of variance in mathematics proficiency of students,= 0.088, F= 4.306, p=.002. The of 0.088 shows that the model predicts 8.8% of the statistical variation observed in the level of math mathematics proficiency of respondents. The coefficient of alienation which is 91.2% points to the extent at which other indicators or domains not included in the study may explain the variance observed in the level of mathematics proficiency among the respondents.

RECOMMENDATIONS

Based on the high results in mathematics self-efficacy, it's recommended to prioritize direct experiences for students, such as interactive learning activities, real-world applications, and problem-solving tasks, to build confidence and mastery. Additionally, role modeling by educators can enhance students' self-belief and motivation in mathematics. A positive, supportive environment that encourages persistence and effort, along with real-world applications, should be fostered to improve self-efficacy.

For psychological support, providing challenges aligned with students' capabilities can help maintain motivation and confidence. Collaborative learning and peer feedback can also strengthen their self-efficacy.

Since reading comprehension proficiency is strong, strategies should focus on enhancing deeper comprehension, particularly through varied text types, context, and background knowledge. For inferential understanding, targeted teaching methods and an exploration of individual differences can optimize instruction. Creative understanding can be further developed through open-ended questions, creative assignments, and collaborative projects.

Although mathematics proficiency in grade 10 is strong, continuous efforts are needed to elevate students' skills through personalized support, collaborative learning, and technology-enhanced methods. Improving students' mathematics self-efficacy can boost proficiency, and interventions should focus on fostering success, providing meaningful feedback, and emphasizing real-world relevance.

Future research should explore the topic using diverse methodologies like mixed methods or case studies, with larger participant groups from different education levels and locations, to offer a deeper understanding of the relationship between variables.

CONCLUSIONS

The study found that grade 10 students had high mathematics self-efficacy, meaning they believe in their ability to succeed in math, which is important for academic success. This belief may come from positive past experiences, supportive environments, or good teaching.

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The students also showed strong reading comprehension skills, indicating they can understand and interpret texts well, though more research is needed to identify the factors behind this.

The students' mathematics proficiency was also good, and there was a significant relationship between their mathematics self-efficacy and proficiency, so the first null hypothesis was rejected.

However, no significant relationship was found between reading comprehension proficiency and mathematics proficiency, so the first null hypothesis for this was accepted.

The analysis showed that mastery experiences significantly influenced both mathematics self-efficacy and proficiency, so the second null hypothesis was rejected. The model explained 8.8% of the variation in mathematics proficiency, with other factors likely contributing to the rest.

No factors were found to significantly affect reading comprehension proficiency in relation to mathematics proficiency.

Overall, the study highlights the importance of mathematics self-efficacy in improving math proficiency, supporting Bandura's theory.

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