

STUDENT'S ANXIETY IN MATHEMATICS

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Abstract: In modern days, mathematics became one of the foundations for student's success. Learning mathematics is a medium when encountering situations in life that needed computation; therefore, mathematics is very important especially in a day to day basis.

The research is entitled; "Student's Anxiety in Math". It was a quantitative in nature. It uses the purposive sampling technique with the Grade 11 students of Jagobiao National High School the respondents of the study. The study focused on the association between the levels of student's anxiety in Math and their mathematics achievement. In gathering the data, a checklist type of instrument was utilized.

It was found out that 96 out of 136 respondents had an average level of math anxiety and their math grade lies between 80 and below which is normal and, 1 out of 136 respondents had a high level of math anxiety and their math grade lies between 86 and 90.

To demonstrate, most of the students are in the "poor state" in their mathematics performance with a high level of anxiety in math. As the mathematics achievement of the students increases, their level of math anxiety decreases. Contrarily, as the mathematics achievement decreases, their level of math anxiety increases. The table reveals that whether the students' performance in mathematics is poor, fair, or satisfactory, their level of math anxiety is average which is normal.

It should have a school based seminar about the different levels of math anxiety and how can it affects with student's mathematics performance.

Keywords: Student's Anxiety, mathematics, school.

1. INTRODUCTION

Rationale:

Mathematics is one subject that pervades life at any age, in any circumstance. Thus, its value goes beyond the classroom and in the school. Mathematics as a school subject, therefore, must be learned comprehensively and with much depth (DepEd K-12 Curriculum, 2012). It is also the science of numbers and their operations (Merriam-Webster Dictionary). The study of Mathematics was established to allow an individual to apply knowledge of Mathematics effectively and responsibly in solving problems and making decisions in everyday life (Zakaira, Zain, Ahmad, & Erlina, 2012, pg. 1761).

Mutawah (2015) said people who feel tension, apprehension, and fear of situations involving Math are said to have Math anxiety (pg.239). Math anxiety has been found to be negatively related to Math achievement both because it leads to avoidance of Math and because it disrupts the working memory resources students used to solve difficult Math problems (Ramirez, Chang, Maloney, Levine & Beilock, 2016, pg. 84). Zakaira, Zain, Ahmad, & Erlina (2012) said students with high Mathematics anxiety levels engage in negative thinking about their self-ability. These students will exhibit less confidence working with numbers and mathematical concepts through a problem-solving process (pg. 1762-1763). In addition, students with high performance levels in Mathematics have a positive attitude toward Mathematics. A student who has a deep interest can be encouraged to work and train without being asked by the teacher. Interest and confidence in this aspect are very important in learning to reduce anxiety in Mathematics and eventually being able to obtain good results on the examination: thus, affecting one's Math performance (pg. 1763).

Good Math achievement is every student's goals, not only for them, but for the parents and the learning institution as well. Undeniably, some students find Mathematics difficult to learn. Both sexes differ in their perceptions in learning Mathematics. In this case, there are certain situations that could lead student's anxiety in Math in relation to their appreciation on how they understand it.

As a researcher, it is very important to know the impacts of Mathematics anxiety that interfere with the manipulation of numbers in a variety of ordinary life and academic situations of the students. This research study aims to determine the differences in Math anxiety of students and to adjudge the differences in Mathematics achievement of students based on the level of Mathematics anxiety.

The Problem:

Statement of Purpose

This research study entitled "Student's Anxiety in Math" intends to assess the different levels of student's anxiety in Math and the Mathematics achievement of Grade 11 Senior High School students of Jagobiao National High School in the academic year 2018-2019.

Specifically, this addresses to answer the following questions:

1. What is the level of anxiety of students in Math?
2. What is the academic performance of students in Mathematics?
3. Is there an association between anxiety of students in Math and their grades?

2. REVIEW OF RELATED LITERATURE

Mathematics is an important subject in school curriculum in every country (Mutawah, 2015, 240). Mathematics has been discussed so that youths can understand the numerical data presented to them, and as well as manifest those information (both simple and complex) in a day-to-day encounter, as cited in the same article. Learning mathematics is cumulative in nature where it is structured step by step, starting with the simplest tasks until getting into more complex ones (Dodeen, Abdelfattah, & Alshumrani, 2014, 2). However, Ashcraft and Krause (2007) said that the very abstractness of mathematical symbols surely adds to the difficulties that people encounter when learning math, including difficulties in storing and using information in working memory of the students (246-247). Students who do poorly in math but believes its importance to it may not be anxious about math while students doing poorly in math but want to do well may report higher levels of math anxiety (Wigfield & Meece, 1988, 214). Therefore, poor mathematical performance might be perpetuated by mathematical anxiety (Witt, 2012, 264).

Math success level has been one of the crucial keys to school success and profession selection. Therefore, it is important to know and if possible eliminate obstacles in front of math success. One of the most significant obstacles in math success is math anxiety (Sevindir, Yacizi, & Yacizi, 2014, 637). Mathematics anxiety is a psychological dimension of learning that is important for educators to identify (Zakaria, Zain, Ahmad & Erlina, 2012, 1761). It refers to such unhealthy mood responses which occur when some students come upon mathematics problems and manifest themselves as being panicky and losing one's head, depressed and helpless, nervous and fearful (Luo, Wang, & Luo, 2009, 12-13). Anderson (2007) said that student anxiety in response to mathematics is a significant concern for educators in terms of the perception that high anxiety will relate to avoidance of mathematics [93].

In the article of Eden, Heine & Jacobs (2013), there are factors that associate with student's anxiety in Math like environmental, personality, cognitive and gender influences [28-29].

The environmental factors have a high impact on human personality development "ego" or its meaning, which is one of the main dimensions of human personality, is influenced by environmental factors (Abbasi, Samadzadeh, & Shahbazzadegan, 2013, 673). The quality of students' academic performance is influenced by wide range of environmental factors rather simply teacher factors and psychological factors within the learners such as motivation and the self, rather than simply by ability (Kumar & Karimi, 2010, 147). Critical for the development of mathematics anxiety are the attitudes, stereotypes and the teaching style of a child's teachers, since they affect a student's attitudes, motivations, and learning activities in a very direct manner (Ashcraft & Ridley, 2005, 315-327). Due to the development

of math anxiety among students, teacher's teaching style was considered as a critical factor. In support, Newstead (n.d.) said that the teaching approaches of math are characterized as either "traditional" or "alternative." She explains that the "traditional" teaching approach talks about the standard, pencil-and-paper methods of computation, by teacher demonstration followed by individual practice where word sums are given as application after practice and mastering of methods while "alternative" approach let students discuss their own strategies for solving word sums, which are used as the principal vehicle for learning [7-8]. Eden, Heine & Jacobs (2013) added that female elementary school teachers, who are anxious in mathematics themselves, pass their negative attitude down to their students thus a factor that leads to math anxiety [28].

According to Stuart (2000) in his article, the formation of math anxiety often takes its origin from self-confidence or lack of confidence. In his study, he found out that students who had viewed mathematics negatively began to appreciate it and feel more confident about their abilities for they are using mathematics skills during science experiments to calculate results and complete tables and graphs. This confidence turns them to be more successful in mathematics-related tasks. Even students who have neutral view about mathematics began to dig deeper and appreciate of it as a learning practices that is implemented during the year [335]. In contrast, students with poor self-esteem and lower levels of motivation to study mathematics could also be more anxious about their performance (Alzahrani & Stojanovski, 2017, 1518). After all, it is difficult for someone to hone their math skills if they avoid engaging in mathematical processing (Beilock & Maloney, 2015, 6).

On the other hand, it is tempting to assume mathematics anxiety to be directly related to poor mathematical competencies which, in turn, are determining experiences of threat in classroom situations (Eden, Heines, & Jacobs, 2013, 28). In the same article, they also said that poor visuospatial processing abilities may be another domain-general factor contributing to the development of mathematics anxiety that is, poor visuospatial processing abilities may affect the development of mathematics anxiety, mediated by poor mathematical abilities.

In terms of emotional response, Goldin (2014) said that different students experience each social interaction differently, as personality traits vary. Events outside school, related or unrelated to mathematics, affect emotional responses. In this sundry of mathematically related contexts, the emotions of different individuals also interact dynamically with each other: some are labeled positive such as curiosity, enthusiasm, fascination, love, pleasure, pride and satisfaction; some also are labeled negative such as anger, anxiety, boredom fear, frustration, hatred and humiliation [392]. Alzahrani and Stojanovski (2017) also said that students have differing social factors, cognitive functioning and academic abilities, all of which can be associated with varying degrees of anxiety towards mathematics. Combinations of these factors could also be attributable to differing levels of associated anxiety when it comes to studying mathematics and related concepts. Social factors, such as the level of support provided by parents and family, could be an additional or related factor attributing to one's perception of mathematics and consequently also to associate anxiety when it comes to studying mathematical concepts, particularly in households associated with low socioeconomic status (SES) [1518]. In relation to this, attitude toward mathematics have affective, behavioral, and motivational components, may include a propensity toward emotions such as enjoyment, liking, or the absence of boredom, as well as toward approach (vs. avoidance) behaviors (Goldin, 2014, 393).

Mathematics performance is statistically significant related to mathematics anxiety (Luo, Wang, & Luo, 2009, 17; Sherman & Wither, 2003, 142; Kumar and Karimi, 2010, 149). This means that students who have high mathematics anxiety tended to perform fewer score in mathematics. However, those who have low mathematics anxiety tended to perform higher score in mathematics. Based on the findings of the study by Zakaria, Zain, Ahmad & Erlina (2012), there are significant differences between students' mathematics achievements based on their math anxiety levels. Their study revealed that students who are high achievers have lower levels of anxiety while low-achieving math students have high levels of anxiety. This is because high achievers have a strong understanding of mathematics and have more confidence than low achievers. Contrariwise, students who have low levels of anxiety tend to score higher in math [1764]. In line to this, the researchers implied that the teachers should pay more attention to low-achieving students, help them improve learning methods and improve learning efficiency, and thus lower their mathematics anxiety [17]. In contrary, Ramirez, Gunderson, Levine and Beilock (2013) said that the connection of math anxiety and math achievement is quite different when plotted as a function of individual differences relating to working memory, for students relatively higher in working memory was pronounced to have negative relation between math anxiety and math achievement [194].

Math anxiety is a problem that can negatively affect children's academic achievement and future employment prospects (Ramirez, Chang, Maloney, Levine, & Beilock, 2016, 97). It is possible that children who suffer a high level of anxiety are at a disadvantage in test situations because the presence of mathematical stimuli elicits their anxiety, which in turn might constitute a serious impediment to their test performance (Lebens, Graff, & Mayer, 2011, 2).

On the other hand, gender differences are a recurrent theme in academic studies in general and in math studies in particular (Mata, Monteiro, & Peixoto, 2012). Research on the relationship between ability level, sex and ethnicity shows that the development of math anxiety is motivated mainly by the findings that female students display higher levels of mathematics anxiety than males throughout their entire schooling (Hembree, 1990, 40). Hill, Mammarella, Devine and Caviola (2016, 46) and Devine, Fawcett, Szűcs and Dowker (2012, 7) both agreed that girls tend to have more math anxiety than boys at both educational levels. Tapia and Marsh II (2004) noticed that gender did not influence student's towards mathematics and levels of math anxiety affects the math anxiety of students but independent of gender. In support Yeo, Tan, Lewgender (2015) said that gender is not one of the factors for mathematics anxiety [4].

Education is a significant mechanism to boost the economy's development (Chavez, Garcia, Santillan & Kramer, 2015, 189). In this context, math is important for it is related to resolution and making decisions in virtually any industry. Generally, Zakaria and Nordin (2008) noted that there is a relationship between mathematics anxiety and achievement indicating that as math anxiety increases, student's achievement decreases with or without the variables indicating it [29].

Therefore, student's anxiety in math is associated with different variables that affects student's mathematics achievement based on the different levels of their anxiety in math.

3. RESEARCH METHODOLOGY

This section contains the research design used by the researchers, research environment, the respondents of the study, the instrument used, and the data gathering and procedure of this research study.

Design:

This research study is using a descriptive-correlation design of the variables determining the significant relationship between math anxiety of the students and their mathematics achievement.

Locale:

This study will be conducted in Jagobiao National High School, specifically in Senior High School Department. The building of Senior High School Department was built last May 2016. It is a three-storey building that is consist of six classrooms for the accommodation of the learners in each academic strand they had offer, namely: General Academic Strand (GAS), Humanities and Social Sciences (HUMSS), Accountancy, Business and Management (ABM). Each strand has one section per year level.

Respondents:

The respondents of the study are the Grade 11 Senior High School students in every year level of each strand (HUMSS, GAS, ABM) in Jagobiao National High School. This study is using universal sampling as it needs all the Grade 11 students as it's respondents. This research study has an overall number of 148 respondents.

Instruments:

The researchers will use Checklist Survey Questionnaire R-MANX (Revised Mathematics Anxiety) as research instrument which is adapted from the article of Mutawah (2015) in gathering data and information from the respondents. Checklist Survey questionnaire will be used as a research instrument of this study, for it is the appropriate tool for gathering data and information in a quantitative research.

Data Gathering and Procedure:

The researchers will ask permission from the students to be the respondents of this research study with the help of the letter of consent signed by the teachers and the principal.

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The respondents will be given questionnaires and they will write their answers on questionnaires itself. After distributing the questionnaires to the respondents, the researchers will give enough time to the respondents to answer the questions given. If the respondents are done answering the questions, their papers will be collected and the researchers will give their appreciation to the respondents for cooperating. The result of the collected papers will be the researcher's basis for the analysis, interpretation, findings, conclusion and recommendation of the study.

Statistical Treatment:

The researchers will use the weighted mean and chi-square in interpreting the data. The chi-squared test will be used to determine if there is significant relationship between student's anxiety in math and student's math achievement.

4. PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

This chapter represents the data gathered. This chapter also shows the analysis and interpretation of data.

Table 1: Levels of Anxiety of Students in Math

	INDICATORS	MEAN	INTERPRETATION
1	I feel happy for not being chosen to answer a question in math class.	2.58	High
2	I panic when I start the mathematical part of a standardized achievement test.	2.32	High
3	I cannot ask any question about what I did not understand in math class.	2.53	High
4	I hate doing math homework.	2.35	High
5	I do not like the equations in science courses.	2.24	High
6	I panic when I get math homework consisting of many problems.	2.42	High
7	When I hold a math textbook to study I start feeling stomach ache.	1.82	Average
8	I cannot concentrate on anything before a math exam.	2.18	High
9	I hate to be the treasurer of the school clubs which I participate in.	2.22	High
10	I am afraid of learning my math grade.	2.23	High
11	I am afraid of presenting the problems to the teacher which I can solve.	2.42	High
12	I can reject helping a child with his homework, because I am afraid of facing a question which I cannot solve.	2.15	High
13	I am afraid of taking a math pop-quiz.	2.49	High
14	I am always late to the first day of math classes every year.	1.49	Average
15	I cannot study well for math exams because I worry about my grade.	2.21	High
16	When I open my math book and look at the pages, I fear I will fail the course.	2.3	High
17	I don't ask my teacher about a concept in math, which I didn't understand well.	2.52	High
18	I feel anxious and pessimistic while waiting for the result of a math exam.	2.63	High
19	I would rather learn a subject presented with numbers or graphics than with words.	2.26	High
20	When I think about the subjects required for passing a math course, I feel I cannot complete my school requirements.	2.29	High
21	I do not like dealing with numbers.	2.15	High
22	I feel nervous when one of my friends notices that I could not understand the solution of a math question.	2.17	High
23	I have problems listening to my math teachers.	2.33	High

International Journal of Novel Research in Education and Learning

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24	The worst parts of the other courses are the parts dealing with mathematics.	2.32	High
25	I get nervous when I learn that the next lesson is mathematics.	2.19	High
26	I do not like making calculations in everyday life.	2.2	High
27	I misunderstand concepts in math courses.	2.44	High
28	I panic when I cannot remember a required equation for a problem.	2.63	High
29	I hate to look through mathematics books.	2	High
30	Even though I think a salesman made a mistake about the amount of my charge, I cannot object, since I will not be able to make the calculations while somebody is watching me.	2.08	High
OVER ALL WEIGHTED MEAN		2.27	High

The table above shows that the overall weighted mean is 2.272 which signify that the overall level of student's anxiety in math is high. The statements "I feel anxious and pessimistic while waiting for the result of a math exam" and "I panic when I cannot remember a required equation for a problem" are indicators that has a weighted mean of 2.63 and is labeled as high are the highest or main indicators why we can determine that students have an anxiety in Math while the statement "I am always late to the first day of math classes every year" which has a weighted mean of 1.49 and is labeled as average states that students with math anxiety is not afraid to come early in their Math class and is the least indicator why we can determine students' anxiety in Math.

Table 2: Academic Performance of Students in Mathematics

ACADEMIC PERFORMANCE		
GRADE		
INTERPRETATION	FREQUENCY	%
POOR (80 & below)	96	70.59
FAIR (81-85)	22	16.17
SATISFACTORY (86-90)	12	8.82
EXCELLENT (91 & above)	6	4.41
TOTAL	136	99.99

The table above shows that 96 students out of 136 have an average grade in Math that lies between 80 and below which is 70.59% of the total population or respondents of the study. On one hand, 22 of the respondents have an average grade in Math that lies from 81 to 85 which is 16.17% of the total population or respondents of the study. There are 12 students whose average grade in Math lies from 86 to 90 and is 8.82% of the total respondents or population labeled as "Satisfactory" while 6 out of 136 students or respondents have an average grade in Math that can be found from 91 and above and is 4.41% of the total population. As table 3 shows, most of the students are in the "poor state" in their mathematics performance with a percentage of 70.59.

Table 3: Association between Anxiety of Students in Math and Their Grades

Levels of Anxiety	ACADEMIC PERFORMANCE				
	GRADE				
		Poor (80 & below)	Fair (81-85)	Satisfactory (86-90)	TOTAL
	High (2.51-3.25)	33	4	1	38
	Average (1.76-2.50)	59	16	14	89
Low (1.00-1.75)	4	2	3	9	
TOTAL	96	22	18	136	

The table above shows that 96 students whose average in Math lies 80 and below is divided into three where 33 of it have high level of math anxiety, 59 of them have average level of math anxiety and 4 of them have low level of math anxiety. On one hand, 4 students out of 22 whose average in Math lies between 81 and 85 is part of those students who have high level of math anxiety while 16 of the 22 students have average level of math anxiety and the remaining 2 of the 22

students have low level of math anxiety. The second to the last column with the heading “Satisfactory” contains 18 students. In this column, only 12 students have an average grade in Math that lies between 86 and 90 as tallied in the table 2. The researchers fused the columns with the number of students who have an average grade in Math which lies between 86 and 90, and the range from 91 and above because there is a few number of students who belong to this category. 1 of the 18 students who are under the heading “Satisfactory” is tallied to have a high level of math anxiety, 14 of these 18 students are considered as students who have an average level of math anxiety while the remaining 3 have a low level of math anxiety. As table 4 shows, most of the students are in the “poor state” in their mathematics performance and it indicates that they have high level of anxiety in math. Therefore, as the mathematics achievement of the students increases, their level of math anxiety decreases. Contrarily, as the mathematics achievement of the students decreases, their level of math anxiety increases. The table also reveals that whether the students’ performance in mathematics is poor, fair, or satisfactory, their level of math anxiety is average which is normal.

Table 4: Result of chi-square statistical method computation

N	χ^2	d_f	χ^2_{crit} , $\alpha=.05$	Interpretation
136	6.61	4	9.49	Not Significant

The table above shows that the computed value, $\chi^2 = 6.61_{(0.05,4)}$ is less than the $\chi^2_{crit}(9.49)$, hence this failed to reject the null hypothesis.

It can be inferred that there is no significant association between the academic grades of students and their levels of math anxiety. Anxiety in math does not determine their performance grade in General Mathematics. Witt (2012) observed the same results that there is no significant correlation between students’ level of mathematics anxiety and their performance.

5. SUMMARY OF FINDINGS, CONCLUSION, RECOMMENDATIONS AND

LIMITATIONS OF THE STUDY:

This chapter presents the findings, conclusion, recommendations and limitations of the study.

FINDINGS:

The study is all about “Student’s Anxiety in Math”, where the researchers conducted a survey that made use of the rating scale in knowing the levels of anxiety of the students in relation to their mathematic performance.

The researchers aimed to know the levels of math anxiety of students of Jagobiao National High School-Senior High School Department in relation to their mathematic grade. The first part of the rating scale showed the personal information of the respondents including their average grade in math. In the first table, the data reveals that the overall weighted mean of students is 2.27. This means that most of the Grade 11 students’ math anxiety level is high.

On one hand, the second table shows that most of the students are in the “poor state” when it comes to their performance in math. In relation to this, table 3 shows that most of the students are in the average level of math anxiety. Aside from this, it is also observed that the lower one’s mathematic performance is, the higher is their level of math anxiety and vice versa.

Lastly, table 4 shows that the computed value of chi-square is 6.61 with the degree of freedom of 4. Based on the data at hand, it is concluded that there is no significant relationship between student’s math anxiety level and their mathematic performance. The null hypothesis which is “There is no significant relationship between student’s math anxiety level and their academic performance” is rejected because the computed value of chi-square is less than the critical value which is 9.49.

CONCLUSION:

The results of the study are the contrary to what is being forecasted by the researchers. Students’ level of math anxiety is not a variable to determine the relationship of math anxiety levels to the increase or decrease of the mathematic performance of the students. Levels of math anxiety cannot significantly change or affect the mathematic performance of the students based on the results of the computed value of chi-square and critical value. Therefore, no matter what happens to the level of math anxiety: high, average, low, the mathematic performance would still be the same because level of students’ math anxiety does not affect their average.

RECOMMENDATIONS:

Levels of math anxiety alone could not establish a significant relationship to mathematic performance. With that, it is reasonable enough to have the recommendations from the study conducted. Based on the results of the study conducted, the researchers of the study recommend the following:

- 1.) A school based seminar about the different levels of math anxiety and how can it incorporate with student's mathematic performance. A seminar is needed so that students can be aware of the different possibilities why they are experiencing anxiety in math.
- 2.) The teachers should continue to ponder in the hearts and minds of the students of Jagobiao National High School the possible effects of math anxiety in students' mathematic performance through (a) the conduct of activities that will enhance the students skills and knowledge about math, (b) observance of everyday responsibilities, and (c) evaluation of each student to check that all are equip with ideas and knowledge from their seminar and activities.
- 3.) On the part of the parents, they should regularly check and help their children during weekdays or even weekends in difficult activities their children cannot do in order to motivate them in doing good in class. They should learn to communicate with their children to know how their children are doing.
- 4.) The Senior High School Department of Jagobiao National High School should implement the "Learning Math 101 Policy" that will help students cope with everyday mathematics.
- 5.) The future researchers should seek dig deeper about math anxiety and how they can influence students' mathematic performance.

LIMITATIONS OF THE STUDY:

Although this research paper was carefully prepared, the researchers are still aware of its limitations.

The respondents of the study is small, we only focus on the Grade 11 students who are currently taking the course. In this manner, the data that was collected do not represent the majority of the students. Second, we adapted a research instrument from other research paper but not validated.

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