

# Factors Affecting the Academic Achievement in Mathematics of Grade 10 Students in Barobo National High School, Llorente, Eastern Samar, Philippines

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## ABSTRACT

This study was conducted to know the factors affecting the Academic Achievement in Mathematics of Grade 10 Students in Barobo National High School. The correlational research design was used. The respondents were forty-eight (48) Grade 10 students of Barobo National High School. A researcher-made questionnaire was used to profile the respondents. The final average grades of students in Mathematics in the previous grade level were used to determine the level of academic achievement of students. The data gathered were tabulated and analyzed using statistical tools such as mean percentage frequency counts, percentage, and Mean and Pearson Product Moment Correlation. Based on the result of the study, the respondents are mostly female and a majority of the mothers reached secondary level. Likewise, the fathers of the respondents mostly obtained an elementary level of education. With regards to their attitude towards mathematics, it was revealed that the learners are undecided on this aspect, meaning they neither agree nor disagree with the given statements about the attitude of learners towards mathematics. On the other hand, the academic achievement of students was obtained at a very satisfactory level for a mean of 86.21%. Meanwhile, the data suggested that the fathers' educational attainment has no significant effect on the academic achievement of students. But looking deeper through the result, it was found that gender and educational attainment of mothers have a moderate correlation to students' academic achievement having r-values of .443 and .503 respectively. The student's attitude toward Mathematics has a low significant bearing or correlation to students' academic achievement in the subject with an r-value of .325. Meanwhile, it was revealed that the mother's educational attainment has the greatest impact on the performance of learners in mathematics 10. Students can get a better learning result if besides being supported by teachers, they can receive full attention from their mothers on what they are learning. The findings of this study led to the recommendation that Mathematics teachers must consistently check the students' level of performance in mathematics to see whether they are performing well or not so that immediate intervention will be employed; every school personnel must inculcate positive attitude for it has significant effect to Math performance; schools must design an activity to engage parents especially mothers in the math activities in school so they can support their children at home and capacity building for teachers must be initiated by school instructional leaders for improved teaching performance.

**Keywords:** Academic achievement, Factors, Mathematics subject, Grade 10 students, Correlation

## INTRODUCTION

Attracting and growing good jobs relies on having a highly, educated and skilled workforce. That is why, we must start investing in our people as soon as possible by giving every child a world-class education. Here in the Philippines, the government is giving a lion's share of the proposed 2024 national budget amounting to Php758.6 billion to the Department of Education to realize the different programs of the Department of Education where Mathematics proficiency is one of her concerns (Loewenberg, 2003).

The curriculum in our country is periodically revised because of the rapid rate of change in education and the need to keep abreast with new and innovative developments. With implementing the MATATAG Curriculum, educators and curriculum planners believed that there would be balanced cognitive demands and clearer articulation of 21st-century skills. This aims to decongest the current K to 12 curriculum which includes a reduction in the number of competencies and is more focused on the development of foundational skills such as literacy, numeracy, and socio-emotional skills among younger learners (Kilag, et. al., 2024). Further, the country's basic education system is expected to be on "par with international standards. Thus, focus must be given to particular learning areas in the education system. One of the challenges of the education reform is to provide opportunities for children to develop 21<sup>st</sup> century core skills which include inventive thinking, focusing on adaptability or ability to manage complexity, curiosity, creativity, risk-taking, higher-order thinking skills, problem-solving, and sound reasoning. Children must develop these skills so they can have great careers in the future.

Mathematics is given an imperative emphasis in the curriculum because, among other reasons, it is a core subject. However, some people today still believe that mathematics is all about computation. However, with the rapid advancements in information and communication technologies, it has become necessary for people of all ages to reach, analyze, and apply mathematical knowledge effectively and efficiently to be successful citizens in our information age. In particular, learners need to be well-equipped with higher-order mathematical knowledge (Starja, 2022).

Tests were proven as the best determinants of learners' performance. It is measured by the extent to which one can cope with some constraints in schools. The mean percentage score of the school in Mathematics for the previous school year was below the standard passing rate of 75%. Likewise, for the past school years, Mean Percentage Scores of the learners in Mathematics showed a decreasing trend, hence there is a need to study the reason for this decline.

In an effort to understand the factors associated with Mathematics achievement, the researcher came up with this study.

### **Statement of the Problem**

This study aims to determine the factors affecting the academic achievement in Mathematics of Grade 10 students at Barobo National High School.

Specifically, the study seeks to answer the following questions:

1. What is the profile of the respondents in terms of:
  - 1.1 Gender
  - 1.2 Educational Attainment of Mother
  - 1.3 Educational Attainment of Father
  - 1.4 Attitude towards Mathematics subject?
2. What is the level of Mathematics achievement of Grade 10 students?
3. Is there a significant relationship between the profile of the respondents and their achievement in Mathematics?
4. What is the most influential factor on the performance of learners in Mathematics?

### **Significance of the Study**

The researcher believed that the study guarantees to be of significant value to the following:

*School Heads and Supervisors.* It may be utilized as a means of evaluating the effectiveness of the procedure in teaching so learners will have a positive attitude toward mathematics. The results and findings of the study

may be used in planning training programs for their teachers and even for themselves.

*Math Teachers.* This will make them realize their strengths and weaknesses in teaching by considering each learner as unique. She has then devised strategies to cultivate students’ interest in math as early as possible.

*Students.* This will help them understand the factor that has a great impact to their low performance in school so they can find ways to improve for the better.

*Parents.* The result of the study may serve as encouragement and reinforcement to help them identify the type of assistance the children need so they can contribute to the improvement of their children’s academic performance.

*Researcher.* This will help in the development of an intervention scheme or plan focusing on improving learners’ performance that could be used in all subject areas to improve their performance in school.

### Scope and Delimitation of the Study

The study primarily aimed to determine the learners’ gender, educational attainment of the mother, educational attainment of the father, and attitude as they relate to students’ performance in Mathematics 10 in Barobo National High School, Barobo, Llorente, Eastern Samar during SY 2023-2024.

Forty-eight samples were used in this study out of fifty-five Math 10 students who were officially enrolled this school year. Questionnaires were utilized to know the respondents’ profiles. Students’ final average grades in Mathematics 9 during the school year 2022-2023 were used as the basis of their academic achievement in school.

### Conceptual Framework

Figure 1 represents the conceptual framework connecting the grade 10 students’ profile to their Mathematics performance.

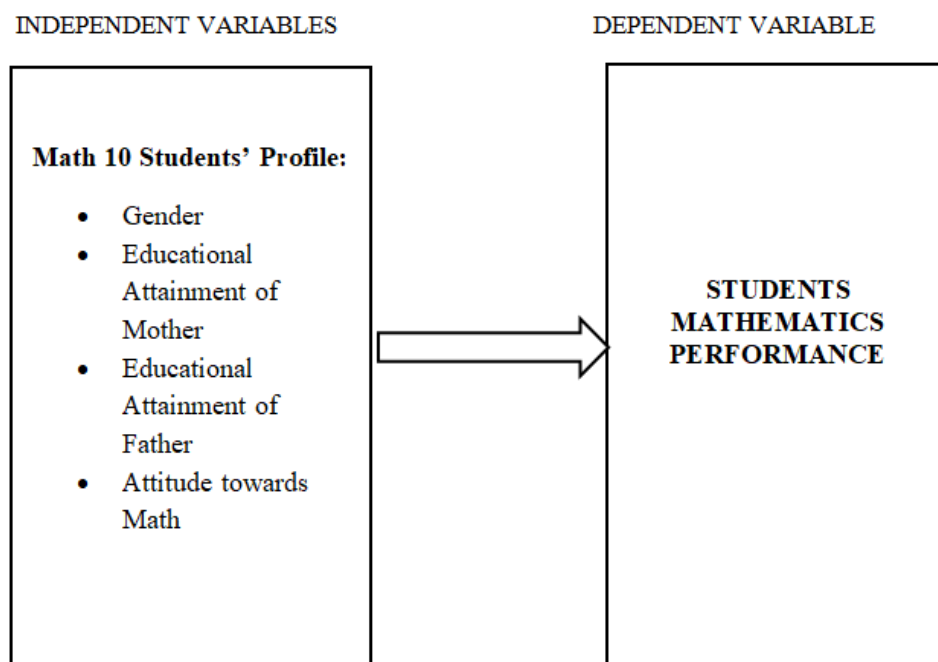


Figure 1. A schematic diagram showing the conceptualization of the study

### Hypothesis of the Study

The null hypothesis below was tested in the study.

There is no significant relationship between the profile of learners particularly their gender, educational attainment of their mother, educational attainment of their father, and attitude towards Mathematics to their academic achievement.

## METHODOLOGY OF THE STUDY

### Research Design

In this study, the correlational research design is considered appropriate to use. According to Suen, et. al. (2014), correlational research gathers data from individuals on two or more variables and then seeks to determine if the variables are related. Further, it is a quantitative research method that is used to test if a relationship exists between two or more variables (Kowalczyk, 2018). The data gathering instrument was a researcher-made questionnaire for the profile of the respondents while for the attitude towards Mathematics subject, a 20-item Math Attitude Scale (MAS) was utilized adopted from Aiken to assess the attitude of learners toward mathematics. The students' final grades in mathematics last school year 2022-2023 were taken from Grade 10 class advisers.

### Locale of the Study

The study was conducted in Barobo National High School, Barangay Barobo, Llorente, Eastern Samar. This is chosen by the researcher as the locale of the study since the researcher works there. Likewise, she is hopeful that the result of the study will be of great help to the school administration to be more innovative in assisting all learners to become competitive and effective.

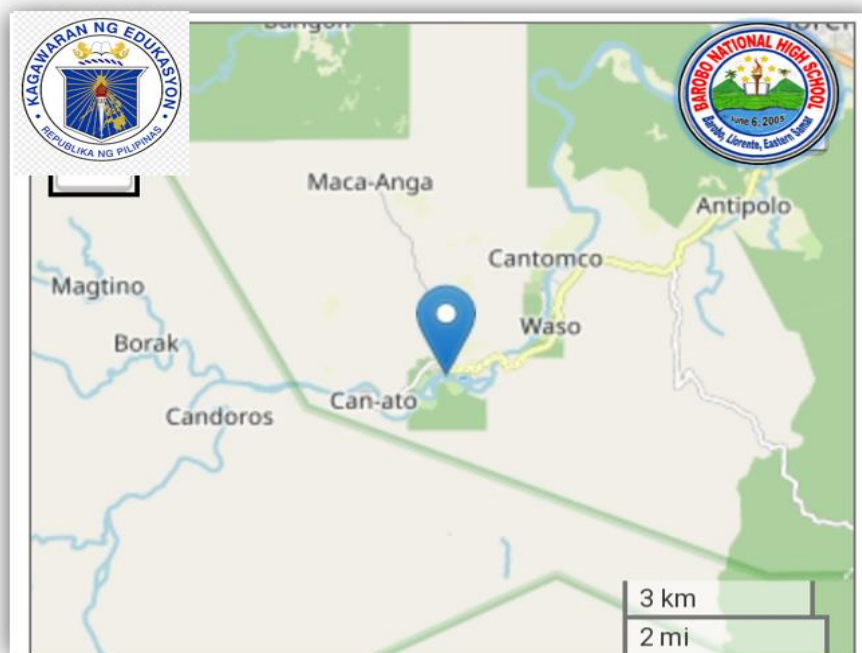


Figure 2. Map showing the locale of the study.

### Sampling Procedure

The identified respondents of the study were chosen from among fifty-five grade 10 who are officially enrolled this school year in Barobo National High School. Using the lottery method, each student of the grade 10 population was assigned a number, and these numbers were put in a bowl. After which numbers were selected at random between 1 and fifty-five in which forty-eight of those numbers were selected.

### Research Instrument

For the profile of the respondents, one set of researchers-made questionnaires were distributed to the

respondents. The mean percentage scores of the final average grades in Mathematics 9, the school year 2022-2023 were used to measure the academic performance of the grade 10 mathematics students. For the attitude toward mathematics, a twenty-item scale was utilized. The Mathematics Attitude Scale has a Cronbach's alpha value of 0.90 which is deemed to be an acceptable reliability. It uses a Likert-type scoring procedure where respondents will choose one of five alternatives from strongly agree to strongly disagree. The authors' scoring procedure points to ten items of a positive nature and ten items of a negative nature being summed to produce a single score.

### Data Gathering Procedure

The researcher asked permission to conduct the study from the Schools Division Superintendent and once approved, she also asked permission from the District in charge. Then she started doing the sampling in the school with the permission of the class advisers. She discussed the procedure with the mathematics teacher handling the two classes so they would be oriented on what to do. After this, the survey questionnaires were administered to the respondents. The final average grades in Math 9 were asked by the class adviser for this will serve as the basis for the student's academic achievement.

### Measurement of Variables

The data gathered were tabulated, scored, interpreted, and analyzed.

Final Average Grade in Math. Based on the grades of the students in Math 10, the students were categorized as follows:

<i>Code</i>	<i>Average Grades in Math</i>	<i>Qualitative Interpretation</i>
6	95 and above	Excellent
5	90-95	Outstanding
4	85-89	Very Satisfactory
3	80-84	Satisfactory
2	75-79	Fair
1	74 and below	Poor

Gender. The respondents were classified as male or female.

<i>Code</i>	<i>Interpretation</i>
1	Male
2	Female

Educational Attainment. In the scoring for educational attainment of parents, the following classification and interpretation were used:

<i>Weight</i>	<i>Qualitative Interpretation</i>
6	PhD
5	MA
4	College

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3	High School
2	Elementary
1	Early Childhood Education

Attitude Towards Math. The study used the Aiken Attitude Scales (Aiken and Dreger, 1961) to measure the attitude of students towards Mathematics.

<i>Code</i>	<i>Rating Scale</i>	<i>Interpretation</i>
5	4.20-5.00	Strong positive attitude
4	3.40-4.19	Moderate positive attitude
3	2.60-3.39	Neutral
2	1.80-2.59	Moderate negative attitude
1	1.00-1.79	Strong negative attitude

### **Analysis of Data**

The data gathered through the survey instrument were tallied, tabulated and statistically treated using different computations.

The frequencies of the educational qualification were determined with the corresponding percentage. Other statistical techniques like frequency count, percentage and Mean and Pearson Product Moment Correlation were used in the analysis of data.

The null hypothesis of this study was tested at  $\alpha = 0.05$  level of significance.

### **Ethical Considerations**

The research was carried out at a particular school where the respondents were Grade 10 learners to a survey questionnaire, and as such, ethical issues were considered during the research process. It is given the importance that when conducting research that involves human beings, concerns such as anonymity, confidentiality, respect, and dignity are top priorities. Thus, in doing this research, the researcher considered these facts as well. Since the respondents are minors, consent forms were given to parents and learners so that they would understand the purpose of the endeavor. Applications to conduct the study were also sought from higher offices of DepEd.

With regard to the privacy of the learners, they were instructed that they may or may not indicate their names in the questionnaire. All concerned participants of the study were assured that all data would be kept safe as the researcher worked on the project.

## **RESULTS AND DISCUSSION**

### **Profile of the Respondents**

Initially, this study was conducted to know the profile of Math 10 learners in terms of gender, the educational attainment of their mother, the educational attainment of their father, and their attitude towards Mathematics. The data are illustrated in Table 1.

### **Gender**

For the gender of the respondents, it can be gleaned from the table that most of the respondents in grade 10 are

female having several 26 (54%) while male respondents were 22 (46%) only. In the actual enrolment for grade 10, there are more male than female students but when respondents were randomly selected, more females were identified as respondents.

### Educational Attainment of Mother

With regards to respondents' educational attainment of their mother, the highest number was 31 (64.60%) wherein their mothers belong to High School. It may be grade 7, grade 8, and so on and so forth, or a graduate of secondary. Mothers who are elementary were 12 giving a percentage of 25.00%. On the other hand, 3 (6.30%) were categorized as college while two (2) mothers with a percentage of 4.20% were categorized under Early Childhood Education.

It is understood that living in a far-flung area did not offer greater opportunities for the mothers of the respondents to take higher education. Only 1 mother obtained a baccalaureate degree with a percentage of 2.00%. But it doesn't mean that these mothers are now educationally stagnant. They are taking short courses from TESDA so they can help their families to become economically stable.

### Educational Attainment of Father

Looking into the table, the distribution shows that the majority of the fathers of the respondents are categorized under elementary (32=66.70%). Then followed by high school (8=16.70%). The next rank is the fathers under Early Childhood Education (5=10.40%). Three (3=6.30%) fathers of the respondents were able to reach college level but no one graduated among them.

**TABLE 1**  
**PROFILE OF RESPONDENTS**  
(Gender, Educational Attainment of Mother, Educational Attainment of Father)

Variables	Frequency	Percent (%)
<b>• Gender</b>		
➤ Male	22	46.00
➤ Female	26	54.00
Total	48	100.00
<b>• Educational Attainment of Mother</b>		
➤ Early Childhood Education	2	4.20%
➤ Elementary	12	25.00%
➤ High School	31	64.60%
➤ College Level/Graduate	3	6.30%
Total	48	100.00%
<b>• Educational Attainment of Father</b>		
➤ No formal education/schooling	5	10.40%
➤ Elementary Level/Graduate	32	66.70%
➤ High School level/Graduate	8	16.70%
➤ College Level/ Graduate	3	6.30%
Total	48	100.00%

### Attitude Towards Mathematics

Table 2 presents the attitude of the respondents towards mathematics. The descriptive statistics show a weighted mean of 3.17% wherein is interpreted as undecided attitude. This tells us that the respondents were neutral or uncertain, meaning their attitude towards mathematics was fair. From the survey questionnaire, ten (10) items are negatively stated. These items are numbers 1, 2, 6,7,8,10,12,13, 16, and 17 and the remaining items are positive statements. Based from the presentation, tells us that 90% or 18 of the statements are categorized as neutral with statements 8 and 13 having the greatest mean of 3.38 while 10% or 2 indicators are

considered moderately positive as reflected in statements number 2 and 11 with mean of 3.5% and 3.42% respectively. In Andamon and Tan (2018), according to him, attitudes do not determine specific acts; rather, they may make a class of individual acting more or less likely to be engaged in. The result neither coincides nor contradicts with the study by Andamon and Tan (2018) that have shown the relational contributions of attitude to learning. Positive and negative attitudes vary in their impact on learning. The performance or achievement of learners may depend on the degree of influence of attitude on every learner. Further Prado (2018) in his study supports this notion that parents, teachers, and education personnel should exert extra effort to enhance the student’s study habits so they would develop a positive attitude toward mathematics.

**TABLE 2**  
**PROFILE OF RESPONDENTS**  
(Attitude towards the Mathematics Subject)

ITEMS	Mean	Descriptive Meaning	Qualitative Interpretation
1)I am always under a terrible strain in Math class.	3.0	Undecided	Neutral
2) I do not like mathematics, and it scares me to have to take it.	3.50	Agree	Moderate Positive Attitude
3) Mathematics is very interesting to me, and I enjoy math courses.	3.31	Undecided	Neutral
4) Mathematics is fascinating and fun.	3.21	Undecided	Neutral
5) Mathematics makes me feel secure, and at the same time it is stimulating.	2.98	Undecided	Neutral
6) My mind goes blank, and I am unable to think clearly when working math.	3.21	Undecided	Neutral
7) I feel a sense of insecurity when attempting mathematics.	3.19	Undecided	Neutral
8) Mathematics makes me feel uncomfortable, restless, irritable and impatient.	3.38	Undecided	Neutral
9) The feelings that I have toward mathematics is a good feeling.	3.15	Undecided	Neutral
10) Mathematics makes me feel as though I am lost in a jungle of numbers and can't find my way out.	2.98	Undecided	Neutral
11) Mathematics is something which I enjoy a great deal.	3.42	Agree	Moderate Positive Attitude
12)When I hear the word math, I have a feeling of dislike	3.25	Undecided	Neutral
13) I approach Mathematics with a feeling of hesitation, resulting from a fear of not being able to do math.	3.38	Undecided	Negative
14) I really like Mathematics.	3.19	Undecided	Neutral
15.) Mathematics is a course in school which I have always enjoyed studying.	3.17	Undecided	Neutral
16) It makes me nervous to even think about having to do a math problem.	3.10	Undecided	Neutral
17) I have never liked Math, and it is my most dreaded subject.	3.13	Undecided	Neutral
18) I am happier in a math class than in any other class.	2.69	Undecided	Neutral
19)I feel at ease in math, and I like it very much.	2.90	Undecided	Neutral
20) I feel a definite positive reaction to mathematics; it's enjoyable.	3.35	Undecided	Neutral
<b>Overall Mean</b>	<b>3.17</b>	<b>Undecided</b>	<b>Neutral</b>

**Level of Academic Achievement in Mathematics of Grade 10 Learners**

Table 3 manifests the mean academic achievement of grade 10 learners based on their final average grades in Mathematics 9 last School Year, 2022-2023 as presented in their respective school forms 9 and 10. The data gathered answered the second reason why this study was conducted which was to determine the level of Mathematics achievement of Grade 10 students.



The academic achievement of students was measured using the mean percentage scores of the forty-eight respondents. As revealed in Table 3, twelve students obtained an outstanding rating whose grades range from 90-95 percent, twenty-one students were found to fall under the category of “very satisfactory” whose average ratings is from 85-89 percent, fourteen were part of the category of “satisfactory” with ratings from 80-84 percent while one student obtained a fair rating which is equivalent to grades from 75-79 percent. Consequently, the level of academic achievement of students has a mean percentage of 86.21% and interpreted as very satisfactory.

**TABLE 3. Academic Achievement of Grade 10 Learners Mathematics**

Average Grades	Frequency	Percent (%)
95 and above (Excellent)	0	0.00%
90-95 (Outstanding)	12	25.00%
85-89 (Very Satisfactory)	21	43.80%
80-84 (Satisfactory)	14	29.20%
75-79 (Fair)	1	2.10%
74 and below (Poor)	0	0.00%
TOTAL	48	100.00%

Mean/Interpretation: 86.21% / Very Satisfactory

### Relationship Between the Profile of the Respondents and their Achievement in Mathematics

An analysis to identify the relationship between variables was done next. It focused on establishing relationships between the respondents’ profiles such as gender, educational attainment of mother, educational attainment of father, attitude towards Mathematics, and their academic achievement.

From the table, correlation analysis revealed that there is a significant relationship between students’ academic achievement in Mathematics to their gender. The coefficient correlation obtained was .443 signifying a moderately strong correlation. This finding supports the study of Sutoyo, et.al., (2023) who stressed that girls’ achievement in Mathematics surpassed that of boys. In this study, more females were included as samples than males having a percentage of 54.00%. These statistics coincide with gender statistics reported by the UNESCO Institute of Statistics saying that there is a significant rise in females than males.

On the other hand, the mother’s educational attainment is a contributory factor to the performance of students in Math having an r-value of .503. The result of the study bears the same findings as other research works wherein they conclude that a mother’s educational attainment significantly affects the educational attainment of students. Likewise, the findings of this research are parallel to the study conducted by Brown & Alexandersen (2020) which it showed that a moderate positive correlation existed between Math performance and parents’ educational attainment where the mother’s educational attainment best-predicted Math performance.

However, no significant relationship existed between the father’s educational attainment and the student’s academic achievement in Math. In other words, whether a father obtained a diploma or not, it will not affect the performance of the student in a math class. This contradicts the notion of Huesmann (2019) who believed that the father’s educational attainment when a child is in his elementary years will predict his success when he reaches the age of 18.

Further, students’ attitude towards Mathematics has a significant effect to students’ academic achievement in Mathematics. They emphasized that if the students’ attitude towards mathematics is positive, then it is more

likely that the students will perform better in that particular subject. He supported the idea that if the attitude of a learner is high, his performance is also high. But a negative attitude will result to poor performance in a class, particularly in Mathematics.

Lastly, among the four variables, the educational attainment of the mother has been identified as the predictor having the greatest impact on the performance of learners in Mathematics. This may maybe due to the fact that the mother is the first teacher in every family who is responsible for every development of learning mathematics. The mother plays a crucial role in shaping the mind of the child for she has the sensitivity and attention to the child’s learning pattern. She stays most of the time with her children, thus giving her the chance to teach and share her knowledge to her offspring and supervise their learning activities.

**TABLE 4**

Relationship between the Profile of the Respondents and their Achievement in Mathematics

A.) Correlation Between Gender and Academic Achievement					
1 <sup>st</sup> Variable	2 <sup>nd</sup> Variable	r	p-value	Decision	Interpretation
Gender	Math Academic Achievement	.443	.002	Reject Ho	Significant
B.) Correlation Between Mother’s Educational Attainment and Academic Achievement					
1 <sup>st</sup> Variable	2 <sup>nd</sup> Variable	r	p-value	Decision	Interpretation
Mother’s Educational Attainment	Math Academic Achievement	.503	.000	Reject Ho	Significant
C.) Correlation Between Father’s Educational Attainment and Academic Achievement					
1 <sup>st</sup> Variable	2 <sup>nd</sup> Variable	r	p-value	Decision	Interpretation
Father’s Educational Attainment	Math Academic Achievement	.072	.625	Accept Ho	Not significant
D.) Correlation Between Attitude Towards Math and Academic Achievement					
1 <sup>st</sup> Variable	2 <sup>nd</sup> Variable	r	p-value	Decision	Interpretation
Attitude Towards Math	Math Academic Achievement	.325	.024	Reject Ho	Significant

## CONCLUSION

The results drawn from this study have significant implications in which gender, mothers’ educational attainment, and attitude towards mathematics played very important roles in the academic achievement of learners. Females are considered better performers in math class than boys. According to another study, females tend to develop study habits which ultimately lead them to be good performers in class. On the other hand, with the help of mothers, teachers can make their learners perform at their best. The mothers are usually so hands-on when it comes to taking care of their children involving giving moral support and showering their children with unconditional love. This paved the way for students to excel more in the class resulting in improved academic performance. On the other hand, the attitude also of a learner is a determinant of his/her performance in school. According to a previous study, students who have positive attitudes toward Mathematics performed well in the class (Ajisuksmo and Saputri, 2017). In the same vein, a positive attitude translated to enjoyment in attending classes in Mathematics significantly predicted students’ performance (Mazana, et.al.,2019). However, their attitude becomes less positive as the students move forward to a higher level of learning.

## RECOMMENDATIONS

1. Other researchers may conduct further studies similar to this study but may involve other possible predictors of Math performance like contextual factors (e.g., teacher's instructional competence, the design of the curriculum, or the teaching methods). They may also utilize a bigger sample size so one can draw a more comprehensive, valid, and reliable result.
2. Mathematics teachers must consistently check the students' level of performance in mathematics to see whether they are performing well or not so that immediate intervention will be employed.
3. Every school personnel must always inculcate a positive attitude towards Math among learners for it has a significant effect on Math performance. You may use other academic interventions and apply the school's best practices to sustain if not improve the academic achievement.
4. The school must design activities engaging parents especially the mother in the exploration of Mathematics through a school-family partnership program. Attendance of parents to school portfolio day must be sustained throughout the school year so they will know the performance of their children in school.
5. Teachers must continuously educate themselves by attending capacity building so they will enhance their teaching strategies and learn the latest trends in education like the practice of digital instruction.

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