Mathematics Performance and Attitude Toward Mathematics: A Correlational Study

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Abstract

This study aimed to investigate the relationship between the indicator of mathematical attitude and mathematics performance. Two hundred seventeen (217) students participated in this study. Ninety-five students (43.78%) were male and 122 (56.2%) were female. The results exhibited that Grade 12 students ATM no significant relationship to MP. Furthermore, there are inter-correlation between motivation, value, enjoyment, and self-confidence. The results also showed a strong correlation between students' motivation and how much they enjoyed learning the subject and how confident they felt about themselves. Likewise, there was a strong relationship between students' motivation and enjoyment, as well as between their enjoyment and their motivation and how much they valued the subject. When students are interested in and motivated to learn about a subject, they value it more. One becomes more motivated and enjoys mathematics the more they believe in its value (have self-confidence), which results in other positive attributes or indicators of attitude toward mathematics.

Keywords: *attitude toward mathematics, mathematics performance, self-confident, value, enjoyment, motivation*

Introduction:

The educational system is required to provide learners with the appropriate knowledge, skills, and attitudes to enable their awareness, appreciation, and preservation of their cultural heritage as well as their creativity in modifying and even shaping this culture for their benefit and that of their society. However, poor mathematics performance is a problem that many students of all grades and levels face in the classroom (Buzzai et. al., 2020). It has long been believed that there is a statistical correlation between attitude toward mathematics and mathematical achievement (Ma& Kishor, 1997). The government received assistance from numerous organizations involved in mathematics education. These initiatives include: (1) teacher training; (2) teacher education; (3) novel models or ways of teaching and learning; (4) research into the challenges and errors that students face when studying mathematics (Zakaria &Syamaun, 2017). These efforts, nonetheless, did not produce the best outcomes.

Negative attitudes about mathematics are a worry in math education, in addition to low student achievement. According to (Clawson, 1999), students find it challenging to perceive mathematics as an engaging and practical topic because of six ingrained beliefs: The following are some reasons why People dislike mathematics: (1) it's boring; (2) it's hard; (3) it requires precision; (4) some people assume I can't do math because I'm a woman; and (6) it has nothing to do with my day-to-day activities. All math educators need to make these changes in order to increase their students' interest in mathematics. According to results from middle school students, students developed a more instrumental view of mathematics along with negative feelings and a sense of low competence. Martino and Zan (2010) confirmed these findings. According to Banks (2015), one of the most important findings showed that a student with a high self-concept might adopt a negative attitude as a coping mechanism. In other words, mathematics may make a student who otherwise has a favorable self-concept feel bad. As a result, the student might keep avoiding mathematics and develop stronger attitudes towards it.

According to Nicolaidou&Philippou's (2003) study, attitudes toward mathematics have a substantial impact on students' ability to succeed in the subject. Moreover, a student's aptitude for mathematics is predicted by their views toward the subject. However, no specific attitude toward mathematics was identified, and it was not investigated if a particular attitude predicts or correlates with mathematical achievement. There is a correlation between attitude and mathematical achievement among the fifth-grade participants, according to Michelli's (2013) investigation into how attitudes like motivation and confidence affect students and their academic achievement. The study of how a particular concept of attitude toward mathematics correlates to mathematical achievement, however, received little attention.

This study provided a correlation between attitude toward mathematics (ATM) and mathematical performance to solve the constraints (MP). Describe any theories on the connection between ATM and MP that would be important to take into account in the space below. It was specifically looked into how students in grade 12 performed mathematically in relation to their attitude toward mathematical indicators.

Theories on the Relation Between Attitude Towards Mathematics and Mathematics Performance

Understanding the relationship between ATM and MP is essential not just theoretically, but also practically for intervention. The decline of MA is associated with the negative attitude of students in mathematics subject.

Theories of Attitude Change

Four distinct categories have been established for the various attitude theories. According to the various consistency theories, there should be consistency not just between attitudes and behaviors, but also between attitudes and behaviors themselves. Discomfort is caused when there is a

lack of consistency. The term "behavioral theories" more correctly refers to the various educational perspectives. The primary aspect that these theories shared in common was the emphasis that was placed on the stimulation qualities of the communication environment. According to the social judgement theory, the audience is responsible for interpreting and evaluating a message, as well as taking a position. The idea focuses on the internal processes that an individual goes through in order to make a judgement in regard to a message that has been communicated (Asemah, Nwammuo and Nkwam-Uwaoma, 2017).

Objective of the Study:

This study wanted to explore relationship betweenthe indicator of ATM and MP. Specifically, it aimed to answer the following questions:

1. What is the attitude toward mathematics in terms of Self-confidence, Value, Enjoyment and Motivation of grade 12 students?
2. What is the mathematics performance of grade 12 students?
3. Is there significant relationship between the indicator of attitude toward mathematicsand mathematics performance?

Hypothesis:

On the basis of the questions that were presented, the following hypothesis was tested:

1. There is no significant relationship between the indicator of attitude toward mathematics and mathematics performance?

Methodology:

Research Design

This study employed a descriptive-correlational research design. The researcher can study, assess, and generalize the direction and strength of the relationship between ATM and MP using statistical analysis. However, it is essentially observational in terms of data collection because it does not investigate for cause and effect (Creswell & Creswell, 2017).

Sample

The respondents of the were 217 randomly selected Grade 12 students from seven national high schools in Western Visayas, Philippines, 95 (43.78%) were male students and 122 (56.2%) were female.

Instruments

The Attitudes Towards Mathematics Inventory is lifted from Martha Tapia, (1996) and was revised by Martha Tapia and George E. Marsh in 2004. The questionnaire has four factors: Self-confidence, Value, Enjoyment and Motivation. It is a 40 items likert scale type of questions in which the respondents were asked to respond 1 (Strongly Disagree), 2 (Disagree), 3 (Neutral), 4 (Agree) and 5 (Strongly Agree). Some items were reversely scored as stated by the author herself when the

researchers asked for permission to use the questionnaire.

The student's general percentage average in mathematics from the first quarter to the fourth quarter was the data that was utilized to arrive at a conclusion regarding the student's overall performance in the subject of mathematics.

Ethical Considerations

The school heads' written consent was sought prior to the study's implementation. The participation of the selected research respondents was assuredly voluntary. Additionally, the parents of the grade 12 students in the participating classes granted their full approval. The research respondents were explicitly informed of the study's goals, and safeguards were taken to make sure the respondent students wouldn't be forced to participate in the study or suffer any harm as a result. The study was the only purpose for all of the data obtained, which was handled with absolute confidentiality.

Results and Discussion:

Table 1 indicated that Grade 12 students have a "Neutral" attitude toward mathematics as evidenced by their self-confidence ($M = 3.03$, $SD = 0.32$) in dealing with the subject, how they value ($M = 3.32$, $SD = 0.39$) the subject, their enjoyment($M = 3.19$, $SD = 0.59$) of engaging in activities or tasks related to the subject, and their level of motivation($M = 3.16$, $SD = 0.52$) for the subject.

Table 1

Attitude Toward Mathematics in terms of Self-confidence, Value, Enjoyment and Motivation of Grade 12 students

Attitude Toward Mathematics	SD	Mean	Interpretation
Self-confidence	0.32	3.03	Neutral
Value	0.39	3.32	Neutral
Enjoyment	0.59	3.19	Neutral
Motivation	0.52	3.16	Neutral

Note: Highly Negative (1.00 – 1.50), Negative (1.51 – 2.50), Neutral (2.51 – 3.50), Positive (3.51 – 4.50), Highly Positive (4.51 – 5.00)

In table 2 it was noted that the grade 12 students have a "Very Satisfactory" performance in mathematics.

Table 2

Mathematics Performance of grade 12 students

Mathematics Performance	SD	Mean	Interpretation
General Percentage Average	4.21	87.55	Very Satisfactory

Note: Did not met expectations (below 75), Fairly Satisfactory (75 – 79), Satisfactory (80 – 84), Very Satisfactory (85 – 89), Outstanding (90 – 100)

Table 3 shows that ATM exhibited no significant relationships with mathematics performancebased on Pearson correlation coefficients. However, there was evidence to suggest that with in the indicator of ATM, self-confidence and value have significant relationship to enjoyment and motivation. Moreover, enjoyment noted significant relationship to motivation. Lastly, no significantly relationship indicated between self-confident and value. All p value is less than .001. The fact that the values of skewness and kurtosis were contained within the range of -1 to 1 demonstrates that the variables were normally distributed.

As can be observed in Table 3, there were large positive correlations between self-confident and enjoyment ($r = 0.58$, $p<.001$), medium positive correlation was noted between self-confident and motivation($r = 0.49$, $p<.001$). Value shown small positive correlation to enjoyment($r = 0.26$, $p<.001$), and motivation($r = 0.28$, $p<.001$), while enjoyment exhibit a large positive correlation to motivation($r = 0.59$, $p<.001$).

Table 3

Relationship between Attitude Toward Mathematics and Mathematics Performance

		Mathematics Performance	Self-confidence	Value	Enjoyment	Motivation
Mathematics Performance	r	1	-0.11	-0.09	-0.04	-0.05
	p		0.105	0.180	0.537	0.440
Self-confidence	r	-0.11	1	0.07	0.58**	0.49**
	p	0.105		0.303	0.000	0.000
Value	r	-0.09	0.07	1	0.26**	0.28**
	p	0.180	0.303		0.000	0.000
Enjoyment	r	-0.04	0.58**	0.26**	1	0.59**
	p	0.537	0.000	0.000		0.000
Motivation	r	-0.05	0.49**	0.28**	0.59**	1
	p	0.440	0.000	0.000	0.000	
Skewness		0.01	-0.05	0.11	0.26	-0.11
Kurtosis		-0.74	-0.22	-0.32	-0.26	-0.18

**p <0.01

Discussion:

In this study, the relationship between the ATM indicator and MP was investigated. The relationship between MP and ATM indicators was not significant. But among the fifth-grade individuals, a relationship was seen between attitude and mathematical success (Michelli, 2013). In order for students to feel confident in their math skills and have a good view on mathematics, teachers, parents, and other mentors should be aware of this association (Michelli, 2013). Teachers

should also be aware of how they feel about math because these attitudes might have a negative impact on the students. Their attitudes can transfer to others in the group, such as when a female teacher has a bad attitude about mathematics and it affects the other female students (Cox, 2010). According to the study's numerous findings, math teachers—especially those in elementary schools—should be mindful of their students' attitudes toward the subject because it may have an impact on their performance. According to Alpacionet al. (2014), academic performance was significantly influenced by one's attitude toward mathematics. Students who approach mathematics with a positive mindset typically perform well. Therefore, fostering a good attitude toward mathematics can help students perform better. Self-confidence had a strong relationship with enjoyment of mathematics in the ATM construct, and this enjoyment showed a strong relationship with motivation to learn mathematics. According to Chue (2020), the relationship between effort and academic success is sequentially mediated by satisfaction and self-confidence. While value of the subject has a small positive correlation to enjoyment and motivation, self-confidence was found to have a medium significant correlation. This only implies a relationship between motivation, value, and self-confidence (Cerbito, 2020).

Conclusion:

To conclude, ATM had nothing to do with MP. Furthermore, there are relationships between motivation, value, enjoyment, and self-confident. The findings suggested that students' motivation and enjoyment for the subject of mathematics can influence how valuable it is to them. Students value a subject more when they are engaged in it and motivated to learn about it. Students' motivation and enjoyment are closely related to how confident they feel about themselves. The more one believes in the value of mathematics (has self-confidence), the more they are motivated and like it, which leads to other positive attributes or indicators of attitude toward mathematics.

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