

Logistic Analysis on Students Attitude in Mathematics

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Abstract:- This study aimed to determine the influence socio-demographic variables and factors on students' attitude in mathematics. A total of 90 students in the public schools in Davao City division were identified through stratified random sampling. The study utilized a descriptive-predictive design. Adapted survey questionnaires which focused on parental influence, teachers emotional support, and attitude were utilized in the gathering of data. Frequency and Percentage, Mean, and Logistic Regression analysis were used as statistical tools of the study. Results revealed that the socio-demographic profile of students showed higher number of female respondents than their male counterpart. Most student-respondents were 16 years old and above. Also, the level of the factors revealed very high ratings on parental influence, teachers emotional support, and attitude. Teachers emotional support and attitude obtained the highest mean rating while parental influence recorded the lowest mean rating. Additionally, the profile of students' attitude in mathematics showed higher number of students who have very satisfactory attitude in mathematics. Further, teachers emotional support and parental influence significantly influenced students' attitude in mathematics. Teachers emotional support has the highest degree of influence to the attitude of students in mathematics.

Keywords:- Attitude, Mathematics, Parental Influence, Emotional Support, Students, Davao City, Philippines.

I. INTRODUCTION

In the modern world, Mathematics is used in a variety of contexts, including the economy of a nation, building construction, marking, and appraisal of people. It is accurate to claim that Mathematics has played a significant role in establishing the fast-paced lifestyle with all of its comforts and pleasures. One could not survive in the real world without Mathematics. It is applied to buy the things we want, measure, tell the time, and so forth. The foundation in Mathematics is important from simple to more complex topics like Geometry, Algebra, and the metric system. One could not survive in the real world without Mathematics. Despite its importance and contributions, many students claim that they detest Mathematics and that it is a pointless, boring, and even difficult subject (Abalde & Oco, 2023).

In Cameroon, students' performance in Mathematics at the High School has not been encouraging of late. Candidates are reported to exhibit poor understanding of Mathematical concepts and are unable to form the appropriate Mathematical models which could be tackled with the requisite skills. It has also been realized that many students have developed negative attitude towards the study of Mathematics as a result of mass failure of students in the subject (Ngeche, 2017).

Further, Filipino students were among the lowest performing groups of students among all the participating countries in the 2018 Programme for International Student Assessment (PISA). In mathematics, less than 20% of students demonstrated the minimum proficiency level (Level 2), while more than 50% showed very low proficiency (below Level 1). Scoring below the lowest level of proficiency in the PISA, these Filipino students have been clearly left behind in terms of mathematics education; more than half of this age group of Filipino students have inadequate mathematical skill compared to their peers in other parts of the world. The poor performance in mathematics also varied in degree between the students in public and private schools, where the means were 343 and 395, respectively (Department of Education 2019).

The related literature revealed the scarcity of studying students' attitudes towards math. Tapia and Marsh (2000a) indicated that there is not enough focus on the students' attitudes towards mathematics, even though remarkable attention was given to students' performance, mistakes, and test scores. Additionally, previous studies have suggested the use of a person-centered approach to identify profiles in students' attitudes toward mathematics (Berger et al., 2020). The focus of person-centered approaches is on the categorization of individuals into distinct groups according to their responses to several variables (Parker et al., 2021).

With the above manifestations, the researcher is prompted to pursue this study since it is important to determine factors influencing students' attitude in mathematics. There are studies that pointed out factors influencing students attitude in mathematics, however it failed to incorporate the combined influence of parental influence, teachers emotional support, and attitude. The success of this study will provide substantial information on how to manage attitude of students in learning mathematics since performance of students in this subject is a big challenge that needs an immediate solution. Therefore, this study is put on urgent notice.

The study aimed to determine whether socio-demographic profile, parental influence, teachers emotional support, and attitude significantly influence students' attitude in mathematics. Specifically, it sought answer to the following questions:

- What is the socio-demographic profile of students?
- What is the level of the factors affecting students' attitude in mathematics in terms of:
 - Parental influence,
 - Teachers emotional support, and
 - Teachers' attitude?
- What is the profile of students' attitude in mathematics?
- Do parental influence, teachers emotional support, and attitude significantly influence students' attitude in mathematics?

➤ *Hypotheses*

The hypothesis was tested at alpha 0.05 in the level of significance:

Ho 1: Parental influence, teachers emotional support, and attitude do not significantly influence students' attitude in mathematics.

II. METHOD

This study utilized descriptive-predictive design. Descriptive design allows the researcher to study and describe the distribution of one or more variables, without regard to any causal or other hypotheses (Aggarwal & Ranganathan, 2019). In the context of the study, this described the socio-demographic profile of the respondents, parental influence, teachers emotional support, and attitude, and students' attitude towards mathematics.

Meanwhile, predictive design determined the prediction capability of a given variable (Pandita, 2012). Thus, this design demanded that the researcher must have a predictor variable and a criterion variable. As a result, this design was significant in studies which aimed at forecasting a given phenomenon. Specifically, this utilized a logistic regression design. Logistic regression is a type of statistical model (also known as logit model) is often used for classification and predictive analytics. Logistic regression estimates the probability of an event occurring, such as voted or didn't vote, based on a given dataset of independent variables. In the context of the study, this determined the significant influenced of the socio-demographic variables, parental influence, teachers emotional support, and attitude on the students' attitude in mathematics.

In this study, Junior High School students in Davao City division served as the respondents. A total of 90 students were utilized as the respondents following the sample formula developed by Tabachnick and Fidell (2007) in performing regression analysis. The formula is $n = 50 + 8(m)$ where 50 and 8 were constant numbers while m represents the number of independent variables. In this regard, the independent variables were socio-demographic profile such as age, gender, parental influence, teachers

emotional support, and attitude. Hence, there were 5 indicators of independent variables, the resulting sample size is 90.

The students were selected via stratified random sampling. Stratified random sampling (also known as proportional random sampling and quota random sampling) is a probability sampling technique in which the total population is divided into homogenous groups (strata) to complete the sampling process. Each stratum (the singular for strata) is formed based on shared attributes or characteristics such as level of education, income and/or gender. Further, inclusion and exclusion criteria were observed in this study. The inclusion criteria covered students who were enrolled in School Year 2023-24 under the public schools in Davao City division. These students have displayed poor performance in mathematics and seemed to have a negative perception about mathematics.

Adapted survey questionnaires pertaining to factors influencing students' attitude in mathematics was employed. These factors were parental influence, teachers emotional support, and attitude. Parental influence questionnaire was taken from Cao et al., (2005) composed of 16 items. Additionally, teacher emotional support was adapted from Schenke et al., (2015) with 15 items, and teachers' attitude was taken from Asli and Zsoldos-Marchis (2022) with 18 items. Further, the questionnaires were subjected to content validation by a panel of experts. These experts were the Chairman of the panel, members of the panel, and one expert-validator from other institution. The experts rated the questionnaire based on criteria. Comments and suggestions from the experts were given weight by the researcher. Prior to the final administration, the questionnaires were subjected to pilot testing. The reliability index of parental influence questionnaire was .941, teachers emotional support with .934, and teachers attitude towards mathematics with .961.

The data gathering mechanisms for this study involved several key steps. First, a written letter requesting permission to conduct the study was submitted to the Dean of the Graduate School of Rizal Memorial Colleges and the Office of the Division Superintendent. Once approved, the letter was presented to the principals of the respondent schools where the students were enrolled. Next, the survey questionnaires underwent content validation and pilot testing. Expert validators assessed the items based on specific criteria, providing feedback and signatures in a face-to-face setup. Following validation, pilot testing was conducted with 25 students not included in the main study to assess the instrument's reliability, with excellent results. The survey questionnaires were then administered using both face-to-face and online modalities, allowing respondents sufficient time to complete them. Additionally, questionnaires could be handed personally to respondents or placed in a dropbox for pick-up and return. Completed questionnaires were collected either online, in person, or via the dropbox. Finally, the results were analyzed and interpreted using statistical treatments.

This research strictly adhered to ethical standards to safeguard the well-being and rights of the respondents. Informed consent was obtained from all participants, with a clear explanation of the study's objectives, potential risks, and confidentiality measures. Participation was entirely voluntary, allowing respondents the freedom to withdraw at any time without consequences. The research team took great care to ensure data anonymity and handled any sensitive information with the utmost discretion, maintaining the highest standards of ethical conduct throughout the study.

Frequency and Percentage, Mean, and Logistic Regression Analysis were the statistical tools used to answer the research questions.

III. RESULTS AND DISCUSSIONS

➤ Socio-demographic Profile of Students

Table 1 presented the socio-demographic profile of students-respondents. This comprised of age and gender. In terms of age, the highest percentage of belongs to students who are 16 years old above with 28.90 or 26 percent. On the other hand, the lowest percentage is obtained by students who are 14 and 15 years old with 21 or 23.30 percent. This means that most of the surveyed respondents are 16 years old and above.

Another socio-demographic profile variable of the students-respondents is gender. The result showed higher percentage of female with 53.30 or 48 compared to male respondents with 46.70 or 42. This means that higher proportion of the surveyed respondents is female.

Table 1. Socio-demographic Profile of Students

Socio-demographic Variables	Frequency	Percentage
Age		
13	22	24.40
14	21	23.30
15	21	23.30
16 and above	26	28.90
TOTAL	90	100
Gender		
Male	42	46.70
Female	48	53.30
TOTAL	90	100

➤ Summary on the Level of the factors affecting students' attitude in Mathematics

Table 2 presented the summary of the level of the factors influencing students' attitude in mathematics which are measured by three indicators namely: (1) parental influence, (2) teacher emotional support, and (3) teacher's attitude. The mean ratings of these indicators are as follows: (1) parental influence (4.70) which was described as Very High, (2) teacher emotional support (4.75) which was described as Very High, and (3) teacher's attitude (4.75) which was described as Very High. Result shows that both teacher's emotional support and attitude garner the highest

mean rating of 4.75 or very high while parental influence records 4.70 or very high. Thus, the teacher's emotional support and attitude are always observed.

Table 2. Summary of the Level of the Factors Influencing Students Attitude in Mathematics

No.	Factors	Mean	Descriptive Interpretation
1	Parental Influence	4.70	Very High
2	Teacher Emotional Support	4.75	Very High
3	Teachers Attitude	4.75	Very High
	OVERALL MEAN	4.73	Very High

The result agrees with the findings of Tang and Tran (2023) revealed that parental involvement and expectations positively affect students' mathematics achievement. Parental involvement negatively impacts students' attitudes toward mathematics; however, parental expectations positively impact students' attitudes toward mathematics. Parental involvement decreases students' negative self-esteem, while parental expectation increases students' negative self-esteem. Notably, parental involvement helps weaken students' anxiety in mathematics, but the more anxiety students have, the lower their mathematics achievement.

➤ Profile of Students Attitude in Mathematics

Presented in table 3 is the profile of students' attitude in mathematics. This is classified as very satisfactory and poor. The result shows that higher percentage of students (61.90 percent) have very satisfactory attitude in mathematics while 38.90 percent have poor attitude in mathematics.

Table 3. Profile of Students Attitude in Mathematics

Attitude	Frequency	Percentage
Very Satisfactory	55	61.10
Poor	35	38.90
TOTAL	90	100

The result affirms the statement of Brezavšček et al., (2020) and Mazana et al., (2019) that attitude towards mathematics is a crucial factor that was examined by many researchers. Mata et al., (2012) found that high school students are identified with a generally positive attitude towards math. In addition, students' achievement in math is influenced greatly by their attitudes. It was found that students' attitudes towards mathematics affect students' learning process and their academic performance (Heilbronner, 2013). When metacognitive awareness was linked to attitude towards mathematics, it was found to impact students' achievement (Ajisuksmo & Saputri, 2017).

➤ Significant Influence of Socio-Demographic Profile and Factors on Students Attitude in Mathematics

Table 4 highlights the influence of the socio-demographic variables and factors on the attitude of students in mathematics. The results showed that parental influence obtained an exponentiated beta of 1.165 with a p-value of

.012. This means that for every increase in the parental influence, 1.165 times are more likely students will obtain a very satisfactory attitude in mathematics. Also, teachers emotional support tallies an Exponentiated beta of 2.235 with a p-value of .025. This indicates that for every increase in the teachers’ emotional support, 2.235 times more likely students will obtain a very satisfactory attitude in mathematics. Further, the result indicates that teachers emotional support and parental influence significantly influenced the students attitude in mathematics.

Furthermore, the Omnibus test records a Chi-square value of 5.362 with a p-value of .016 indicating significant. This indicates that the model with variables performs better with the null model. In addition, the Cox and Snell and Nagelkerke R-squared indicated .058 and .078 respectively. These are the variances explained by the predictor variables regarding the student’s attitude in mathematics.

Table 4. Significant Influence of Socio-Demographic Profile and Factors on Students Attitude in Mathematics

Mathematics Attitude					
Factors	B	S.E	Wald	Sig.	Exp (B)
Constant	-2.528	3.638	.483		
gender(1)	.350	.483	.525	.469	1.419
Age			4.554	.208	
age(1)	1.093	.687	2.528	.112	2.982
age(2)	-.315	.628	.251	.616	.730
age(3)	.427	.614	.483	.487	1.532
Parent’s Influence	.153	1.385	.012	.012	1.165
Teachers emotional support	.804	1.265	.405	.025	2.235
Teacher’s attitude	-.425	1.495	.081	.776	.654
Chi-square	5.362				
p-value	.016				
Cox and Snell R2	.058				
Nagelkerke R2	.078				

The result supports the findings of Lara and Saracosti (2019) that highly involved parents had children who had higher academic achievement than those whose parents are low involved. The performance of students in mathematics is still a topic of concern because knowledge of mathematics is viewed globally as very important since, through this discipline, students acquire accuracy, consistency, and mental discipline- essential skills required for a problem-solver and critical thinker individual in today’s world and the expressing concerns about under achievement in mathematics (Abin et al., 2020).

IV. CONCLUSIONS

From the findings of the study, the following conclusions were drawn:

- The socio-demographic profile of the teachers which was composed of age and gender, most of the student-respondents were female and were 16 years old and above.
- The level of the factors influencing students’ attitude in mathematics in terms of parental influence, teachers emotional support, and teacher’s attitude was described as very high which also means that it was always observed.
- Higher percentage of students have very satisfactory attitude in mathematics.

- Among the variables that affects the attitude of student’s towards mathematics, Teachers emotional support and parental influence significantly influenced students’ attitude in mathematics.

RECOMMENDATIONS

From the conclusions drawn, the following recommendations are offered.

- School administration should develop programs or activities that will encourage and entice students to engage in learning math activities.
- Teachers should design appropriate activities for students who have demonstrated negative attitude in mathematics. In this manner, students who hate mathematics will be given chance to engage and love the subject.
- Intensify monitoring from teachers and parents regarding students’ performance in mathematics and provide peer tutoring sessions to students who dislike mathematics.
- Students should elicit increase engagement since teachers are encouraged to design activities that will allow students to fully participate in math class. In doing so, students should enhance participation and commitment in mathematics activities. Explore other

variables that may influence students' attitude in mathematics.

- The results of the study will be used as basis by future researchers to test the influence of the variables to other attitude towards a subject related concerns. Similar studies may be conducted to validate its findings.

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