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The Influence of Mathematical Test Anxiety and Self-Efficacy on Students' Performance

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ABSTRACT

The purpose of this study was to investigate the relationships between the students' self-efficacy, test anxiety and performance on Mathematics of Saint Joseph College, Junior High School Department for SY 2019-2020. The respondents of the study were randomly chosen junior high school students. Descriptive correlational method of research was used. The data gathered were statistically treated using the Excel and IBM SPSS programs, which summarize the percentage scores, weighted means, correlation coefficients, independent t-test values, and corresponding p-values of relevant statistical tools. Findings indicated that, at average, the students were not confident on their mathematical self-efficacy, moderately anxious on their mathematical test anxiety and satisfactory on their mathematical performance. More findings showed that the following variables have significant relationships: mathematical anxiety and mathematical self–efficacy; mathematical self-efficacy and mathematical performance; and mathematical test anxiety and mathematical performance. The higher the self-efficacy level, the lower the degree of test-anxiety; the higher the self-efficacy, the better the mathematics performance; and the lower the test-anxiety, the better the performance. The study recommends regular conduct of diagnostic tests on mathematical self-efficacy and test anxiety and design programs to address the enhancement of learners' mathematical self-efficacy and reduce their mathematical test anxiety. The researcher recommends Mathematics Learning Development Program (MLDP) as the output of the study.

Keywords: self-efficacy, mathematical test anxiety, MLDP, performance

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INTRODUCTION

Mathematical methods encompass every field of human endeavors and play a fundamental role in economic development of a country. In our journey towards scientific and technological advancement, we need nothing short of good performance in mathematics at all levels of schooling. Its application is irrefutable but only few are interested and moreover, most of today's generation is passive and anxious when it comes to learning math.

According to the National Association for the Education of Young Children, the mathematics skills that students learn at a young age build a foundation for future learning endeavors and can be a good indicator of whether young people will be able to meet and overcome new challenges as they mature. Likewise, mathematical demands on students, increase as they progress through school; take up their adult lives at home and in the workplace. In order to function in a mathematically literate way in the future, students must have a strong foundation in mathematics. A strong foundation involves much more than the rote application of procedural knowledge. Ontario Ministry of Education report in 2004 shows that, all students should be able to understand, make sense of, and apply mathematics. Students should make connections between concepts and see patterns throughout in mathematics (Lambdin, 2009). It is also noticed that students who are good in math are more confident and had better chances of success in the future.

However, despite the unquestionable usefulness of mathematics in real life, there are factors that considerably affect the learners' ability to understand and apply mathematics concept. This can be manifested where there is a continuous decline of the performance among young learners in mathematics. This disappointing condition is evident in international and national surveys in mathematics. The recent result of the Programme for International Student Assessment (PISA), a worldwide study of Organization for Economic Co-operation and Development (OECD), showed that Philippines ranked 78th out of 79 countries on their 2018 survey is one evident. Furthermore, the country ranked 42nd among 45 countries in the 2003 Trends in International Mathematics and Science Studies (TIMSS) for the high school students. In addition, the National Achievement Test (NAT) for secondary Math barely breaches the 50% mean percentage score since the first time this national test was conducted.

Many studies over the years have indicated that many people have extremely negative attitudes towards mathematics, sometimes amounting to severe anxiety (Maloney & Beilock, 2012). The estimates of the prevalence of mathematics anxiety vary. Researchers found out a low of 2-6% (Chinn, 2009) and Johnston-Wilder et. al. (2014) said that about 30% of a group of apprentices showed high mathematics anxiety, with a further 18% affected to a lesser degree. There is no doubt, even when taking the lowest estimates, that anxiety in mathematics is a very significant problem.

Many factors could be attributed to dismal performance of the students in mathematics. Educators observed and agreed that one of the causes of the low performance in the subject is due to anxiety where learners develop as they tackle math subjects. 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). One of the most common forms of math anxiety is math test anxiety.

Test anxiety is not beneficial to the learners. Test anxiety can interfere with the normal thought processes, inhibit the recall information, and therefore prevent success (Lee, 1999). It showed clear evidence of performance deficits caused by the inability of the learners to retrieve task related information. Math test anxiety most often appears initially as a mental block on a particular problem--often one that the student knew how to do moments before the test. Worry over the original problem can lead to more generalized worry and negative self-talk, which can sabotage the student's overall test performance. According to Lou et al. (2009), learning mathematics is about a student's emotional state. Students feeling a high level of anxiety about mathematics test will lower their success in the subject. This imminent failure in the subject caused by high anxiety can possibly be countered by the students' self-efficacy.

Self-efficacy is the learners' judgments regarding their capabilities to carry out future tasks or challenges. These judgments of capability are related to important learning behaviors such as effort and

persistence, performance, and choice of career path. In order to support students' continued engagement with and learning of mathematics, it is important to consider how students make sense of their mathematical experiences as well as the relationship between students' mastery experiences and mathematics self-efficacy.

Research into self-efficacy has established that learners who express high self-efficacy in an academic domain tend to perform better on tasks in the domain than peers who report low self-efficacy (Pajares & Schunk, 2001). However, the experiences of the researcher as classroom teacher, has observed that a lot of students do not have the confidence that they can perform mathematical tasks successfully for their self-efficacy is low.

It is with these premises that the researcher as a teacher in mathematics, would like to investigate if mathematical test anxiety and low mathematical self-efficacy could lower mathematical performance. Furthermore, the researcher would like to investigate on the possible causes of mathematical test anxiety among students in order to come up with possible interventions that could improve students' performance.

Research Questions

The purpose of this study was to investigate the relationship between the students' mathematical test anxiety and mathematical self-efficacy and performance on math of Saint Joseph College Junior High School Department for SY 2019 -2020.

The following were the specific research questions:

1. What are the learners' levels of mathematical test anxiety, and mathematical self-efficacy?
2. What is the mathematical performance of the learners?
3. What is the association between mathematical test anxiety and mathematical self-efficacy of the respondents?
4. What is the associations between mathematical performance and mathematical test anxiety, and mathematical self-efficacy?
5. Are there differences on the male and female learners' mathematical test anxiety, and mathematical self-efficacy?
6. What factors cause anxiety during the test?
7. What output can be proposed based on the findings of the study?

RESEARCH METHOD

Research Design

The purpose of this quantitative study is to learn whether there is a relationship between mathematical test anxiety, mathematical self-efficacy, and students' mathematical performance. The study looked for the levels of measures of mathematical test anxiety, mathematical self-efficacy, and mathematical performance for all grade levels of the junior high school for both genders. This study used the descriptive and correlational designs of quantitative research. Descriptive design since it described the current status of the students' level of mathematical test anxiety, mathematical self-efficacy, and mathematical performance. Correlational design because it explored the relationship between mathematical test anxiety, mathematical self-efficacy and mathematical performance using statistical analyses. However, it does not look for cause and effect and therefore, is also mostly observational in terms of data collection. Moreover, the researcher is interested in understanding the problem of mathematical test anxiety and math self-efficacy affecting students' performance in mathematics at the junior high school level.

Participants

The respondents of this study were the grades 7 - 10 junior high school students of Saint Joseph College for the SY 2019-2020. Random sampling was used in this study. Students were randomly selected across each grade levels and gender. They were made to answer specific questions of the research employing their best judgement.

Data Analysis

It presents the data gathered from the elicited responses of the respondents and data retrieved from the subject teachers handling mathematics. Moreover, it displays the analyses of the data to test statistically the hypotheses and answers the questions of the study. The presentations are in tables and follow the sequence of the specific problems as presented in chapter 1 of this study. Comparison of mathematical test anxiety and mathematical efficacy and their associations with the mathematical performance of the learners were the focus of the study. Causes of mathematical test anxiety were also analyzed. Succeeding tables summarized the results.

FINDINGS AND DISCUSSION

Results

The Levels of Mathematical Test Anxiety and Mathematical Self-Efficacy. The levels of mathematical test anxiety and mathematical self-efficacy of the learners were determined using a checklist composed of fourteen questions per questionnaire uploaded into the Genyo platform of DIWA Systems, Inc. The questions were patterned from the modified Test Anxiety Inventory (TAI) for the test anxiety and modified Mathematical Self-Efficacy Questionnaire (MSEQ) for the self-efficacy.

Table 1. Level of Mathematical Test Anxiety of the Learners

Group	No. of Cases	%	Average Weighted Mean (AWM)	SD	Overall Description
Not Anxious	20	8.2	1.39	0.117	
Low Anxious	88	35.9	2.11	0.208	
Moderately Anxious	68	27.8	2.59	0.116	Moderately Anxious
High Anxious	69	28.2	3.27	0.300	
All	245	100	2.51	0.606	

As projected in the table, at average, the learners saw their mathematical anxiety level at the ***moderately anxious*** level with moderate degree of distribution as indicated by the standard deviation score. The average weighted mean is almost at the middle of the range of the anxiety scale and standard deviation score implies that the students evaluate themselves quite differently which may be because of their varying experiences, interests towards the subject and expectations on mathematics assessments. Moderately anxious students somewhat manifest at some degree the symptoms of test anxiety. They are still fearful of mathematical test but not as extreme as the high anxious students.

Less than ten percent of the learners were considered ***not anxious*** of mathematics test. The rest viewed themselves either on ***less anxious***, ***moderately anxious,*** or ***highly anxious*** levels with ***low anxious*** showing the biggest percentage. As expected, the mean for each grouping of the anxious learners was within the range of the groupings of the anxiety level. Compact distributions were manifested by the not anxious and moderately anxious learners, though close distributions were also shown by the low anxious and highly anxious learners as manifested by the standard deviation scores.

More than half of the learners were moderately anxious and highly anxious which were manifestations of problems on degree of mathematical anxiety. This is in consonance with the findings of Maloney & Beilock (2012) which stated that many studies over the years have indicated that many people have extremely negative attitudes towards mathematics, sometimes amounting to severe anxiety. The estimates of the prevalence of mathematics anxiety vary. Ashcraft and Moore (2009) estimated that 17% of the population has high levels of mathematics anxiety. Johnston-Wilder et al. (2014) found that about 30% of a group of apprentices showed high mathematics anxiety, with a further 18% affected to a lesser degree. As a result of the increased frequency of formal evaluations being used for assessments, test anxiety

may be present within many students from grade school through postsecondary school levels (Peleg, 2009).

The level of mathematical self-efficacy shows the confidence level of the learners on learning mathematics. Self-efficacy is positively related to confidence because self-efficacy is having the confidence in one's ability to deal with a situation without being overwhelmed. High self –efficacy means being confident and low self-efficacy means being not confident. Table 2 summarized the mathematical self-efficacy of the learners and consequently, their level of confidence in mathematics.

Table 2. Average Weighted Mean of Level of Mathematical Self Efficacy of the Learners

Self-Efficacy Level	Confidence Level	N	%	Average Weighted Mean (AWM)	SD	Overall Self-Efficacy (Confidence) Level
Usually	Confident	14	5.7	4.50	0.218	
Often	Confident	53	21.6	3.69	0.195	
Sometimes	Not Confident	113	46.1	3.02	0.236	Sometimes (Not Confident)
Seldom	Not Confident	59	24.1	2.31	0.212	
Never	Not Confident	6	2.4	1.40	0.254	
All		245	100	3.04	0.675	

The overall average weighted mean of the learners fell on the ***sometimes*** level that implies that their mathematical self-efficacy were at the middle of the scale and generally, they are not confident of mathematics. Since self-efficacy beliefs influence the choices the learners make and the effort they put in their performance, this sometimes level of mathematical self –efficacy would imply that the learners will somewhat be reluctant to seek help and will more likely engage less in the classroom in terms of their behavior, cognition and motivation.

The standard deviation scores was not big but would imply that though most of the learners were at the ***sometimes*** level, a good number will also be at the ***often*** and ***seldom*** levels. Those belonging to the never, seldom and sometimes levels of self-efficacy were considered to be not confident and those in the often and usually levels were considered confident. The confident learners comprised a quarter of the learners, thus, the cumulative percentage distribution of the not confident learners was almost thrice than the confident learners.

Bandura (1997) postulated that perceptions of self-efficacy are context specific, thus people possess different degrees of self-efficacy specific to the tasks required of them. Pajares (1996) attributed efficacy beliefs to an individual's previous experiences, which are specific to situations and contexts. Therefore, belief on one's mathematical self-efficacy varies for each learner.

Mathematical Performance of the Learners. The mathematical performance of the learners was measured based on their first and second quarter periodical tests results. Data were retrieved from the respective mathematics teachers of the respondents. Table 3 shows the summary of the results.

Table 3. Mean Percentage Scores on the Periodical Tests of the Learners

Level of Mathematical Performance	N	%	Mean Percentage Scores (MPS)			Overall SD	Overall Description
			First	Second	Overall		
Outstanding	71	29.0	93.04	90.97	92.01	5.082	
Very Satisfactory	43	17.6	83.14	77.91	80.52	2.289	
Satisfactory	28	11.4	74.71	69.61	72.16	2.427	Satisfactory
Fairly Satisfactory	39	15.9	61.72	67.38	64.55	2.670	
Did Not Meet Expectations	64	26.1	46.95	48.41	47.68	7.501	

All	245	100.0	72.18	71.36	71.77	17.828	

The result reveals that at average, the learners were classified at the ***satisfactory*** level. Their overall standard deviation score was considerable which implied that a good percentage fell on the other performance levels. The test scores of the learners are varied and covered all performance levels. The mean percentage scores for the first and second grading periods were classified at the satisfactory level. Though most of the students fell on the outstanding level, yet almost the same percentage of students were at did not meet the expectations level. Results showed that students' mathematical ability as shown in their performance scores were diverse which implied that a good number of them have experienced difficulty on this subject. Many of the students do not fully grasp the content of their present curriculum. This conformed with the study of Patena, et.al. (2013) stating the alarming observation among Filipino students revealing that most of them perform low in mathematics and are unprepared for learning mathematics. Accordingly, this low mathematical performance level accompanied by discouraging achievements has become a cause of great concern among educators of the country. With these, a lot of researchers have been concerned of studying in depth on the possible causes of the issue, looking into self-efficacy and emotions such as anxiety and test anxiety as possible causes.

The Association between Mathematical Test Anxiety and Mathematical Self-Efficacy of the Learners. The Pearson product-moment correlation coefficient ***r*** was used to determine the relationship between mathematical test anxiety and the self-efficacy of the learners. Table 4 shows the results.

Table 4. Coefficient of Correlation between the Mathematical Test Anxiety and Mathematical Self-Efficacy of the Respondents

Test Anxiety Level	Self-Efficacy Level	Pearson *r*	Strength of Relationship	p – value	Remarks
Not Anxious	Confident	0.091	Very Weak Positive	0.703	Not Significant
Low Anxious	Not Confident	-0.332	Moderately Negative	0.002	Significant
Moderately Anxious	Not Confident	-0.087	Very Weak Negative	0.479	Not Significant
High Anxious	Not Confident	-0.142	Very Weak Negative	0.245	Not Significant
All		-0.422	Moderately Negative	p<.001	Significant

The result as projected in the table shows that for all the students, the linear correlation between mathematical test anxiety and self-efficacy was moderately negative. The Pearson ***r*** value gave a p-value of less than .001 which also less than the value of the level of significance, alpha (α) of 0.05. So, the null hypothesis of no significant relationship is rejected. Test anxiety and self-efficacy in mathematics were significantly related. The higher the efficacy scores, the lower the math anxiety scores of the learners. Accordingly, test anxious students experience a reduced sense of self-efficacy, anticipate failure, and experience intense emotional reactions at the very first sign that of failure (Ergene, 2003). Such experience is likely to be evoked when a person believes that her or his intellectual motivation and social capabilities may be affected by the test situation (Sarason et al., 1990).

For the low anxious students, with not confident self-efficacy, the moderately negative coefficient of correlation had a p-value lower than the alpha (α) of 0.05. Thus, the null hypothesis of no significant relationship is rejected. The correlation between the mathematical test anxiety and mathematical efficacy of the learners is significant. The higher the efficacy scores of the low anxious students, the lower their mathematical test anxiety scores. The outcome is confirmatory to the findings of Luo et al. (2009) on his study on west China middle school students. He found out that there was a significant negative correlation between self-efficacy and mathematics anxiety. The result indicates that the more confidence students have, the less mathematics anxiety they may have. Thus, self-efficacy is associated to mathematical anxiety and mathematical test anxiety in particular.

On the contrary, there were very weak negative correlations between the mathematical test anxiety scores and self-efficacy scores of the not anxious, moderately anxious and high anxious learners. There

corresponding self-efficacy levels were confident, not confident and not confident, respectively. Their corresponding p-values were greater than $\alpha = 0.05$, thus they failed to reject the null hypotheses of no significant relationships. The two variables for those three groups of learners were not significantly related. How high or low the scores of the learners on their anxiety scores will not point on their efficacy scales for the not anxious, moderately anxious and high anxious learners.

The Association between Mathematical Performance and Mathematical Test Anxiety and Mathematical Self-Efficacy. The associations between performance and test anxiety and self-efficacy in mathematics were determine through the use Pearson ***r.*** Table 5 shows the association of performance and test anxiety and Table 6 presents the association between performance and self-efficacy in mathematics.

Table 5. Coefficient of Correlation between the Mathematical Performance and Mathematical Test Anxiety of the Respondents

Test Anxiety Level	Performance Level	Pearson *r*	Strength of Relationship	p – value	Remarks
Not Anxious	Outstanding	-0.119	Very Weak Negative	0.616	Not Significant
Low Anxious	Satisfactory	-0.151	Very Weak Negative	0.160	Not Significant
Moderately Anxious	Satisfactory	0.047	Very Weak Positive	0.701	Not Significant
High Anxious	Satisfactory	0.114	Very Weak Positive	0.352	Not Significant
All		-0.186	Weak Negative	0.004	Significant

Overall, there was a weak negative linear correlation between the mathematical test anxiety and mathematical performance of the learners. The corresponding *r* value had a p-value of .004 which was less than .05. The null hypothesis of no significant relationship is therefore rejected. The two variables have significant relationship. The lower the mathematical test anxiety scores of the students, the higher their mathematical performance. It shows that the lesser the test anxiety the learners, the better they perform in mathematics. This confirmed the previous findings of some researchers that anxiety affects mathematical performance (Enu &Nkum, 2015). Test anxiety negatively affects students' performance as revealed by the study of Barrows, Dunn, and Lloyd (2013). They found that a strong relationship between both test anxiety and exam grades, and linear regression analyses showed that exam grade could be predicted by test anxiety.

Table 5 further reveals that there were very weak negative linear correlations with the mathematical performance and test anxiety of the not anxious and low anxious learners with their outstanding and satisfactory levels of performance, respectively. These very weak negative correlation scores had p-values which are greater than .05, thus, they failed to reject the null hypotheses of no significant relationships. Their relationships were not significant. There were very weak positive linear correlations between the mathematical performance and test anxiety scores of the moderately anxious and high anxious learners with their satisfactory level of academic performance. The correlation values gave p-values which are greater than 0.05. They failed to reject the null hypotheses of no significant relationships. The two variables have no relationship for the moderately and high anxious learners. Analyses by levels show that there are no relationships on the test anxiety scores and mathematical performance for the levels of anxious learners with their corresponding levels of mathematical performance.

Table 6. Coefficient of Correlation between the Mathematical Performance and Mathematical Self-Efficacy of the Respondents

Self –Efficacy (Confidence) Level	Performance Level	Pearson *r*	Strength of Relationship	p – value	Remarks
Confident	Very Satisfactory	0.153	Very Weak Positive	0.217	Not Significant
Not Confident	Fairly Satisfactory	0.178	Weak Positive	0.017	Significant

All	.340	Moderately Positive	p<.001	Significant

The overall moderate positive linear correlation had a p-value of less than 0.001. Therefore, the null hypothesis of no significant relationship is rejected. The overall relationship between mathematical self-efficacy and mathematical performance was significant. The higher the mathematical self-efficacy scores, the higher the mathematical performance of the learners. Better efficacy means better performance in mathematics. Intellectually gifted students tend to believe that they are competent to complete a task and this confidence is strong motivation for exceptional performance (Pajares, 1996). Compared to their peers, students with higher levels of self-efficacy also have higher levels of general achievement in mathematics, more easily overcome negative outcomes, display more positive attitudes towards mathematics, and possess a more comprehensive understanding of mathematics. As self-efficacy increases or decreases, it has a corresponding effect on learning and academic achievement (Phan, 2012)

The table further shows that for the confident learners with their very satisfactory performance level, the correlation between the self-efficacy and performance scores in mathematics was very weak positive. The resulting p-values was greater than α=.05. Thus, the relationship between the two variables was not significant. The scores on one variable cannot be predicted based on the scores of the other variable.

On the other hand, there is a weak positive linear correlation between the mathematics self-efficacy scores of the not confident learners with their fairly satisfactory level of academic performance. The corresponding p-value was less than 0.05. The null hypothesis of no significant relationship is therefore rejected. The relationship between the self-efficacy and performance of the not confident learners in mathematics is significant. The higher the self-efficacy scores, the higher the performance of the not confident learners in mathematics.

The Differences on Mathematical Test Anxiety and Self-Efficacy. The independent t-test was used to determine how significant the difference of the mathematical test anxiety and self-efficacy mean scores between the male and female learners across the test anxiety groupings. Table 7 shows the summary for the mathematical test anxiety.

Table 7. T-test of the Mathematical Anxiety between the Male and Female Respondents

Group	Gender	N	%	Mean	Mean Difference	t-test	df	p - value	Remarks
Not Anxious	M	6	30.0	1.44	0.07	1.341	11	0.207	Not Significant
	F	14	70.0	1.37					
Low Anxious	M	36	40.9	2.13	0.03	0.578	80	0.565	Not Significant
	F	52	59.1	2.10					
Moderately Anxious	M	28	41.2	2.60	0.01	0.317	57	0.752	Not Significant
	F	40	58.8	2.59					
High Anxious	M	19	27.5	3.21	-0.08	-1.220	52	0.228	Not Significant
	F	50	72.5	3.29					
All	M	89	36.3	2.46	-0.08	-1.012	243	0.313	Not Significant
	F	156	63.7	2.54					

There were more female respondents than male across all anxiety groupings. Overall, there were almost twice as many females than males. The females scored 0.08 points higher than the males. This mean difference had a t-test of -1.012 which gives a p-value of .313. This p-value was greater than .05. Therefore, it failed to reject the null hypothesis of no significant mean difference between the mathematical test anxiety scores of the male and female learners. The mathematical test anxiety mean scores of the male and female students were statistically equal. They experienced mathematical anxiousness at the same degree. Gender does not affect the mathematical test anxiety of the learners.

For each grouping, all the mean differences had t-tests that yielded p-values which were all greater than .05. Thus, it failed to reject the null hypotheses of no significant mean differences. The mean differences for each of the anxiety groupings were not significant. The male and female learners for anxiety grouping scored at the same level for their mathematical test anxiety assessment. Mathematical test anxiety is independent of gender.

The end is in contrary to findings of Rani (2017) which revealed that male and female differ significantly on the level of test anxiety. Female students compared to male are more anxious. Furthermore, many studies indicated that females tend to show higher levels of trait anxiety than males (Chapman et al., 2007). This is also in opposite direction with the findings of Bono et. al. (2016) that female students have higher levels of test anxiety than do their male peers.

The outcome of the current undertaking indicates that both male and female students experience mathematical test anxiety. Gender differences on this regard do not exist for they experienced anxiety at the same degree. How they may overcome that negative feeling towards mathematics would depend on the individual learner.

Table 8. T-test of the Mathematical Self-Efficacy between the Male and Female Respondents

Confidence Level	Gender	N	%	Mean	Mean Difference	t-test	df	p - value	Remarks
Confident	M	23	34.3	3.98	0.19	1.933	65	0.058	Not Significant
	F	44	65.7	3.80					
Not Confident	M	66	37.1	2.77	0.07	0.939	155	0.349	Not Significant
	F	112	62.9	2.70					
All	M	89	36.3	3.08	0.07	0.815	179	0.416	Not Significant
	F	156	63.7	3.01					

For the difference in the level of self-efficacy between male and female respondents, results disclose that for mathematics self-efficacy, the mean difference is 0.07 in favor of the male learners. The t-test value for this mean difference was 0.815 and the corresponding p-value was 0.416. This p-value was greater than 0.05. Thus, it failed to reject the null hypothesis of no significant mean difference. The means of the two groups of learners' mathematical self-efficacy were statistically equal. None of the group is better than the other in terms mathematical self-efficacy. They were just as good as the other group. Gender does not affect the mathematical self-efficacy of the learners.

The mean differences across the confidence levels had t-test that yielded p-values which were all greater than .05. It therefore failed to reject the null hypotheses of no significant mean differences. The self-efficacy mean differences between male and females across the confidence groupings were not significant. The male and females learners scored the mathematical self-efficacy at the same degree. Although a large body of research indicated that females tend to have lower mathematics self-efficacy than males, like that of the study of Pajares (2005), the present study did not observe this gap in the confidence of the learners towards mathematics.

The Factors Causing Mathematical Test Anxiety. To determine the major causes of test anxiety the researcher listed the top 7 leading causes identified in previous studies. The respondents were made to answer yes, no or no response. Following the list, a blank was provided for students to indicate other possible causes that are not found on the list. The outcome of the survey is presented in the two succeeding tables.

Table 9. Frequency Count and Percentages of the Causes of Mathematical Test Anxiety

Cause	Frequency of YES Response (n=245)	Percentage	Rank
Timed tests and the fear of not	186	75.9	1

finishing the test, even if one can do all the problems			
Lack of preparation	175	71.4	2
Fear of failure	171	69.8	3
Poor past test performance	131	53.5	4
Fear of alienation from parents, family, and friends due to poor grades	126	51.4	5
Association of grades and personal Worth	116	47.4	6
Embarrassment from a teacher	96	39.2	7

The outcome shows that the majority of the students agree with the listed causes. Three fourths of the respondents become anxious with timed test and fear of not being able to finish the test. This result is in consonance with the findings of a study that timed tests can cause stress in students which they do not experience when working on the same mathematics questions in untimed situations (Engle, 2002). As Engle has argued, education's pervading preference for timed tests, in the interests of automaticity, has created the damaging myth amongst students that *fast math is good math*. As two of the respondents answered,

> *"If the test has a timer, then that is the number one caused my anxiety. Especially, if you must answer all the questions in just a minute."*
> *"I'm feeling nervous during the math test because of the time limits of the test and, I have no trust in myself if I can do well in math test.*

Furthermore, they also develop anxiety during exams when they lack preparation for the test. As stated by another two respondents,

> "*The lack of studying and being lazy to do or learn from math"*
> *"Being unprepared for the test."*

Having low grades and lower personal worth that may result from the test does not bother much the students. The majority of them answered no than yes. The majority of them also does not believe that embarrassment from the teacher caused their mathematical test anxiety. But the positive responses on these two items were still quite significant.

This result implies that students are conscious of time bounded exams and that they need enough time to analyze and answer test items. Lipka & Clarke (2014) observed that mathematics performance was worse under high as compared to low time pressure task. This effect was more pronounced for high-anxious than low-anxious individuals. Task-irrelevant thoughts resulting from time pressure are most likely to impair the processing efficiency and performance effectiveness of highly mathematics anxious individuals. The learners also recognized the importance of preparing for a test or having mastered the test. Conversely, the students are mindful of their grades so failure in the test makes them anxious. Overall, the results indicate that students have various reasons of having anxiety during mathematical tests due to their notion that the subject would require special skills. Hamamunda (2016) have confirmed, Mathematics anxiety is not caused by single factor but by a combination of several factors.

Aside from the factors mentioned in the previous table, the following are some other factors not indicated in the list that had been identified by some of the respondents with the open ended question asked. The table that follows shows the top three (3) written answers.

Table 10. Other Factors that Caused Mathematical Test Anxiety

Theme	Insight	Verbatim Statements from Respondents

Lack of understanding and retention of learned concepts	Majority of the respondents believed that they feel anxious because they have not fully understood their lesson and that they may not remember what they have learned during the exam.	• *"I tend to forget what I learned the next day"* • *"I cannot cope up or understand some of the lessons that affect during my exams"* • *"Forgetting the formula to an equation"* • *"Having mental block during exams"* • *"Complex and or confusing questions"*
Personal Standards	Some students put on themselves self-inflected pressures with their desire to be on top of the class or to be an honor student.	• *"Maybe because I just want to succeed and understand in learning and solving"* • *"When I am very pressured by my own thoughts of reaching the standard grade I want"* • *"aiming for high grades"*
Class Competition or Competitive-ness of classmates	Students are pressured and are comparing their abilities with their peers. They have the tendency to set a norm within their peers.	• *"having a competitive classmates regarding our grades"* • *"Competition within the classroom, the surrounding"* • *"Classmates asking scores to" compete with* • *"There is always a competition in class when it comes to grades. The fear of having someone that has a bigger score than you makes me so anxious that I solve an item two times to make sure it's accurate. I consider myself as a very competitive person. Therefore, I am very scared that I may lose my place or standing in the list of honors."*

Causes of mathematical test anxiety could be one of the many things as cited by the learners. It could be social, mental or biological. The truth is, it's real. Hence, learners and other concern people need to realize the reality of this academic problem and address the issues and matters on this regard.

CONCLUSION AND RECOMMENDATION

Conculsions

Based on the analysis of the data gathered, the following findings are summarized:

1. Overall, the learners see their level of mathematical anxiety at the Moderately anxious level. There is almost equal distribution for Low, Moderate, and High anxious learners with little proportion of not anxious learners. The learners' mathematical self-efficacy is at Sometimes level. They are three times more likely to be not confident than being confident in mathematics.
2. The learners are at the Satisfactory level on their performance in mathematics. Highest percentage belong to the Outstanding level followed by the Did Not Meet Expectations level.
3. There is a significant relationship in the overall mathematical self-efficacy and mathematical test anxiety of the learners. The lower the level of mathematical anxiety, the higher the level of self-efficacy of the learners and vice versa.
4. Overall, there is a significant relationship between the mathematical test anxiety and mathematical performance of the students. The lower their test anxiety, the higher their test scores. This finding is also true for the low anxious learners with their outstanding level of mathematical performance. However, there is no relationship between these two variables for the high, moderately, and not anxious learners with their satisfactory level of mathematical performance. There is a significant relationship between the mathematical self-efficacy of the learners and their mathematical performance. The higher their self-efficacy scores, the higher their test scores. The same finding is true for the not confident learners with their satisfactory mathematical performance. There is no relationship for the two variables in the confident learners with very satisfactory level of mathematical performance.

5. Overall, there is no significant mean difference on the mathematical test anxiety scores between the male and female respondents. This is also true for all the groupings of anxiousness. They were statistically anxious at the same level. Gender does not affect the mathematical test anxiety of the learners. There is also no significant mean difference on the mathematical self-efficacy scores between the male and female respondents. This is also true for the two levels of confidence. They scored statistically at the same degree. Gender does not affect the mathematical self-efficacy scores of the learners.
6. There are many and varied causes of mathematical test anxiety of the learners. On top of the causes are when tests have time limit, when learners lack preparation and when they fear failing on their grades or test results. Moreover, lack of understanding and retention has also been found out to be another major cause of mathematical test anxiety.

From the findings of the study, it is established that the better the mathematical self-efficacy of the learners, the lesser their mathematical test anxiety, the better their mathematical self-efficacy scores the better their mathematical performance and the lower the level of their mathematical anxiety, the better they perform in mathematics. Test anxiety and self-efficacy are indicators of mathematical performance, therefore, improvement of the self-efficacy of the learners will lessen their mathematical test anxiety and will increase their mathematical performance. Addressing concerns on the mathematical test anxiety of the learners will yield to better management of the test thereby improving the performance of the learners.

Recommendations

In line with the findings of the study, the following recommendations are suggested:

1. The school may conduct assessments to determine the degree of self-efficacy and test anxiety of the learners and use the results to address concerns on this matter.
2. The subject teachers and math club members may conduct and promote activities that will enhance the mathematical self-efficacy of the learners. Activities may include teachers' trainings, group counselling and peer tutorials.
3. Math teachers may review their approaches in teaching and assessing mathematics, focusing on the factors causing test anxiety such as timed test and lack of preparation of the learners.
4. Saint Joseph College Junior High School Department may apply the Mathematics Learning Development program proposed by the researcher.
5. Future researchers may conduct related studies on the following:
    a. Effect of test anxiety on the overall academic performance on other learning areas of the learners
    b. Causes of test anxiety among secondary students
    c. Variations of the self-efficacy among learners

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