
ABSTRACT

The main objective of this study was to determine the relationship between the level of Mathematics anxiety and the academic performance of the students at the Naval State University. The data were gathered through the questionnaire from the 200 student-respondents. More than three-fourths or 82.5 percent of the students' involved in the study aged between 16 and 18 years old. Almost one-half or 48.5 percent of the students was rated "Good" as school grades in Mathematics; 86 percent had favorable attitude towards Mathematics; 44 percent from the total number of students were from the College of Engineering (COE) and College of Arts and Sciences (CAS). The remaining 42 percent were from the College of Industrial Information and Communication Technology (CICT) and College of Maritime Education (COME). More than one-half or 64.5 percent of the students have Average Anxiety. Highest Percentage of 18.5 percent from COE, 17.5 percent from COME, 16 percent from CAS, and 12.5 percent from CICT. Topping among the other Colleges was the College of Engineering (COE) when it comes to mathematics performance, 17 % of them were rated as "Satisfactory". Majority of the teachers (79.5 %) were democratic in their approach in teaching Mathematics. None of the teachers from the CICT department used autocratic approach. Other teachers from other Colleges used Democratic, sometimes autocratic or a combination of both.

KEYWORDS: Academic Performance; College Students; Mathematics Anxiety.

INTRODUCTION

Math anxiety has most often been explained according to inability to perform math calculations, such as an ability by otherwise intelligent person to cope with quantification, and more generally, mathematics, Perry (2004).

According to Bursal & Paznokas (2006), mathematics anxiety as "state of discomfort that occurs in response to situations involving mathematical tasks that are threatening to self-esteem" and "the panic, helplessness, paralysis, and mental disorganization arising among some people when they are required to solve a mathematical problem".

Oxford & Vordick (2006) added that mathematics anxiety as a disabling condition when students struggle with mathematics. This condition is a specific and real fear of mathematics that causes students to have obsessive urge to avoid mathematics completely. The declining performance in Mathematics of students in all levels has gained increasing attention over the past three decades. This has been the concern of Math educators worldwide. They complain of students' problem ranging from poor arithmetic and algebraic manipulation skills to lack of valuable geometric evaluation. In educational setting, Math ranks very close to the lowest among the eight subject areas in the college curriculum. Many students have even chosen their college major on the basis of how little Math is required for the degree (Stubblefield, 2006).

Mathematics certainly means many things to many people (Marzita binti Puteh, 2002). Mathematicians and Mathematics teachers observe that Mathematics generates so much intensity of feelings. Its adherents speak of joy, excitement and satisfaction at finally mastering the problem. Yet, for the majority, Mathematics remains an object of mystery. To some students, the mere mention of the word "Mathematics" can cause anxiety and trigger unusual

behavior, known as Mathematics Anxiety, which Mathematics teachers consider as one of the factors that hinders Mathematics learning (Tobias, 1993).

Mathematics anxiety is a problem to many people. It can occur in all levels of education from primary school to higher education, and once established, can persist in life, interfering with everyday activities involving numeracy and further learning in mathematics (Oxford & Vordick, 2006). Mathematics anxiety can have detrimental effects for college students including feeling of nervous tension, fear of rejection, and stress (Truttschel, 2002). According to Perry (2004), much like a novice golfer on the first tee, the mathematics students can seriously hamper her or his performance by being nervous and insecure towards mathematics. Many students who suffer from math anxiety have little confidence in their ability to do mathematics and tend to take minimum number of required mathematics courses, greatly limiting their career choice options. This is unfortunate especially as society becomes more reliant on mathematical literacy (Scarpello, 2005).

Mathematics educators need to recognize the causes of mathematics anxiety by reading related literature and attending workshops and conferences on the topic. Student should be made to realize that myths such as mathematics aptitude are genetic and mathematics being a male domain is simply not true (Woodward, 2004). If negative attitude are not changed, student's performance, college and career choices will be limited (Sheilds, 2006).

With the desire of the researcher to investigate and find out what could be the factors and reasons behind students' anxiety and whether such situation affects their academic performance in Mathematics, she took the immense challenge to undertake this study in order to find solution to the pressing problem. Likewise, she was also moved to contribute improvement of Math instruction by looking into the student's attitude, interest towards Math, their level of Math anxiety as well as their performance in the subject.

OBJECTIVES OF THE STUDY

The study aimed to measure the level of Math Anxiety and its relationship to the Mathematics performance of freshmen college students of Naval State University, Naval, Biliran.

Specifically, this study sought to:

1. determine the profile of students in terms of: age; high school grades in Mathematics; and attitude towards Mathematics.
2. determine the profile of the parents of the respondents in terms of: educational attainment; and monthly family income.
3. identify the teaching approaches of Mathematics teachers;
4. determine the level of performance of students in Mathematics;
5. find out the level of Math anxiety among students;
6. determine whether significant relationships exist between the students' level of Mathematics anxiety and profile of the students; profile of the parents; teaching approaches of the teachers; Mathematics performance.

FRAMEWORK OF THE STUDY

Math anxiety is an emotional reaction to Mathematics subject based on past unpleasant experience which harms future learning. A good experience in learning Mathematics can overcome unfavorable feeling which paves the way for success and future achievement by the learners in the said subject.

Figure 1 shows different factors contributing to the Mathematics anxiety of students. The three factors taken as independent variables were: students' profile, teaching approaches, and the parents' profile. The profile of the students included the age, high school grades in Mathematics, and their attitudes towards Mathematics. The teaching approach of the teacher was considered one of the main factors that primarily contributed to the anxiety of the students. To reduce the Math anxiety among students, an intervention scheme must be proposed in order to improve their Mathematics performance.

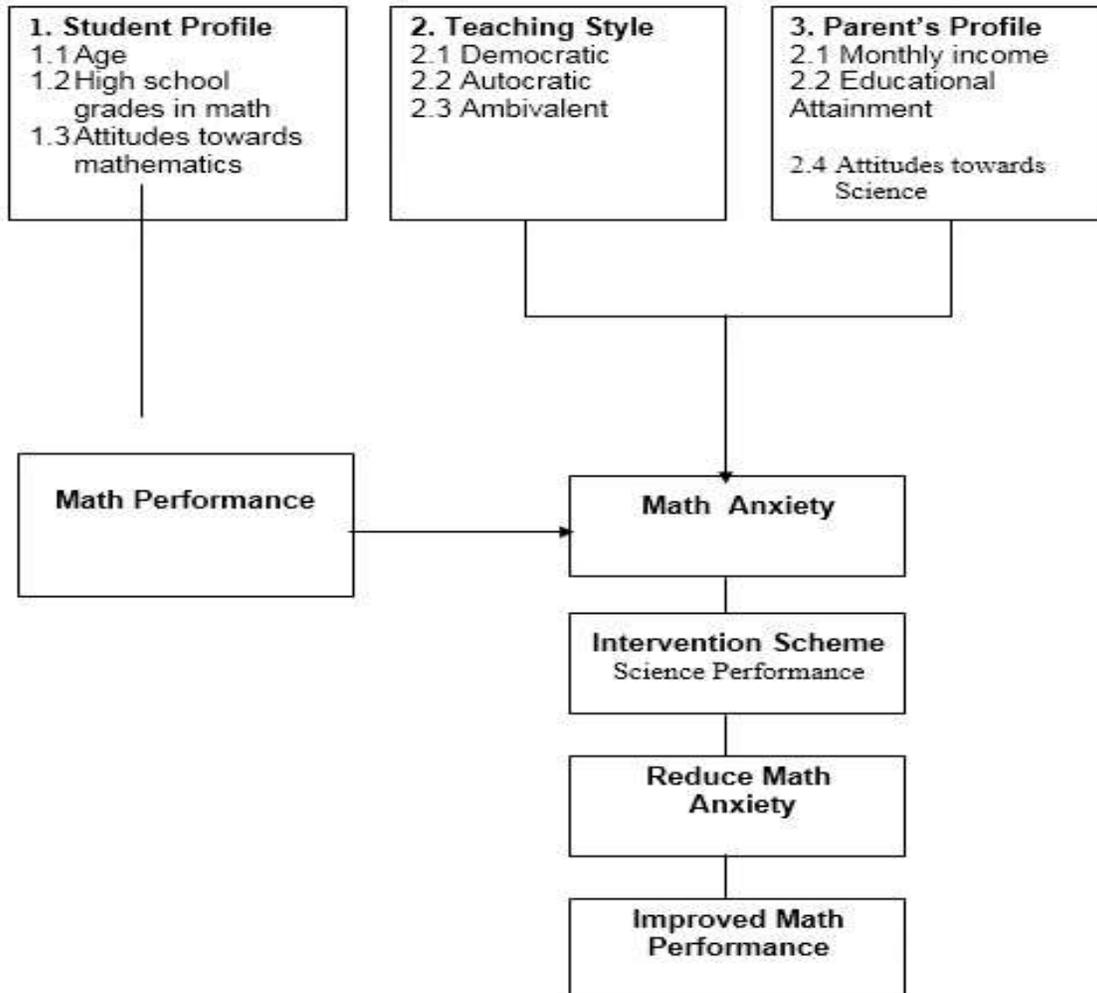


Figure 1. The Conceptual Framework of the Study

Scope and Delimitation of the Study

This study was limited only to the level of Mathematics anxiety of the freshmen College students of Naval State University and their performance in Mathematics. This study consisted of 200 students coming from the different departments which were randomly selected. Parents of the students were also included as subjects of the study. The variables considered were: age, high school grades in Math, students' attitudes towards Mathematics, teaching styles of the teachers, educational qualification and monthly income of the family and educational attainment of the parents. The departments involved in the study were the following: College of Industrial Information and Communication Technology, College of Engineering, College of Arts and Sciences, and the College of Maritime Education.

METHODOLOGY

This study adopted the descriptive method of research which aimed to determine relationships between Math anxiety and academic performance of the freshman college students of Naval State University. Questionnaires were used in the collection of data and served as basis for drawing out necessary information and outputs in determining the main objectives of the study. The study was conducted at the Naval State University, Naval Biliran. The subjects of the study were the freshmen college students taking up College algebra at Naval State University. The Colleges involved in the study were: Arts and Sciences, Industrial Information and Communication Technology, Engineering, and Maritime Education. The respondents were randomly selected with only fifty (50) students from each college. The distribution of the respondents by college is shown in Table 1.

Table 1. Respondents of the Study

Colleges	Respondents	Percentage (%)
College of Arts and Sciences (CAS)	50	25
College of Industrial Information and Communication Technology (CICT)	50	25
College of Engineering (COE)	50	25
College of Maritime Education (COME)	50	25
Total	200	100

The following statistical procedures were used to test the null hypothesis of the study. Percentage, Pearson Product – Moment Coefficient of Correlation, and T -test.

RESULTS AND DISCUSSION

This chapter presents the analysis and interpretation of the data gathered from the questionnaire which were subjected to statistical testing.

The data gathered in this study include the profile of the respondents: age, high school grades in Mathematics, and attitudes towards Mathematics. It also includes data on the level of Math anxiety, academic performance through the achievement test, and the teaching approach of the teacher teaching Mathematics.

Personal Profile of the Student

Age. The age profile of the Freshmen College Students of the Naval State University is depicted in table 2.

Table 2 Age Profile of the Respondents

Age	CAS	CICT	COE	COME	Total	%
22 and above	1	4	3	2	10	5
19 – 21	4	8	3	7	22	11
16 – 18	44	38	42	41	165	82.5
15 and below	1	0	2	0	3	1.5
Total	50	50	50	50	200	100

As reflected in table 2, majority or 82.5 percent of the respondents' ages ranged from 16 to 18 years old. Only 10 or 5 percent were 22 years old and above and only 3 or 1.5 percent were 15 years old and below. This implies that most of the students were in their appropriate age as freshmen college student.

High school grades in Mathematics of the respondents. The high school grades in Mathematics of the respondents are presented in Table 3.

Table 3 High School Grades in Mathematics of the Respondents

Grades	CAS	CICT	COE	COME	Total	%
95 and above	0	0	1	0	1	0.5
90 - 94	1	1	11	2	15	7.5
86 – 89	4	9	13	10	36	18
80 – 85	26	22	17	32	97	48.5
76 – 79	16	14	8	6	44	22
75	3	3	0	0	6	3
71 – 74	0	1	0	0	1	0.5

70	0	0	0	0	0	0
Total	50	50	50	50	200	100

Table 3 shows the frequency and percentage distribution of the respondents' high school grades in Mathematics. The grades were obtained from the student's high school report card which was filed upon enrollment at the Registrar's office. The ratings were categorized into: Excellent (95 and above), Outstanding (90 – 94), Very good (86 – 89), Good (80 -85), Fair (76 – 79), Poor (75), Conditional (71 – 74) and Failed (70). As reflected in the table above, most of the respondents got a grade between 80 to 85 which is “ *Very Good* “. COME led with a frequency of 32 students, 26 from CAS, 22 from CIICT and 17 from COE which comprises the 48.5 % of the total number of respondents. Only 1 or 0.5 percent from COE got a grade of 95 and above which is interpreted as “ *Excellent* “. Another respondent from CIICT got a grade between 71 to 74 which is considered “ *Conditional* “. This only implies that most of the respondents performed well in Math during their secondary years.

Attitudes of students towards Mathematics. The respondents' attitudes towards Mathematics were determined and presented in table 4.

Table 4 *The Attitude of the Respondents Towards Mathematics*

Scores	CAS	CIICT	COE	COME	Total	%
81 – 100	3	1	4	1	9	4.5
61 – 80	44	42	44	42	172	86
41 – 60	3	5	2	7	17	8.5
21 – 40	0	2	0	0	2	1
1 – 20	0	0	0	0	0	0
Total	50	50	50	50	200	100

There were five indicators under this variable, namely: Very favorable (81 – 100), Favorable (61 – 80), Neutral (41 – 60), Unfavorable (21 – 40) and Very unfavorable (1 – 20). As reflected in table 4, there were 172 or 86% of the students whose responses ranged from 61 to 80 and were described as “ *favorable* “. Four point five percent of the responses corresponded from 81 to 100 which are “ *very favorable* ” and those responses were from COE which had 4, CAS had 3 CIICT and COME had both 1. None from the respondents viewed Mathematics as very unfavorable. This only shows that most of respondents have favorable attitude towards Mathematics subject.

Profile of the Parents of the Respondents

Parent's educational attainment. The educational attainment of the Parent of the Respondents is presented in table 5.

Table 5 *Educational Attainment of the Parent of the Respondents*

Educational Attainment	CAS	CIICT	COE	COME	Total	%
Elementary level	2	4	2	2	10	5
Elementary Graduate	3	4	2	3	12	6
High School Level	2	7	5	4	18	9
High School graduate	5	13	7	12	37	18.5
College level	29	16	19	24	88	44
College Graduate	9	6	15	5	35	17.5
Total	50	50	50	50	200	100

As shown in table 5, majority of the respondents' parents were college level. It comprised the 44 percent of the totality of the respondents. Most of these parents were from the College of Arts and Sciences (CAS) followed by College of maritime Education (COME), College of Engineering (COE) and College of Industrial, Information and Communication Technology (CIICY). There were 10 of the parent's respondents who were elementary level and most of these parents were from CIICT. There were 17.5 percent college graduates in which majority of them came from the College of Engineering (COE). It only suggest that most of the parent's respondent were not able to finish their college degree.

Monthly income of the family. The parents of the respondents monthly income is provided in Table 6. The monthly income of the parent's respondents were categorized as 2000 and below, 2001 – 5,000, 5001 – 10,000, 10,001 – 20,00, and 20,001 and above.

Table 6 Monthly Income of the Parent's Respondents

Monthly Income	CAS	CICT	COE	COME	Total	%
P 20,001 and above	2	3	2	8	15	7.5
P 10,001 – P 20,000	5	8	12	6	31	15.5
P5,001 – P10,000	13	14	8	13	48	24
P2,001 – P 5,000	20	11	18	13	62	31
P 2,000 and below	10	14	10	10	44	22
Total	50	50	50	50	200	100

It can be gleaned from Table 6 that out of the five category, one category had the highest frequency of 62 or 31% for income between P2,001.00 to P5,000. Most of these parents were from CAS with a frequency of 20, followed by COE with frequency of 18 COME with frequency of 13 and CICT with 11. Only 7.5% had an income of P20,001 and above and most of these parents were from COME. However, 22% of the parent's respondents have monthly income of P2,000 and below and most of these parents were from CICT. It only implies that majority of the parent's respondents belonged to low income level of life.

Teaching approaches of the teachers in Mathematics. Table 7 presents the frequency and percentage distribution of the preferred teaching approaches of Mathematics teachers. To determine the teaching approach used by the teacher, the respondents were asked to answer ten (10) statements for autocratic and ten (10) statements for democratic. The respondents were able to indicate when the teacher always, often, sometimes, rarely, and never used democratic or autocratic style in teaching his/her students.

Table 7 Teaching Approaches of the Teachers in Mathematics

Teaching Approach	CAS	CICT	COE	COME	Total	%
Democratic Teaching Approach	40	43	40	36	159	79.5
Ambivalent Teaching Approach	7	7	8	9	31	15.5
Autocratic Teaching Approach	3	0	2	5	10	5
Total	50	50	50	50	200	100

As reflected in table 9, majority of the teachers employed democratic teaching approach. There were 79.5 percent of them led by CICT among the four colleges involved. There were only 5 percent of the teachers who practiced autocratic and most of them were from COME. The rest were ambivalent in terms of their teaching approach. This only implies that most of the times the teacher use the democratic way of teaching.

Performance of the students in Mathematics. Table 8 reflects the frequency and percentage distribution of the students' performance in Mathematics. The performance of the students were obtained from the result of the test administered by the teacher. The ratings of the students were categorized into Outstanding (41 – 50), Very satisfactory (31 – 40), Satisfactory (20 – 31), Needs improvement (10 – 19) and Poor (0 – 9).

Table 8 Performance Profile of the Students in Mathematics

Raw Scores	CAS	CICT	COE	COME	Total	%
41 – 50	0	0	2	0	2	1
31 – 40	2	8	34	4	48	24
20 – 30	27	28	12	27	94	47
10 – 19	20	12	2	18	52	26

0 – 9	1	2	0	1	4	2
Total	50	50	50	50	200	100

As depicted in the table above , 47 percent of the scores were from 20 to 30 which is interpreted as “satisfactory “. The highest frequency of 28 came from CICT followed by CAS and COME which have both the frequency of 27 and COE with 12. Only 1 percent of the students were rated as “outstanding” from the College of Engineering (COE). There were only 2 percent rated “poor” that came from other colleges except for COE. This only reveals that most of the students are not low performing in Mathematics subject.

Level of Mathematics Anxiety of the Students. The level of Mathematics Anxiety among students is presented in table 9. The level of math anxiety of the students was categorized into four: high anxiety for students with scores of 76 to 100, average anxiety for scores 51 to 75, low anxiety for scores 26 to 50 and no anxiety for scores of 1 to 25.

Table 9 Level of Mathematics Anxiety of the Students

Scores	CAS	CICT	COE	COME	Total	%
76 – 100	4	5	3	3	15	7.5
51 – 75	32	25	37	35	129	64.5
26 – 50	14	20	10	12	56	28
1 – 25	0	0	0	0	0	0
Total	50	50	50	50	200	100

As shown in table 9, majority of the students’ responses fell from 51 to 75 which is described as “average anxiety”. The students from the College of Engineering (COE) topped in terms of having average anxiety. Only 7.5 percent of the students responses were from 76 to 100 which correspond to “high anxiety” and most of these students were from CICT. There were no responses under 1 to 25 which is described as “no anxiety”. It only implies that Math anxiety among students is only average and a remedy can be done in order for them minimize and/or to overcome their Math anxiety.

Relationship of Variables

Level of Mathematics anxiety and the age profile. Table 10 shows the relationship between the level of Math anxiety and the Age profile of the Students.

Table 10 Relationship between the Level of Mathematics Anxiety and the Age Profile

Variables	r	Ct	TV	Interpretation
The level of Math Anxiety and the Age profile of the students	0.17	0.24	4.303	Accepted

The relationship between the age and the level of Math anxiety of the students is revealed in table 10. The r value was found to be slightly correlated or negligible relationship. The t value computed at 0.05 level of significance was 0.24 which is less than the table value of 4.303 with the degree of freedom of 2. It only implies that the age of the respondents has no significant relationship to the Mathematics anxiety of the students.

Level of Mathematics Anxiety and high school grades in Mathematics of the students. The relationship between the level of Mathematics anxiety and the High School grades in Math of the students is presented in Table 11.

Table 11 Relationship between the Level of Mathematics Anxiety of the Students and their High School Grades in Mathematics

Variables	r	Ct	TV	Interpretation
The level of Math Anxiety of the students and their high school grades in Math	-0.17	-0.39	2,571	Accepted

As shown in table 11, the computed r value on the relationship between the level of Math anxiety of the students and their High School grades in Mathematics was -0.17 and therefore negligible relationship. The computed t value of -0.39 was much lesser than the table value of 2.571 with the degree of freedom equal to 5 at 0.05 level of significance. This only indicates that the students' high school grades in Math are not related to their anxiety.

Level of Mathematics Anxiety and the students' attitude towards Mathematics. The relationship between the level of Math anxiety of the students and their attitude towards Mathematics is presented in Table 12.

Table 12 Relationship between the level of Mathematics Anxiety of the Students and their Attitude towards Mathematics

Variables	r	Ct	TV	Interpretation
The level of Math Anxiety of the students and their Attitude towards Math	0.91	7.287	2.201	Rejected

As reflected in the table, the computed value of r was 0.91 which is described as very high correlation. The computed t value of 7.287 at 0.05 level of significance with the degree of freedom equal to 11 was higher than the table value of 2.201. This means that there is an existing relationship between the level of Math anxiety of the students and their attitude towards the subject.

Level of Mathematics anxiety of the students and educational attainment of their parents. The relationship between Mathematics Anxiety of the students and the Educational Attainment of their parents is presented in table 13.

Table 13 Relationship between Mathematics Anxiety of the Students and their Parent's Educational Attainment

Variables	r	Ct	TV	Interpretation
The level of Math Anxiety of the students and their Parents Educational Attainment	0.97	7.98	2.776	Rejected

Table 13 shows that the computed r value was equal to 0.97 which is interpreted to be of very high correlation or very dependable relationship. The computed t value at 0.05 level of significance with the degree of freedom of 4 was 7.98 which is higher than the table value of 2.776. This shows that the Math anxiety of the students is related to the educational attainment of their parents.

Level of Mathematics Anxiety and Family's Monthly Income. The relationship between level of Math anxiety of the students and their family's monthly income is reflected in table 14.

Table 14 Relationship between Mathematics Anxiety of the Students and the Monthly Income of the Family

Variables	r	Ct	TV	Interpretation
The level of Math Anxiety of the students and the monthly income of the family	-0.28	-0.5	3.182	Accepted

As depicted in table 14, the computed r value was -0.28 which is a negative correlation. The t value computed at 0.05 level of significance with the degree of freedom of 3 was -0.5 which is very much lesser compared to the table value of 3.182. It only implies that the Math anxiety of the students is not related to the family's monthly income. The financial status of the family has nothing to do with the Math anxiety of the students.

The level of Math anxiety of the students and the teaching approach used by the teachers in Mathematics. The table below presents the relationship between the Math anxiety of students and the teaching approaches of the teachers teaching Mathematics.

Table 15 Relationship between Mathematics Anxiety of the Students and the Teaching Approach used by the Teachers in Mathematics

Variables	r	Ct	TV	Interpretation
The level of Math Anxiety of the students and the Teaching Approach used by the Teachers in Math	-0.69	-0.958	12.706	Accepted

As reflected in table 15, the computed r value was equal to -0.69 which is interpreted to be negligible relationship or no correlation at all since the computed value was negative. The t value computed at 0.05 level of significance with the degree of freedom equal to 1 was -0.958 which is very much lesser than the computed value of 12.706. This means that the teaching approach used by the teachers in Mathematics has nothing to do with the Math anxiety of the students. *The level of Mathematics anxiety and the Mathematics performance of the students*. The relationship between the level of Math anxiety of the students and their performance in Mathematics is shown in table 16.

Table 16 Relationship between the level of Mathematics Anxiety and the Performance in Mathematics of the Students

Variables	r	Ct	TV	Interpretation
The level of Math Anxiety and the performance of the students in Math	0.42	0.7985	3.182	Accepted

As revealed in table 16, the computed r value on the relationship between the level of Math anxiety and Math performance of the students was equal to 0.42 which is considered to be in moderate correlation or substantial relationship. The t value computed at 0.05 level of significance with the degree of freedom equal to 3 was 0.7985 which is lesser than the table value of 3.182. The null hypothesis that there is no significant relationship between the level of Mathematics anxiety and the Mathematics performance of the students is accepted.

CHAPTER IV

Summary, Conclusion And Recommendation

This chapter presents the summary of the findings and the conclusions derived from the outcome of the study and the recommendations forwarded.

Summary of Findings

This study purported to determine the relationship between the level of mathematics anxiety and the academic performance of students at Naval State University.

Using the descriptive method of research, the following findings were revealed:

Profile of the students. The age of the student respondents ranged from 15 to 22 above. Majority of the respondents (82.5) belonged to the age bracket of 16 to 18 years old. Considering their high school grades in Mathematics, most students had a grade of 80 to 85 (48.5 percent) which is rated as “Good”. Out of the total number of respondents 86 percent or majority had favorable attitude towards Mathematics,

Profile of the parent’s respondents. Majority of the parents (44 percent) of the respondents were College level, and most of these parents were from CAS. Majority of the respondents’ parents (31 percent) had a monthly income between P 2,000 and P 5,000.

Teaching approaches of the teachers in Mathematics. There were 79.5 percent teachers who preferred to use democratic approach in teaching Mathematics as compared to those who use autocratic or ambivalent approach.

Performance of the students in Mathematics. Most of the scores of the respondents from the achievement test ranged from 20 to 30 which is interpreted as “satisfactory”.

Level of Mathematics anxiety of the respondents. There were 129 or 64.5 % of the respondent's responses ranged between 51 to 75 which is interpreted as "average anxiety".

The study revealed that there is no significant relationship between the level of Mathematics anxiety of the students and their age profile, high school grades in Mathematics, teaching approaches used by the teachers, their performance in Mathematics and the family's monthly income.

The study showed that there is an existing relationship between the level of Mathematics anxiety of the students and their attitude towards the subjects as well as the educational attainment of their parents.

CONCLUSIONS

After thorough analysis of the result on the findings gathered from the study, the following conclusion were drawn: The level of mathematics anxiety and the attitudes of the respondents towards the subject are correlated. The student's favorable attitude towards math is congruence to the average anxiety of the students. It is also functionally dependent on the attitude of the respondents towards the subject. Students with favorable attitude may perform better in the achievement test as compared to the students with unfavorable attitude. Students having high achievement in math have less anxiety levels than that of low achieving students.

The educational attainment of the parent's respondent has something to do with the level of math anxiety of the respondents. Parents' attitude can affect the students' level of anxiety that would result also to poor academic achievement especially those parents who are also math anxious. Math anxious parents may be less effective in explaining math concepts to their children and may not respond well resulting to poor math performance.

The teaching approach used by the teacher has nothing to do with the level of math anxiety of the respondents. The teacher's way of teaching is most of the time democratic which means involving students on a regular basis and in developmentally appropriate ways, shared decision making that increase the student's responsibility for helping to make the classroom a good place to learn.

RECOMMENDATIONS

Based on the conclusions made, the following recommendations are highly offered.

1. Mathematics teacher could enhance the students' attitude towards math through effective teaching strategies.
2. Parents must continue to inspire, guide, and encourage their children to establish reading and study habits for Mathematics.
3. It is highly recommended that the teachers should continue pursue further studies for professional growth in order to become more effective and efficient especially those in the field of Mathematics.
4. Mathematics teachers should teach students' study habits, raise student's confidence in their mathematical abilities and provide more hands on activities during mathematics class.
5. Mathematics teachers should be trained to address anxiety problems of individual student.
6. An Anxiety rating scale exam must be conducted every semester by Math teachers to determine and monitor the anxiety of the students.
7. A similar research may be conducted to investigate the development of Math anxiety and its relation to Math performance of the students.

LITERATURE CITED

- [1] Ashcraft, M. H. (2002). "Math anxiety: Personal, educational, and cognitive consequences, current directions in psychological science", Vol 11 (5), October, 181-185. Retrieved, December 12, 2010 from "<http://wiki.ed.Uiuc.Edu/index.php/Math> Anxiety.
- [2] Ashcraft, M. H & Faust M. W. (1994). Mathematics and Mental arithmetic performance: An exploration investigation cognition and emotion. E(2) 97 – 125.
- [3] Ashcraft, M & Kirk, T. (2001). "The relationships among working memory, math anxiety, and performance", Journal of Experimental Psychology
- [4] Afuwape, M. O. (2003). Test anxiety as determinant of examination misdeamnor among some Nigerian secondary schools students. Ibadan J, Educ., 3: 32 – 39.

- [5] Barnes, A. (2006). Investigating the causes of Math anxiety in the High school classroom. In L.P. MyCoy (Ed.) Proceedings of studies in teaching, 2006 Research digest (pp 13 – 18). NC: Winston – Salem. Retrieved, December 21,2010,from,<http://www.wfu.edu/education/gardtea/forum06/proceedings06pdf>.
- [6] Bursal M. & Paznokas, L. (2006). Mathematics anxiety and Preservice Elementary teacher’s confidence to teach mathematics and Science. *School Science and Mathematics*, 106, 173 – 180.
- [7] Dossel S. (1993). Math anxiety. *Australian Mathematics Teachers* 49 (1) 4 – 8. Retrieved, December 2, 2010 from <http://www.eric.ed.gov/ERICWEBPortal/searchdetailminijsp?-nfpb=true&-ERICExtSearchValue-O=EJ496892&ERICEXTSearch>.
- [8] D’Ailly, H. & Bergering, A. J. (1992). Mathematics anxiety and Mathematics avoidance behavior: Validation study of two factor. *Educational and Psychological measurement*, 52 (2), 369-378. Retrieved, December 2, 2010 from EBSCO database.
- [9] Furner, J. M. & Beermen, B. T. (2003). Confidence in their ability to Mathematics: The need to eradicate Math anxiety so our future students can successfully compete in a high-tech globally competitive world. Florida Atlantic University and Contra Costa County Office of Education, California. Retrieved, January 15, 2011 from [Http://people.exeter.ac.uk/PEErnest/porne18/furnermathanxiety2.htm](http://people.exeter.ac.uk/PEErnest/porne18/furnermathanxiety2.htm).
- [10] Gowlding, M., Rowland, T. & Barber, P (2002). Does it matter? Primary Teacher Trainee’s subject knowledge in Mathematics. *British Educational Research Journal* Volume 28, issue 5. Retrieved, January 14, 2011 from www.tandfonline.com/doi/abs/10.1080/0014119202200001554939.
- [11] Hadfield, O. D. & McNeil, K. (1994). The Relationship between Myers-Biggs Personality and Mathematics type and Mathematics anxiety among Preservice elementary teachers. *Journal Instruction Psychology*, 21(4), 375 -384. Retrieved, January 4, 2011 from <http://www.freepatentsonline.com/articlecollege-student-Journal/86289422.htm>.
- [12] Hadfield, O. & Trujillo, K. M. (1999). Tracing the Roots of Mathematics anxiety through depth – interviews with Preservice elementary teachers. *College Journal* , 33 (2).
- [13] Ma, X. (2003). Effect of Early acceleration of students in Mathematics on attitude towards Mathematics and Mathematics anxiety. *Teachers College Record*, 105(3), 438-463.
- [14] Marzita, P. (2002). Qualitative Research approach towards factors associated with Mathematics anxiety. Sultan Idris Education University, Malaysia. Retrieved, January 22, 2011 from <http://www.mes3learning.aav.dk/Projeits/Puteh.pdj>.
- [15] Mendoza, Ronnie D., “ Student’s Scholastic Performance in Algebra Across National High School in Western Biliran” Master Thesis, Naval Institute of Technology, Naval Biliran, 2006
- [16] Mendez, Virgilia A. “Elementary Teachers Strategies in Teaching Mathematics in Calubian, Leyte Districts” Master Thesis, Naval Institute of Technology, Naval Biliran, 2008
- [17] Miller, L. D. & Mitchell, C. E. (1994). Mathematics anxiety and alternative Methods of Evaluation. *Journal of International Psychology*, 21(4), 353-358.
- [18] Olatunde, Yara Philiat (2009). “ Math Anxiety and Academic Achievement in Some Selected Senior Secondary Schools in Southwestern Nigeria “. *Pakistan Journal of Social Sciences*. Vol 6.,Issue. 3 ,page no: 133 – 137. Retrieved on March 22, 2011 from [Http://www.medwelljournals.com](http://www.medwelljournals.com).
- [19] Oxford, J. & Vordick, T. (2006). Math anxiety at tarleton State University: An empirical report. Tarleton State University.
- [20] Perry, A. B. (2004). Decreasing Math anxiety in College students. *College students Journal*, 38(2), 19-20.
- [21] Richardson, F. C. & Suinn, R. M. (1972). The Mathematics anxiety Rating Scale: Psychometric data. *Journal of Counselling Psychology*, 19,551-554. *European Journal of Social Sciences – Volume 16, Number 1 (2010)*.
- [22] Ridley, K. S. (2005). Math anxiety and its Cognitive consequences: a tutorial review. In J. Cambell (Ed.). *Handbook of Mathematical Cognition*. New York: Psychology Press. Pp 315-327.
- [23] Scarpello, G.V., (2005). The effects of Mathematics anxiety on the course and career choice of high school vocational – technical education students. Unpublished Doctor of Philosophy Thesis, Drexel University. Retrieved. January 20, 2011 from <http://idea.library.drexel.edu/bitstream/1860/49218/scarpello.Gary.pdf>.
- [24] Sheilds, D. C. (2006). Causes of Math anxiety: The students perspective. Unpublished doctoral dissertation, Indiana University of Pennsylvania, Indiana. Retrieved, January 13, 2011 from <http://math.usm.my/research/online/POC/ED12.pdf>.

- [25] Slavin, R. E. (2003). Educational Psychology. Boston: Allyn and Bacon. Retrieved, January 13, 2011 from http://vitt.fsu.edu/_website/papers/W7_slavin_revised.pdf.
- [26] Smith, S. & Littlefield, S. (1994). An outline of Best Methods of study, New York: Barnes and Noble Inc. Retrieved, December 28, 2010 from books.google.com.ph/books?id=hEWd10hVnusC&pg=PA98&dg=Smith=1948+math+anxiety&source=bl&ots=V6LHLZnyl6&sig=9PEHXORP.
- [27] Stubblefield, L. (2006). Mathematics anxiety among GED Recipients in Four-Year Institutions. Journal of Mathematics Science & Mathematics Education, 19 – 22. Retrieved, January 14, 2011 from <http://www.msme.us/2006-2-4.pdf>.
- [28] Sutter, C. M. (2006). The Anxiety levels and perception of Mathematics learners from a Midwestern Technical College on selected classroom climate factors mitigating the effects of math anxiety. Unpublished Master of Science Project Paper, University of Winconsin, Stout. Retrieved, January 15, 2011 from <http://www.uwstout.edu/lib/thesis/2006/2006sutterc.pdf>.
- [29] Tobias, S. *Overcoming math anxiety*, W.W. Norton & Company, Inc., New York. Copyright 1978.
- [30] Truttschel, W. J. (2002). Mathematics anxiety at Chippewa Valley Technical College. Unpublished Master of Science Project Paper, University of Winconsin, Stout. Retrieved, January 14, 2011 from <http://www.uwstout.edu/lib/thesis/2002/2002truttschellw.pdf>.
- [31] Turner P. H., Meyer, D. K. & Midley, C. (2003). How teachers establish Psychological environment during the first days of school: Associations with avoidance in Mathematics. Teachers College Record, 105(8), 1521 -1558.
- [32] Vinson, B. M. (2001). A comparison of Preservice Teacher’s mathematics anxiety before and after a methods class emphasizing manipulatives. Early childhood education Journal Vol. 29 issue 2, pp 89 – 94. Retrieved, January 14, 2011 from [Link.springer.com/article/10-1023%3a1012568711257?LI=Trere](http://link.springer.com/article/10-1023%3a1012568711257?LI=Trere)
- [33] Watson, J. B. & Rayner, R. (1920). Conditional, Emotional reactions. Journal of Experimental Psychology, 3, 1-4. Retrived, January 14, 2011 from www.uady.mx/~contadur/sec-cip/articulos/libros_online/Educacion/lawrenceErlbaum2004FoundationsforResearchmethods.
- [34] Woodard, T. (2004). The effects of Math anxiety on Post-secondary developmental students as related to achievement, gender, and age. Inquiry, 9(1), 1-3. Retrieved, December 15, 2010 from www.vccaedu.org/inquiri~spring2004/i-91-woodard.html.