

## THE RELATIONSHIP OF ATTITUDE AND PERFORMANCE IN MATHEMATICS OF THE BEED AND BSE STUDENTS

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**Abstract:** This study aimed to determine if the attitude toward mathematics of BSE and BEED students in DMMMSU NLUC is significantly correlated to their Mathematics performance. Specifically, it seeks answers to the following questions: What is the profile of the students enrolled in Mathematics along sex, CAT Result in Mathematics and IQ level. What is the attitude of students towards Mathematics? What is performance of the respondents in Mathematics? Is there a significant relationship between profile variables and attitude towards Mathematics profile variables and performance in Mathematics, attitude toward Mathematics and Mathematics performance? Which among the variables are predictors of Mathematics performance? What action plan can be proposed to enhance the level of performance and attitude of the students in Mathematics?

This study utilized the descriptive method of investigation. This is best fitted to the study because this method involves describing, recording, analyzing and interpreting conditions that exist. It also includes some forms of comparison and contrast and discovers relationship between existing non-manipulative variables. The respondents are two classes enrolled in Basic Mathematics and Contemporary Mathematics for the SY 2014-2015. Their attitude towards Mathematics were obtained using an attitude inventory, their IQ and CAT Math results were obtained from the Guidance Office and their performance were taken from their final grade in Mathematics. The attitude of students toward Mathematics and their performance in Mathematics were described, analyzed, compared, and interpreted. Mean was used to describe the attitude and performance in Mathematics. Furthermore, the relationship of the aforementioned variables will be obtained. Hence, the use of statistics of correlation under descriptive method was also used.

The following are the salient findings of this study: Majority of the Mathematics students are females with fair to good performance in the Math CAT and IQ level. The students have positive to highly positive attitude towards Mathematics. The students have very good performance in Mathematics. IQ and CAT performance are significantly correlated with Mathematics performance. CAT significantly correlates with attitude and attitude is significantly correlated with Mathematics performance.

In the light of the above-stated findings, the following conclusions are drawn: The Math classes are dominated with females who have only fairly satisfactory to satisfactory IQ levels and performance in the CAT along Mathematics. A greater majority of the students find mathematics enjoyable, interesting and fun. Most of the students have acquired the needed competencies in Mathematics. They are good in computation, comprehension and problem solving. Those who have high IQ and high CAT results perform excellently in Mathematics. The better is the attitude towards Mathematics the higher is the performance in the subject. Attitude has a positive impact of performance in Mathematics.

Based on the conclusions, the researcher offered the following recommendations: Teachers are encouraged to customize their instruction and improve the use of modernized and innovative teaching techniques and strategies to enhance performance and attitude of students toward Mathematics. The Mathematics teachers especially the Math Club Adviser should consider the implementation of the Action Plan to improve attitude and performance in Mathematics. The administrators should support the implementation of the Action Plan by providing the opportunities and logistics for its accomplishment. The Action Plan should be considered for adoption by other HEIs in La Union with the administrators and Head of Mathematics Department planning its mechanics of implementation. A research on the effectiveness of the proposed action plan when implemented be conducted as basis for revisions and improvement.

**Keywords:** Academic Program, Action Plan, Attitude, Basic Mathematics, Performance

### 1. Introduction

Tertiary education, which consists of general education courses, subject content and professional subjects, is intended for specialized study to qualify the individual for professional activity for employment in higher positions in business, industry and government. Towards this end, colleges and universities provide necessary

training for individuals wishing to enter professional careers. They also strive to develop the students' creativity, insight and analytical skills. Moreover, they provide unique opportunities for personal enrichment while also preparing the students for future careers. Mathematics, being one of the most important subjects in tertiary education, plays a vital role in the development of the individual by providing powerful theoretical and computational techniques to advance their understanding of the modern world and societal concerns and to develop and manage the technology industries for the advancement of the national economy. the performance of students needs special attention.

Mathematics is the language of the sciences, demanding adherence to precise logical structure, facility with symbolic formalism and expertise in problem solving. As such, it provides a solid foundation for further academic pursuits in a variety of fields as well as for careers in business industry. Our society becomes increasingly complex in its technology and organization, the management of resources and information becomes more vital. Mathematics, with its abiding insistence on the understanding of structure and pattern, provides a gateway to an ever increasingly array of activities which the complexity of our society dictates ([www.amazon.com/exec/obidos/ASIN 2003](http://www.amazon.com/exec/obidos/ASIN/2003)).

Since Mathematics is at the very fabric of every field of study, it is necessary for a person to study mathematics very extensively. Studying Mathematics is important for everyone, not just for those who specialize in it. Even though a person may not remember much of the Mathematics course content in subsequent years, it will help them: 1) develop a more orderly thought process. This is such a gradual and subtle change that it is most likely to go unnoticed even though it affects everything that they do; 2) to be more effective in reading and translating verbal statements into mathematical statements; 3) to further develop their ability to arrange display data in an orderly manner; 4) to develop the ability to take specific data and make general inferences; 5) to develop self-discipline, perseverance and improve on time management on time management (Academics.hamilton.edu/Mathematics,2003). The Philippines has always taken pride in its achievement in education, particularly its high literacy rate and high enrolment rate. Ironically, however, such high achievements are not translated into higher levels of development. This is because of the low quality of education. Poor quality education is evident in the low scores obtained by Filipino students in standardized tests at both international and national levels.

In the Third International Mathematics and Science Survey (TIMSS), the Philippines performed poorly, ranking second from the bottom in Mathematics category and third for the bottom in the Science category. Results of the National Elementary Achievement Test (NEAT) and National Secondary Achievement Test (NSAT) showed that students gave correct answers to less than 50% of the questions (2003 Philippine Human Development Report Quality Relevance and Access in Basic Education).

In the study of Mangaliman, it was found that students with failures generally had great difficulty in understanding Mathematics. In general, these students have poor study habits and negative attitudes toward Mathematics and their teachers, which influenced their failures to a moderate degree. ([http://dspace.slu.edu.ph/bitstream/123456789/125/1/ROGELIO +A. +MANGALIMAN.pdf](http://dspace.slu.edu.ph/bitstream/123456789/125/1/ROGELIO+A.+MANGALIMAN.pdf).)

Teachers play a vital role in the teaching-learning process. It is a challenge for them how to make students love and like Mathematics. The negative attitude of students toward Mathematics hinders them to successfully learn the subject. The teachers have to do something to change the negative attitude of students toward Math by making the discussion more interesting and more realistic for the students.

It is with these thoughts that the researchers decided to carry out an investigation on the attitude of the students toward Mathematics. Moreover, the performance of these students in Mathematics was correlated to their attitudes towards the subject. This in turn served as a basis of Math teachers in planning and customizing their instructions to make Mathematics more meaningful for the students.

## 2. Significance of The Study

This study is important to the following persons who are directly involved in the educational setting especially those who are in contact with students every day.

To the school administrators, especially the Dean of Education, that they will be able to evaluate the performance of the students and thereby guide them in devising programs for its enhancement. Moreover, this will encourage them to continuously supervise the quality outputs of their Mathematics teachers as well as their students.

To the Mathematics teachers, the result of this study would give them a clearer sense of direction in having a positive outlook towards Mathematics. This would serve as an eye opener for them to assess themselves, to reflect on their ways of teaching, to assess their students' strength and weaknesses in learning Mathematics. This will serve as a springboard in creating enhancement programs to further improve and strengthen the students' competence in Mathematics.

To the students who are the main reason of conducting this study, so that they will be informed as regard their performance in Mathematics and the effect of negative attitude on performance. Eventually, this will inspire them to improve their performance by developing a positive attitude toward the subject.

To the researcher herself, this will motivate her to continuously support programs designed to attain excellence and quality in the teaching profession.

To other researchers, this will give them ideas to research on ways to improve attitude and performance of students in Mathematics and in other areas.

### 3. Review of Related Studies

#### 3.1. Theoretical Framework

Mathematics is sequential. This sequential nature of Mathematics together with the underlying structure of the subject, hinges itself on the psychological theory of learning which contends that meaningful learning processes involve an interaction between the new information and the ones which have been learned (Gubrub & Novak, 1993). This means that meaningful learning involves an impression of a new knowledge upon a previously learned or pre-existing knowledge structure. This theory emphasizes a continuing education which is the very knowledge structure. This theory emphasizes a continuing education which is the very nature of Mathematics; hence, its inclusion in the curriculum from pre-school to the highest professional courses.

Learning is interactive. The learner must be active, not passive, for maximum learning. The Pragmatic Theory of learning recognizes the importance of the learner; his interest, his attitudes and his ability to utilize his past experiences in meeting new situations. There is no substitute for experience in which learner is definitely involved (Gregorio, 1983). This point of view states that learning process is essentially experiencing, reacting, doing and understanding.

In the same vein, Rogers proposed the Experiential Learning Theory. Rogers feels that human beings have a natural propensity to; learn the role of the teacher is to facilitate such learning. This includes: (1) setting a positive climate for learning; (2) clarifying the purpose of the learners; (3) organizing and making available learning resources; (4) balancing intellectual and emotional components of learning; and (5) sharing feeling and thoughts with learners but not dominating (<http://oprf.com/Rogers>). The said theory implies that significant learning takes place when the subject matter is relevant to the personal interest of the students. Learning which is threatening to the self (new attitudes or perspectives) is more easily assimilated when external threats are at a minimum. Self-initiated learning is the most lasting and pervasive.

Learning theories are the basic materials which are usually applied in all educational and training activities. The more one understands learning theories, the better he or she will be able to make decisions and apply them in achieving the objectives. The behaviorist, the cognitivists and the humanists emphasize different aspects of the teaching-learning process in their approaches (<http://www.fao.org/docrep/w580e/w583oh.htm2006>).

The Behaviorist theory focuses on observable and measurable behaviors. Learners are considered blank slate (<http://www.islandnet.com/kpotter/itl/idFORCBBT-files/slide0004.htm>). In the remedial program, the learners acquire learning; hence, there is low skill development and this will change to the behavior of the individual. Behaviorist theory emphasizes the need for practice of each skill in varied situations. The positive change will gain immediate and positive feedback which is strongly motivating. Cognitive theorists believe that a significant amount of learning evolves through the mind. In learning, the mind has to work to be able to process the information being learned. In cognitive theory, there are three-stage in the information processing model, namely: (1) meaningful effects-information that is meaningful is easier to remember; (2) practice-effects-information that is rehearsed is more easily retained; and (3) transfer effects-describes the effects of prior learning on new learning (<http://www.island.net.com/kpotter/itl/idFORCBT-files/sl.deo013.htm>).

Humanist theory states that a person has the capacity for self-awareness; that he does have control over his behavior. The Humanist allows that a person has a freedom of choice, self-determination and is responsible for his self-direction ([http://hogar.up.ac.za/catts/learner/am/eyes/glossary\\_of\\_learning\\_theory.htm](http://hogar.up.ac.za/catts/learner/am/eyes/glossary_of_learning_theory.htm)). This theory explains that learning depends on the openness of the learner to accept it and that attitude and emotion affect learning a lot. In learning, if the individual has the desire to learn, his free will can move in an upward direction attaining progression of personal growth and reaching an optimum level. This implies that to achieve maximum learning, the individuals should be motivated and hence, if he is, he will have an open mind and he will enjoy learning. This, in turn, will generate a better result.

Given the theories presented, the researcher theorized that attitude is a great factor affecting learning. For the teachers, knowing the student's previous knowledge, skills and attitudes toward learning mathematics would provide background on how to deal with these students and could make plans for effective teaching-learning process.

#### 3.2. Conceptual Framework

Teachers and other Mathematics educators generally believe that children learn more effectively when they are interested in what they learn and that they will achieve better in Mathematics if they like the subject. Therefore, continual attention should be directed toward developing, maintaining and reinforcing positive attitudes. The

development of positive attitudes towards Mathematics and the pupils' involvement in it helps in the learning of Mathematics (Angel, 2001).

According to Tan (2004), Mathematics is probably one of the subjects most dreaded by students and even by some teachers. Based on random interviews, students' dislike for Mathematics can be traced back to a lot of negative experiences in learning the subject. These include being punished or being embarrassed in front of the class for giving wrong answers. Considering the students' negative experiences in the past, renewing their mind set and attitude toward Math could be a difficult task. Teaching difficult Mathematics concepts requires lots of patience in terms of preparations and dealing with learners of different personalities and abilities.

Fortea (1999) mentioned that the negative attitudes toward Mathematics were due to the students' perception that Mathematics is difficult and boring; important only because of course requirements; unreasonable strictness and lack of sense of humor of Mathematics teachers. Furthermore, she concluded that the positive attitude towards Mathematics were brought about by the stimulating, challenging, interesting nature of Mathematics, the development of the ability to think and reason, favorable study habits, teachers' preparedness, patience, appreciation and encouragement for student performance and a capability to simplify and clarify difficult lessons.

It is in this context that the study has been conceptualized. It attempted to determine if the attitude toward Mathematics is significantly correlated with the Mathematics performance of BSE and BEEed students.

## 4. Methodology

### 4.1 Research Design

This study utilized the descriptive method of investigation. This is best fitted to the study because this method involves describing, recording, analyzing and interpreting conditions that exist. It also includes some forms of comparison and contrast and discovers relationship between existing non-manipulative variables (Rutab, 1996).

The attitude of students toward Mathematics and their performance in Mathematics was described, analyzed, compared, and interpreted. Furthermore, the relationship of the aforementioned variables was obtained. Hence, the use of statistics of correlation under descriptive method was used.

### 4.2 Sources of Data

The population of this study consisted of first year and second year education students enrolled in Basic Mathematics and Contemporary Mathematics for the 1<sup>st</sup> semester of school year 2014-2015. The entire population was taken with a total population of 290.

### 4.3 Instrumentation and Data Collection

To obtain the necessary data, documentary analysis and a Questionnaire-checklist were used. The performance of students in Mathematics was taken from their grades in Basic Mathematics and Contemporary Mathematics. It was secured from the grading sheets of the teachers in Basic Mathematics and Contemporary Mathematics for the first semester of School Year 2014-2015. The CAT and IQ results were taken from the guidance office.

The use of the questionnaire-checklist in descriptive survey studies helps ensure the objectivity of responses to the same item from all cases and guides the research in collecting the unique, exceptional or unusual facts particularly interesting to him. In other words, it standardizes and maintains objectivity of observation (Good, 1992).

One set of questionnaires was used as principal instrument in gathering the data and information on the attitude of students toward Mathematics. The questionnaire is divided into two (2) parts. Part I elicited data on the profile of the students along the high school graduated from and their academic program. Part II elicited the attitude of the students toward Mathematics. The questionnaire on attitude towards Mathematics was lifted from the study of Mique (2009).

Validity and Reliability of the instrument. Because the tool is lifted from a previous study, its validity and reliability are presumed.

### 4.4 Tools for Data Analysis

Data gathered were processed following statistical tools and techniques. The raw data were tallied and presented in tables in an effort to present the data accurately.

For problem number 1 on the profile of the respondents, and problem number 3 on the performance of student's frequency counts and percentages were utilized.

Problem 2 which deals with the attitude of students toward Mathematics, the responses were converted to scores. For the positively stated indicators, very strongly agree is given a score of 5, 4 for strongly agree, 3 for slightly agree, 2 for slightly disagree and 1 for strongly disagree. For the negatively stated indicators, the scoring is

reversed. Please refer to the table below: The items which reflect positive attitudes are 1, 5, 6, 7, 10, 12, 14, 17, 19 and 20 while items which reflect negative attitudes are 2, 3, 4, 8, 9, 11, 13, 16 and 18.

The mean of scores was computed and interpreted using the descriptive equivalents to determine the attitude of each student toward Mathematics using a scale in the data categorization.

To determine the attitude of students toward Mathematics, frequency counts and percentages were used. Frequency counts refer to the number of respondents belonging to a particular category.

To determine degree of relationship, the Pearson Product Moment Correlation was utilized. To test if the coefficient of correlation is significant, the t test for the significance of r was used.

To determine the level of performance in Mathematics based on the grades of the respondents in Fundamentals of Mathematics and Contemporary Mathematics the scale below was used.

<u>Range of Grades</u>	<u>Descriptive Equivalent</u>
93-100	Outstanding
84-92	Very Good
75-83	Good
Below 75	Poor

### 5. Findings and Results

**Table.1.** Profile of the Respondents Along CAT Results in Math

Score	Descriptive Equivalent	Frequency	Percent
75 – 100	Very Good	34	11.72
51 – 74	Good	90	31.03
25 – 50	Fair	88	30.34
1 – 24	Poor	78	26.90
		290	100%

#### Interpretation of table-1.

Table 1 reveals the College Admission Test results in Mathematics. It can be gleaned from the table that the respondents are distributed to the different performance levels. It can be noted that only 11.72 % would be very good while 26.90% are poor. This is indicative that there is significantly greater number of students who did not do well in Mathematics. In fact, more than half of the group failed in the exams. This implies further that many have not acquired the needed competencies in Mathematics like computation, comprehension, analysis and problem-solving skills. In addition, the students find difficulty in the Math subject. It is good to note though that about 42% passed. These are the students who were equipped with the needed competencies in the subject. They were able to perform computation, comprehension, analysis and problem-solving skills.

**Table.2.** Profile of the Respondents Along IQ Level

Score	Descriptive Equivalent	Frequency	Percent
75 – 100	Very Good	40	13.79
51 – 74	Good	59	20.34
25 – 50	Fair	119	41.03
1 – 24	Poor	72	24.83
		290	100%

#### Interpretation of table-2.

The profile of the respondents along IQ (Intelligence Quotient) is reflected in Table 4. The table elucidates that the students in Contemporary and Basic Mathematics have fair IQ level with a rating of 41%. It is sad to note that about 25% have poor IQ level. This means that many in this group have poor analytical skills and that they are not equipped with sufficient knowledge and concepts. Their mental ability is lower than the expected which is appropriate for their age. On the contrary, there were some who were good to very good. Barely 34% would have good to very

good performance. This shows that while it is true that many have poor mental ability, there are still some in the group who have sharper and more satisfactory IQ level.

**Table.3.** Attitude of the Students Towards Mathematics

Attitude	Frequency	Percentage
Highly Positive	115	39.66
Positive	143	49.31
Negative	31	10.69
Very Negative	1	.34
Total	290	100%

**Interpretation of table-3.**

Table 3 shows the attitude of students toward Mathematics. Of the 290 respondents, 115 students or 39.66% have highly positive attitude toward Mathematics and 49.31% have positive attitude towards Mathematics. This implies that majority of the students tend to like math to a great extent. This indicates further that the education students in the College of Education did not have any apprehension of liking the subject. This means that a great percentage of the students find Mathematics enjoyable, fascinating and fun. Moreover, they do not find it very difficult and are not very afraid of the subject. However, it can also be gleaned from the Table that 10.69% have negative attitude towards Mathematics. This shows that there is a few who may have an unsatisfactory regard towards the subject. These are the students who find Math difficult and boring.

**Table.4.** Performance of Students in Mathematics

Grade	Descriptive Equivalent	Frequency	Percent
93 above	Outstanding	28	9.66
84-92	Very Good	143	49.31
75-83	Good	97	33.45
Below 75	Poor	22	7.59
		290	100

**Interpretation of table 4.**

Table 4 discloses the performance of students in Mathematics. The table reveals that many of the students are good in Math to very good performance in the subject with rates of 33.45 and 49.31 respectively. This implies that the students perform very satisfactorily in the subject. They are capable of computing, analyzing and solve problems in Mathematics. Furthermore, they find the subject easy because they are equipped with adequate and accurate concepts in the subject. They have also mastered the different techniques in solving and are able to recall the correct formula for a particular problem, in addition, most of them are critical, logical and analytical thinkers.

**Table.5.** Correlation of Profile, Attitude and Performance in Mathematics

Variables	R	Descriptive Equivalent	Decision	Remarks
Sex & Attitude	- 0.03	Negligible	Accept H <sub>0</sub>	Not Significant
CAT Result & Attitude	0.33	Substantial	Reject H <sub>0</sub>	Significant
IQ & Attitude	0.03	Negligible	Accept H <sub>0</sub>	Not Significant
Sex & Math Performance	-0.21	Low	Accept Ho	Not Significant
CAT Result & Performance	.61	Substantial	Reject Ho	Significant
IQ & Performance	.54	Substantial	Reject Ho	Significant
Attitude & Performance	.31	Low	Accept Ho	Significant

### Interpretation of table-5.

Table 5 present the relationship among the profile variables, attitude toward Mathematics and performance in the subject.

The table reveals that the variables which are positively and significantly correlated with Math performance are CAT result and IQ level. This means that CAT result and IQ level have a bearing on the Mathematics performance. Those who got high in the CAT and those with high IQ level perform very satisfactorily in Mathematics. Hence, those who did not do well in the CAT and those with below average IQ may fail or perform poorly in the subject. Mathematics requires rigorous comprehension and analysis. Hence, it is logical that those who have IQ or have high mental capacity perform also excellently in the subject. Likewise, the CAT result in Math can also speak or predict the future success of the students in Mathematics.

On the other hand, sex is not significantly correlated with performance in Mathematics. Sex has nothing to do or has no impact on Mathematics performance.

The table also reveals that sex and IQ are not significantly correlated with attitude. This explains that sex and IQ have nothing to do with attitude. This implies further that whether male or female, high IQ or low IQ, the attitude may be similar. However, the CAT result is significantly correlated with attitude. There is actually direct relationship which implies that those who got high in the CAT have also very positive attitude in the subject and conversely. This proves that the positive attitude or disposition in the subject promotes more effective learning.

Similarly, the attitude and performance are directly and significantly related. This implies that attitude is a great factor in achieving better performance in Mathematics. Tendency for those who dislike the subject is to fail in the class. Those who are positive about it achieved success and excellent performance in the subject. This elucidates further the significance of making the attitude of students in Mathematics favorable so that they will be able to understand and learn it more effectively.

### 6. Conclusion

The Math classes are dominated with females who have only fairly satisfactory to satisfactory IQ levels and performance in the CAT along Mathematics.

A greater majority of the students find mathematics enjoyable, interesting and fun. Most of the students have acquired the needed competencies in Mathematics. They are good in computation, comprehension and problem solving.

Those who have high IQ and high CAT results perform excellently in Mathematics. The better is the attitude towards Mathematics the higher is the performance in the subject. Attitude has a positive impact of performance in Mathematics.

### 8. Recommendations

Based on the conclusions, the researchers offer the following recommendations: (1) Teachers are encouraged to customize their instruction and improve the use of modernized and innovative teaching techniques and strategies to enhance performance and attitude of students toward Mathematics; (2) The Mathematics teachers especially the Math Club Adviser should consider the implementation of the Action Plan to improve attitude and performance in Mathematics; (3). The administrators should support the implementation of the Action Plan by providing the opportunities and logistics for its accomplishment; (4). The Action Plan should be considered for adoption by other HEIs in La Union with the administrators and Head of Mathematics Department planning its mechanics of implementation; and (5) A research on the effectiveness of the proposed action plan when implemented be conducted as basis for revisions and improvement.

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