

Short Paper

Attitude towards Mathematics and Mathematics Achievement of Secondary School Learners in Banayoyo-Lidlidda District

Regie R. Naungayan
Department of Education, Philippines
regie.naungayan@deped.gov.ph

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Abstract

The study aimed to assess and find the relationship between the attitude of high school students towards mathematics and their level of achievement in the subject. It made use of the descriptive correlation design with a validated questionnaire and documentary analysis as its main data gathering tool. Gathered data were analyzed and interpreted using weighted mean, and Pearson r . The attitude towards mathematics as reflected by the responses of the students was described as positive. Moreover, the mathematics achievement of the students is approaching proficiency level. Results revealed that a student's attitude towards the subject is related to their performance in the subject. Studies related to the subject matter may be conducted to testify to the results of this current study. Additional variables may be included to enhance the scope.

Keywords – attitude towards mathematics, mathematics achievement, secondary schools

INTRODUCTION

Mathematics is present everywhere. Whether one does the shopping, managing money, understanding sports, doing some basic household chores, and in work, math is performed or applied. These show the importance of mathematics and studying it from early childhood education level to college.



However, when students are asked about Mathematics, they say it's hard and difficult to deal with (Kislenko, Grevholm & Lepik, 2007). Students' exposure to numbers and all mathematical concepts is like bringing them to another incomprehensible dimension. Complex numbers and mind-boggling formulas make students focus more on its difficulty rather than its essence and importance. These have been the existing struggles in the field of Mathematics.

With the success and failures students experience, an attitude towards the subject is developed. Attitude towards mathematics can either be positive or negative. Zan and Martino (2007) defined a positive attitude as a positive emotional disposition toward the subject while a negative attitude is a negative emotional disposition toward the subject. Moreover, a positive attitude towards the subject is more often associated with success in Mathematics, while the negative attitude is seen as an indicator of low-level performance, which brings out suggestions on interventions to improve learning and replacing the 'negative' attitude with 'positive'.

On the other hand, in the most recent Programme for International Students Assessment (PISA) result released in December 2013, taken by 510,000 students from 65 participating countries around the world, Asian countries like Shanghai – China, Singapore, Hong Kong, Taiwan, and Korea emerged to be on top in Mathematics category (Dela Cruz, 2013). On the contrary, Thailand, Malaysia, and Indonesia ranked 50th, 52nd, and 64th, respectively (Fry, 2013). The Philippines, however, did not participate in the said international survey since the last TIMSS participation in 2003 where the country ranked at the bottom. In a 2008 survey under the Advanced Mathematics category, the Philippines still ranked lowest among 10 countries though the participants came from the science high schools (Jalmasco, 2014).

Based on the 2015 National Achievement Test, the mean percentage scores of the high school students from Banayoyo and Lidlidda NHS dropped to an utmost 54.44% from the 2014 NAT result. This shows a great deficit in the performance of the students under Mathematics for the year presented. This calls for immediate action and study to elevate the mathematical competency and achievement of the students. Even inside the classroom, students find it difficult to comprehend simple computations, much more with the semi-complicated ones. Students also find word problems very difficult. They know how to identify the main problem in the text but they cannot formulate a plan to solve the given word problem.

This scenario prompted the researcher to conduct a study that aims to look at a possible factor that affects mathematical achievement – that is the student's attitude towards the subject.

Statement of the Problem

This study is directed towards the discovery of the attitude of secondary school students in Banayoyo-Lidlidda District as well as their mathematics achievement.

It specifically aimed to provide significant answers to the following questions:

1. What is the attitude of the students towards Mathematics?
2. What is the level of mathematics achievement of the students as reflected in their grades?
3. Is there a significant relationship between Mathematics achievement and attitude towards the subject of the students?

LITERATURE REVIEW

ATTITUDES TOWARDS MATHEMATICS

Ayuman-Valdez and Guiab (2015) concluded that the Grade VI pupil-respondents have a positive attitude towards Math and pupils see it as interesting and contributory to their development in terms of the subject. Villanueva (2009) had similar findings, though he used high school respondents, which he also concluded that most students have a positive attitude towards the subject and a clear indication of lesser fear of their Math subject. Dela Cruz (2018) also revealed that students have a positive attitude and beliefs towards the subject.

In contrast, Jenkins (2006) reported a negative attitude towards mathematics among her students. Many of them would rather work with other subjects than math. According to her, this might be caused by the poor linkage between math concepts and their real-world importance. Suan (2014) found that the attitude and interest of the respondents towards Mathematics is almost negative. Students view the subject as boring, difficult, and has no relevance to their daily lives.

Considering gender, the study of Mohamed and Waheed (2011) reveals no significant difference between the perceptions of attitude towards mathematics from both genders. Mata, Montiero, and Pexieto (2012) confirm that gender-related attitudes are identical. Against the findings of the previous study, results from the study of Asante (2012) revealed that there exists a significant difference in the attitudes shown towards Mathematics between boys and girls. Supporting this, Barham (2002) discovered that male Jordanian students have a more positive perception towards Mathematics than females.

Other factors such as school environment, attitudes, and beliefs of teachers, teaching strategies, parental attitudes are known factors that influence attitude towards the subject of the students (Asante, 2012).

RELATIONSHIP BETWEEN ATTITUDES TOWARDS MATHEMATICS AND MATHEMATICS ACHIEVEMENT

Individual factors such as attitude towards mathematics significantly affect the mathematics achievement of the students (Andaya, 2014). This conforms to the conclusion in the research conducted by Patena and Dinglasan (2013) where the attitude towards the subject is a significant factor that affects students' achievement. Moreover, it was indicated that the respondents have a positive attitude in Mathematics. Positive attitudes towards mathematics denote interest or feeling towards studying mathematics. However, even if the students try to develop positive attitudes in Mathematics, they find it hard to learn the subject.

The study of Suan (2014) agrees as it was concluded that student factors, like study habits, attitudes and interest towards mathematics, and time management, significantly contribute to success in mathematics. This is the same as the study conducted by Dela Cruz (2018). The study claims that students who manifest a positive attitude and belief towards the subjects tend to perform better.

Hemmings, Grootenboer, and Kay (2011) studied the probable correlation between mathematics achievement and attitude towards Mathematics among Australian secondary school students. Their study disclosed that female learners are more likely to have a better perception of Mathematics compared to their male counterparts. Additionally, the relationship between mathematics achievement, as reflected in the LANNA Numeracy and Reading test results, and attitude towards mathematics is found to be to a great extent.

Supporting the previous studies, a significant relationship between achievement and attitude towards mathematics was also found in the study conducted by Mohd, Mahmood, and Ismail (2011). The overall attitude towards mathematics was seen to be at a medium level. Moreover, the study showed that the level of patience towards problem-solving and mathematics achievement have a significant relationship but the student's level of confidence towards problem-solving posted no significant relationship with their achievement.

On the other hand, Al-Agili, et al. (2012) found a weak association between mathematics achievement and attitude towards the subject. Though the correlation coefficient was positive, it yields no significant relationship. It was supported by Barham (2002), who found out that one's attitude towards Mathematics does not affect his/her achievement in the subject. Concerning attitude towards mathematics, Flynn (2013) found inconsistency in the results of some studies. She added that results are only representative of the population.

Ayuman-Valdez and Guiab (2015) studied the possible predictors of mathematics performance of grade six pupils of Cauayan Northeast District. Most of the pupil-respondents

obtained a general average described as 'Approaching Proficiency', numerically 80–84, while next in number are those whose average is described as Proficient or 85–89. In this study, it was found out that the impression of the mathematics teachers significantly influences the achievement of students. A possible intervention program to attain a better impression of the students to their teachers was asserted to obtain a better performance. Predictors like attitude, success orientation, and self–confidence to mathematics performance yielded a slight correlation while defense orientation and Math self–perception showed no relationship; all are insignificant.

Despite the excellent performance of Singaporean students in TIMSS assessments, self-concept in learning mathematics and valuing mathematics is low among the Singaporeans compared to the international average (Mohammadpour, 2012). Results indicated that attitudinal factors are the strongest predictors of achievement which leave personal, family background factors, and self–concept following.

From the study of Hamid, et al. (2013) it was found that math anxiety and test stress significantly affect mathematics achievement of Brunei secondary school students. It is stated that these two psychological factors are effective barriers to the performance of the students.

The results of studies relating to mathematics achievement of the students at any level of learning show the factors which may contribute to the success or failure of students in this particular subject. This current study eyes the probable correlation between attitude towards mathematics and the student's mathematics achievement.

METHODOLOGY

RESEARCH DESIGN

This study used the descriptive–correlation research design. The research design is a combined description and correlational design where theories or concepts gathered were used to describe a certain phenomenon and were subjected to a correlational strategy to see significant associations. Its main data gathering tool is a survey questionnaire used in describing the variables in the study. Moreover, this included the correlation between variables to see significant relationships that affect one variable to another.

POPULATION AND LOCALE OF THE STUDY

The respondents of the study were 273 students from the two public secondary schools: Banayoyo NHS and Lidlidda NHS. Students were chosen using Slovin's Formula and the random sampling technique. The following table shows the population and the number of samples taken per school.

Table 1. Distribution of Student-Respondents

Schools	Population	Sample
Banayoyo National High School	488	155
Lidlidda National High School	371	118
Total	859	273

RESEARCH INSTRUMENT

To collect the necessary information to complete this study, the data gathering instruments were the following:

A survey questionnaire was used with 40 items under the Attitude towards Mathematics Inventory (ATMI) adopted from Tapia (1996). This is a checklist of items that constitute the attitude of the students in the specified subject. The students respond to a given item by checking the description (Very Strongly Agree, Strongly Agree, Agree, Disagree, or strongly Disagree) which best describes/represents their thought. The instrument was subjected to validity and reliability tests. It scored a mean rating of 4.30 under the validity test, while 0.92 reliability was obtained via Cronbach Alpha.

For the students' grades, documents such as class records and a summary of grades were obtained from the subject teachers, with permission from the school administration.

DATA GATHERING PROCEDURE

The researcher wrote a letter asking for permission from Mr. Jorge M. Reinante, the Schools Division Superintendent of the Schools Division of Ilocos Sur to conduct the actual survey via questionnaire to the respondents.

For the conduct of the data gathering, the researcher personally asked permission and requisition of copies of documents such as grading sheets and class records from the two principals of the responding schools. The questionnaires were personally distributed to the students.

STATISTICAL TREATMENT OF DATA

To treat and analyze the data gathered, the following statistical tools were utilized:

- Frequency count and percentages were employed to describe the profile of the respondents in terms of the level of proficiency in Mathematics.
- Weighted Mean Was utilized to describe the level of Mathematics achievement, attitude towards Mathematics of the students.
- Pearson's Correlation (r) was used to determine the relationship between the level of Mathematics achievement and attitude towards Mathematics.

RESULTS AND DISCUSSION

Table 2 shows the result of the Attitude towards Mathematics Inventory by the student-respondents. This includes the mean score of each item and descriptive rating, including the overall mean rating.

It can be gleaned from the table that the highest recorded mean score is 4.22 described as Very Strongly Agree which is attained by the items “I want to develop my mathematical skills.” and “Mathematics helps develop the mind and teaches a person to think.” The item “Mathematics is one of the most important subjects for people to study.” has registered a mean score of 4.17 which is interpreted as Strongly Agree. Meanwhile, the lowest tallied mean score is 1.89 described as Slightly Disagree, garnered by the item which states that “I am never confused in my mathematics class.” The overall mean of 3.02 registers a descriptive rating of Positive which visibly signifies an affirmative perception of the students towards the named subject area.

Students find the subject sometimes confusing and complicated. Despite these perceptions, they still see Math as an important subject they need to study to go to a higher level of learning. Students see Mathematics in everyday living and its importance to everyone.

In support, Schenkel (2009) found out that learners from St. Mary's School presented a positive attitude towards their mathematics subject except those who are in the eighth grade. It is further confirmatory to the findings of Ayuman-Valdez and Guiab (2015) and Villanueva (2009). Learners find the subject interesting and contributory to their development thus indicating lesser fear towards the subject area. Conversely, Jenkins (2006) and Suan (2014) reported a negative attitude towards Mathematics. Their respondents revealed that they would rather work in other areas than in Math. They view it as boring, difficult, and has no relevance to their daily lives. According to Jenkins (2006), this might be due to the poor linkage between the learned mathematical concepts and the real-world application.

The level of mathematics achievement of the students is being presented in Table 3. Table 3 revealed 92 or 33.70% of the student-respondents obtained final grades equivalent to 80–84 with a descriptive rating of Satisfactory. The group is followed by those whose final grades are within 85–89 or Very Satisfactory Level. Students whose grades are from 75 to 79 tallied 63 making up 23.08% of the sample while those who have obtained remarkable final grades of 90 and above enlisted only 36 or 13.19% of the total respondents. None of the student-respondents have incurred failed grades. The values state that most of the students from these high schools are close to being proficient in the subject area.

Table 2. The attitude of the Students towards Mathematics

Attitude towards Mathematics Inventory	Mean	DR
1. I get a great deal of satisfaction out of solving a mathematics problem.	3.79	SA
2. I have usually enjoyed studying mathematics in school.	3.88	SA
3. Mathematics is fun and exciting.	3.86	SA
4. I like to solve new problems in mathematics.	3.78	SA
5. I would prefer to do an assignment in math than to write an essay.	3.75	SA
6. I like mathematics.	3.60	SA
7. I am happier in a math class than in any other class.	3.41	SA
8. Mathematics is a very interesting subject.	3.82	SA
9. I am comfortable expressing my ideas on how to look for solutions to a difficult problem in math.	3.63	SA
10. I am comfortable answering questions in math class.	3.58	SA
11. Mathematics is a very worthwhile and necessary subject.	3.81	SA
12. I want to develop my mathematical skills.	4.22	VSA
13. Mathematics helps develop the mind and teaches a person to think.	4.22	VSA
14. Mathematics is important in everyday life.	4.16	SA
15. Mathematics is one of the most important subjects for people to study.	4.17	SA
16. High school math courses would be very helpful no matter what I decide to study.	3.97	SA
17. I can think of many ways that I use math outside of school.	3.88	SA
18. I think studying advanced mathematics is useful.	4.01	SA
19. I believe studying math helps me with problem-solving in other areas.	4.16	SA
20. A strong math background could help me in my professional life.	3.91	SA
21. Mathematics is not one of my most dreaded subjects.	2.81	A
22. I can think clearly when working with mathematics.	2.59	A
23. Studying mathematics does not make me feel nervous.	2.85	A
24. Mathematics makes me feel comfortable.	2.89	A
25. I am never under a terrible strain in math class.	3.01	A
26. When I hear the word mathematics, I have a feeling of enjoyment.	3.16	A
27. It makes me excited to even think about doing a mathematics problem.	3.87	SA
28. Mathematics does not scare me at all.	3.44	SA
29. I have a lot of self-confidence when it comes to mathematics	2.35	SD
30. I can solve mathematics problems without too much difficulty.	3.34	A
31. I expect to do fairly well in any math class I take.	3.48	SA
32. I am never confused in my mathematics class.	1.89	SD
33. I feel a sense of security when attempting mathematics.	3.31	A
34. I learn mathematics easily.	3.40	A
35. I believe I am good at solving math problems.	3.36	A
36. I am confident that I could learn advanced mathematics.	3.60	SA
37. I would like to continue using mathematics in college.	3.68	SA
38. I am willing to take more than the required amount of mathematics.	3.44	SA
39. I plan to take as much mathematics as I can during my education.	3.58	SA
40. The challenge of math appeals to me.	3.60	SA
Overall Mean	3.02	P

Legend: 4.21 – 5.00 Very Strongly Agree (VSA) Very Highly Positive (VHP)
 3.41 – 4.20 Strongly Agree (SA) Highly Positive (HP)
 2.61 – 3.40 Agree (A) Positive (P)
 1.81 – 2.60 Slightly Disagree (SD) Slightly Negative (SN)

Table 3. Level of Mathematics Achievement of the Student–Respondents

Grade	Descriptive Rating	Frequency	Percentage
75 – 79	Fairly Satisfactory	63	23.08%
80 – 84	Satisfactory	92	33.70%
85 – 89	Very Satisfactory	82	30.04%
90 – 94	Outstanding	31	11.36%
95 – 99	Outstanding	5	1.83%
Total		273	100.00%
Final Average Grade		83.76 (S)	

Overall, the final average grade of the student–respondents is 83.76 with a descriptive rating of Satisfactory. The value states that the mathematics achievement of the students is still on the acceptable level. Furthermore, the mean average indirectly states that the mathematics achievement of the students needs to be enhanced to achieve a higher level. A set of developmental actions and interventions to improve their mathematics achievement is necessary and should be immediately done by the subject teachers.

Confirming this study, Escalona (2015) found out that most of his respondents have a moderately satisfactory level of mathematical performance. In addition, the research work of Balbalosa (2010) revealed that the learners satisfactorily perform in the mathematics subject.

Gabriel (2012) unveiled that fourth-year students from both public and private schools are approaching proficiency. Students tend to perform better during the first three months of the school year when they can still see the subject as an interesting and enjoyable subject. Another confirmation to the result of this study is the one conducted by Ayuman- Valdez, and Guiab (2015) where the highest percentage of grade six pupils has the general average equivalent to “approaching proficiency”. The students with a general average qualified as “proficient” come after.

Mathematics is one of the most disliked subjects. Gafoor and Kurukkan (2015) said that students' main reasons for hating the subject are its difficulty, poor instruction and the subject demands more time to grasp. Students do not perform activities once they see their difficulty. This led to poor retention and what has been learned is easily forgotten. This can contribute to the fair performance of high school students in Mathematics.

Table 4 shows that the attitude of students towards the subject is related to the student’s mathematics achievement. The positive probability value implies a positive relationship between the two factors. If one has a positive perception of the subject, then he/she can perform better in it. On the other hand, if a student has a negative attitude towards the subject, then he/she is bound to perform lower.

Table 4. Correlation between Attitude towards Mathematics and Mathematics Achievement

Factors	Degree of Freedom (df)	Probability Level	Mathematics Achievement
Attitude towards Mathematics	272	0.05	0.123*

The result of the study conforms with the findings of Andaya (2014). In the study, it was disclosed that students perceive the subject positively and believe that it is contributory to their development and performance. The study of Patena and Dinglasan (2013) also agrees with this result. This research revealed that attitude towards the subject is a significant factor for a student's mathematics achievement.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings, the students have displayed a positive attitude towards the labeled difficult subject. They can acknowledge the relevance of the subject to oneself and his future undertakings though they experience difficulty in dealing with some calculations and problem-solving. The level of mathematics achievement of the students is Satisfactory. However, a significant number of 'Very Satisfactory' students were noted. Attitude towards the subject is significantly correlated to a student's mathematics achievement.

As a result, the following are hereby recommended: Teachers may continue to enrich their teaching capacity to deliver quality education to every student. Seminars and training and post-graduate studies may be attended to enhance teaching efficiency and performance. Teachers who have been in the profession for many years may assist those who are new in the service and share professional techniques to attain efficiency. Teachers may seek updates with the newest trends in motivational strategies in mathematics to increase the motivation level of the students and help them develop confidence in dealing with math problems. Additionally, they may continually maximize the use of technology such as gadgets in the teaching-learning process. Teachers may provide immediate interventions towards the advancement of the level of mathematics achievement of the students. The use of technology as a medium of instruction, varied teaching strategies, and collaborative learning approaches are highly commendable. Studies related to the subject matter may be conducted to testify to the results of this current study. Additional variables may be included to enhance the scope.

PRACTICAL IMPLICATIONS

Assessing the students' attitude towards Mathematics and its relation to students' achievement in the subject will provide information for possible interventions and help every learner achieve more satisfactory results. The study suggests that if a student has a positive

attitude or outlook of the subject, they are more likely to perform better. Mathematics teachers should consider this aspect whenever they are inside the classroom.

On the other hand, the educational administrators may provide learning opportunities for Mathematics teachers, where they can adapt motivational techniques and skills, for them to be able to maintain or even raise the positive attitude of students towards the subject they are teaching. With the country's performance in Mathematics in the international large-scale assessments, the educational leaders are expected to look for alternative ways to uplift the present status of student achievement.

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