ISSN 1596-969X

Volume 10
Number 2,
2020

EDUCATIONAL THOUGHT

A Publication of
Institute of Education
ADEKUNLE AJASIN UNIVERSITY
P.M.B. 001, Akungba-Akoko,
Ondo State, Nigeria

Educational Thought
Volume 10 , No. 2, 2020.
ISSN: 1596-969X

EDITORIAL BOARD

Educational Thought
Volume 10 , No. 2, 2020.
ISSN: 1596-969X

TABLE OF CONTENTS

Educational Thought
Volume 10 , No. 2, 2020.
ISSN: 1596-969X

Comparative Analysis of the Relationship between the Students' Test-Anxiety and Students' Achievement in Senior Secondary School Mathematics

Prof. B. C. ALIO
chuksbath@yahoo.com

Olasoji Victoria OMOSOWON, Ph.D.
Olasowon4@yahoo.com

Chigozie O. ANIBUEZE, Ph.D
anibueze.chigozie@yahoo.com

Blessing Nkiruka ENEZE
nkeirueneze@gmail.com

Department of Mathematics and Computer Education,
Enugu State University of Science and Technology,
Enugu State, Nigeria.
Department of Science Education, University of Nigeria, Nsukka,
Enugu State, Nigeria.

Abstract

The study examined the relationship between the students' test-anxiety and students' achievement in senior secondary school mathematics. The design of the study was non-equivalent quasi-experimental research. The population for the study was four thousand, eight hundred and thirty-two (4832) Senior Secondary School 2 (SSS 2) students in the thirty (30) secondary schools in Enugu Education zone as at 2018/2019 academic session. The sample size of the study was three hundred and ten (310) SSS 2 students. Mathematics Cognitive Test Anxiety Scale (MCTAS) and Mathematics Achievement Test (MAT) were the study's instruments. Both instruments were reliable with Cronbach Alpha of 0.79 and Kuder-Richardson (KR-20) coefficient of 0.86 respectively. The study discovered that students' test anxiety had a poor predictive effect on the students' achievement in Senior Secondary School Mathematics. The study discovered that for any increase of additional unit of 36.366% of the Students' achievement, the Students' test anxiety level in Mathematics is predicted to decrease by 11.425%. Thirdly, the study discovered that the female students worried more than their male counterparts but the higher test-anxiety mean score in the female students does not make any difference in the mean achievement scores of the male and female students. The study therefore recommended that Federal/State Ministries of Education, Nigerian Educational Research and Developmental Council (NERDC) should develop Mathematics curriculum that is inclusive of strategies of coping with test anxiety.

Keywords: Test anxiety, achievement, mathematics, gender, emotions

Introduction

Mathematics is considered by many people, institutions, and employers of labour, among others, as very important (Unodiaku. 2014). Mohamed, Al-Agili, Bin, Lazim & Abdul-Maad (2012) posited that mathematics is

the basic pillar of any scientific progress.Onuigbo and Eze (2010) opined that mathematics is so crucial that it is a prerequisite for admission into Nigerian universities. Mathematics is considered indispensable because it has substantial use in all human activities including school subjects such as in Introductory technology, Biology, Chemistry, Physics including Agricultural science. According to Unodiaku (2014), Mathematics is such a subject that can help students to realize their dreams. It is the backbone of all science subjects. This situation demands that every child should be involved in mathematics instructions right inside the classrooms (Sydney, 2015; Hill, 2011) at the secondary school level of education (Unodiaku, 2014).

According to Anibueze (2017), Mathematics is a subject that is mostly failed in schools especially in secondary schools. The poor students' achievement in Mathematics has prompted the mathematics scholars to investigate on the causes. Most mathematics scholars like Umar & Ibrahim (2018), Ndukwe (2018), Anibueze (2017) have attributed the cause to teacher's methodology, other scholars like Eze (2006) has attributed it to government factor. But according to Anibueze & Ugwuanyi (2020), there are many psychological problems that may have affected the students' achievement in mathematics, which may be students' interest, task-persistence, anxiety, self- esteem, etc. But one psychological factor that may have affected or may not have affected the students' achievement in Senior Secondary School mathematics is students' anxiety. This is because, according Zeidner (1998), there are many factors like cognitive, affective, motivational, somatic and environmental factors, along with test anxiety, which affect students' achievement while according to Kaya (2014), the major factor which has influence on students' achievement in science is test anxiety. According to Porto (2013), there are psychological symptoms that build up in students before sitting for a test and such include restlessness, unusual body movement, difficulty in concentration, insomnia, fatigue, muscles contraction, abdominal pain and tremor and these symptoms affects the students from actualizing their full achievements.

Stober (2004) revealed that test anxiety is multidimensional condition that has cognitive (worry), affective (emotional) components interference and lack of confidence. Mandler & Sarason (1952) indicated that test anxiety consisted of two major components. The first component was emotionality which was related to the physical reactions to test situations, such as nervousness, sweating, constantly looking at the clock, pencil-taping and so on. The second factor was worry, which comprises the psychological or cognitive aspect of test anxiety. Worry relates primarily to cognitive concern(s) about the consequences of failure (Mandler & Sarason, 1952). This is not surprising since a student's test anxiety is something that cannot be perceived by a teacher or instructor. What is more, students' actual levels of test anxiety cannot be directly measured or examined. According to Mandler & Sarason (1952), the only thing that could be observed is the students' manifestation of test anxiety in the form of emotionality responses mentioned earlier. Test anxiety implies the debilitating experiences of anxiety as described by Lewis, during the preparation for a test orduring the test itself (Jing, 2007). Lewis (1970) described anxiety as an unpleasant emotion experienced as dread, scare, alarm, fright, trepidation, horror or panic. Onyeizugbo (2010) revealed that highly-test anxious students are often worried due to test situation. Woolfolk (2004) described that test anxiety has interference on three points: focusing attention, learning, and testing.

Many studies had indicated the effects of test anxiety on students' achievement in science (Amalu, 2017; Kaya, 2014; Nicholson, 2010; Peleg, 2009) while most studies like Amalu (2017), Dorinejad, Hakimi, Ashouri, Dehghani, Zeinal and Daghighi (2011), Driscoll, Evans, Ramsey and Wheeler (2009) have reported that test-anxiety has affected the students' achievement negatively, very few studies have indicated that there is no effect depending on the situation like Ford (2013) and Parviz & Alemi (2010) while others like Ali & Mohsin (2013) and Mohamed, Al-Agili, Bin, Lazim & Abdul-Maad (2012)have indicated that test-anxiety have positive effect on the students' achievement. Ali & Mohsin (2013) revealed that the correlation of test anxiety and achievement measures were not very strong while the findings of Mohamed, Al-Agili, Bin, Lazim & Abdul-Maad (2012) revealed that there was weak positive correlation of test anxiety and students' achievement in science whereas according to Parviz & Alemi (2010), test-anxiety are normal and often helps students to stay mentally and physically alert but too much of test-anxiety can result in emotional or physical distress, difficulty

Educational Thought
Volume 10 , No. 2, 2020.
ISSN 1596-969X

concentrating and emotional worry, which influences the academic performance.

Onyeizugbo (2010) asserted that minimal amount of anxiety can mobilize human beings to respond rapidly and efficiently, but excessive amount of anxiety may foster poor response and sometimes inhibit response. From these assertions, it then means that a moderate level of test anxiety is essential for better academic achievement in mathematics. Nicholson (2010) indicated that test anxiety had significant effect on achievement of students but the higher the test anxiety implied the higher/lower the achievement of the students. The findings tallied with the findings of Ford (2013), which implied that test anxiety may influences students' achievement positively especially at Senior University level but have no influence in students' achievement in junior elementary level and may increase decrease the students' achievement in senior elementary/junior college level. These assertions of these scholars are the findings of the minorities but most scholars have opined that test-anxiety has an inverse relationship with the students' achievement (Amalu, 2017).

Kaya (2014), Zeinal & Daghighi (2011) and Putwain (2008) in their separate studies asserted that there were negative relationship between of test-anxiety and students' achievement. These scholars added that when test anxiety is higher, academic achievement is lower. Woolfolk (2004) revealed further that highly anxious students divert their attention between this new material and tension, and as a result, the achievement of anxious students becomes lower. According to Eysenck (2001), test-anxiety created irrelevant thoughts, preoccupation, and decreased interest and concentration thus, leads to academic difficulties. The implications of these assertions from these scholars on students' test-anxiety showed that test-anxiety influenced the students' achievement in mathematics but with the contradictory findings from the minorities and secondly, since none of these studies centered in Mathematics, the researchers decided to investigate the Comparative Analysis of the Relationship between the Students' Test-Anxiety with Students' achievement in Senior Secondary School Mathematics. Secondly, the researchers shall determine the effect of gender on the students' test-anxiety and students' achievement in Senior Secondary School Mathematics.

Chapell et al. (2005) revealed that the female undergraduate students had lower test anxiety and higher grade point average than their male counterparts. Ford (2013) revealed that there was no sex difference in test anxiety as regards to mathematics. In line with Ford (2013)'s findings, Chapell, Blanding, Silvestein, Takahashi, Newman, Gubi, and McCain, (2015) discovered that there was no significant gender differences (p=.109 F=2.68) found on test anxiety in a study of a sample of elementary children in Florida.According to Ford (2013), the anxiety level based on gender is based on locality and educational level of the students. In college and university level, the female students tend to have higher test-anxiety but the reverse is the case for the students brought from the typical rural areas while in elementary level, the test anxiety level is close.Amalu (2017) revealed that the female students have more test anxiety than the males. Males and females experience similar level of test worry but females have higher level of the emotionality component which produces higher general test anxiety (Cakici, 2016). Daskzan (2004) documented that 37% of male and 53% of female high school students had test-anxiety. Hence, the researchers shall investigate the Comparative Analysis of the Relationship between the Students' Test-Anxiety and Students' achievement in Senior Secondary School Mathematics based on gender since that none of these studies were centered in mathematics.

Research Questions

1. What are the students' test-anxiety and students' achievement mean scores in senior secondary school mathematics?
2. What are the test-anxiety and achievement mean scores of the male and female students in senior secondary school mathematics?
3. What is the relationship between the test-anxiety and students' achievement mean scores in senior secondary school mathematics?

Hypotheses

The following hypotheses were tested at 0.05 levels of significance.

H_0 1: There is no significant relationship between the students' test-anxiety and students' achievement mean scores in senior secondary school mathematics.

H_0 2: There is no significant difference between the male and female students' test-anxiety mean scores in senior secondary school mathematics.

H_0 3: There is no significant difference between the male and female students' achievement mean scores in senior secondary school mathematics.

Methodology

The design of this study was non-equivalent quasi-experimental research. According to Nworgu (2006), this design is often used in classroom experiments when experimental and control groups are naturally assembled groups as intact classes which may be similar. The researchers used this design and minimized all extraneous variables that if the researchers had felt cold about them could have constituted potential threats to the validity of this study. The population for the study was four thousand, eight hundred and thirty-two (4832) Senior Secondary School class 2 (SSS 2) students in the thirty (30) secondary schools in Enugu Education zone as at 2018/2019 academic session (Planning, Research and Statistics Department, Post Primary School Management Board, Enugu, 2019). The sample size of the study was three hundred and ten (310) Senior Secondary School class two (SSS 2) students in the four (4) sampled co-educational secondary schools in Enugu Education zone. Hence, the researchers randomly sampled one hundred and fifty-six (156) students in control group and one hundred and fifty-four (154) students in the Experimental group. The Experimental group was taught Mathematics using a Constructivism Teaching Strategy. The researchers used this method because most scholars like Ndukwe (2018), Eze (2016) have all agreed that Constructivism Teaching Strategy significantly enhanced students' achievement in Mathematics.

Mathematics Cognitive Test Anxiety Scale (MCTAS) and Mathematics Achievement Test (MAT) were the instruments. Mathematics Cognitive Test Anxiety Scale (MCTAS) underwent face validation only while Mathematics Achievement Test (MAT) underwent face and content validation. Both instruments were reliable with Cronbach Alpha of 0.79 and Kuder-Richardson (KR-20) coefficient of 0.86 respectively. Both instruments had sections A and B. Section A consisted of the respondent's personal data while section B of Mathematics Cognitive Test Anxiety Scale (MCTAS) had two parts where part 1 of the Section contains positive items with four (4) response categories as Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) that were assigned 4,3,2 and 1 respectively and the part 2 was assigned 1, 2, 3 and 4 respectively for negative items whereas the Section B of the Mathematics Achievement Test (MAT) contained forty (40) multiple choice items with 2.5marks for each item. The researchers taught all the mathematics teachers that were used for the study and the Mathematics teachers taught their respective classes. The experiment lasted for six (6) weeks.

Data gathered from the post-Mathematics Cognitive Test Anxiety Scale (MCTAS) and post-Mathematics Achievement Test (MAT) was analyzed using Statistical Package for Social Science (SPSS) version 23. The data gotten from the post-administration was because treatment administered to the students were uniform and all the extraneous variables were minimized. Mean ($\bar{x}$) and standard deviation (s) were used in answering the research question 1 and 2 while Pearson Product Moment Correlation Coefficient (r) was used to answer the research question 3. Linear Regression was used to test the hypothesis 1 while the Analysis of Covariance was used to test Hypothesis 2 and 3 at 0.05 levels of significance. Research question 3 was interpreted in line with Nwana (2011)'s assertions. The null hypothesis (H_0) was rejected if the significance of F (value of the test statistics) is less than 0.05. Otherwise do not reject at 0.05.

Educational Thought
Volume 10 , No. 2, 2020.
ISSN: 1596-969X

Results

Question 1: What are the students' test-anxiety and students' achievement mean scores in senior secondary school mathematics?

Table 1

The Students' Test-Anxiety and Students' Achievement Mean Scores in Senior Secondary School mathematics

		Students' Test Anxiety			
Groups	**Number**	**Pretest**		**Posttest**	
		Mean ($\bar{x}$)	**Standard Deviation (*s*)**	**Mean ($\bar{x}$)**	**Standard Deviation (*s*)**
Experimental	154	2.65	0.81	1.49	0.41
Control	156	2.70	0.81	1.73	0.28
Total	310	2.68	0.81	1.61	0.37
		Students' Achievement			
Groups	**Number**	**Pretest**		**Posttest**	
		Mean ($\bar{x}$)	**Standard Deviation (*s*)**	**Mean ($\bar{x}$)**	**Standard Deviation (*s*)**
Experimental	154	27.56	17.32	63.92	8.99
Control	156	27.68	16.11	45.90	7.501
Total	310	27.63	16.70	54.85	12.23

Table 1 displayed the Students' Test-Anxiety and Students' Achievement Mean Scores in Senior Secondary School mathematics. Table 1revealed that the students' test anxiety decreased from pretest to posttest which was from pretest of 2.68(with a standard deviation of 0.81) to 1.61 (with a standard deviation of 0.37) while the students' achievement in Mathematics increased from the pretest of 27.63 (with a standard deviation of 16.70) to the posttest of 54.85 (with a standard deviation of 12.23). From the Table 1, the study discovered that the treatments given by the students' mathematics teachers to the students affected the students' achievement in Senior Secondary School Mathematics.

Question 2: What are the test-anxiety and achievement mean scores of the male and female students in senior secondary school mathematics?

Table 2

Male and Female Students' Test-Anxiety and Achievement Mean Scores in Senior Secondary School Mathematics

		Anxiety		Achievement	
Gender	**Number**	**Mean ($\bar{x}$)**	**Standard Deviation (*s*)**	**Mean ($\bar{x}$)**	**Standard Deviation (*s*)**
Male	151	1.51	0.28	53.63	9.94
Female	159	1.71	0.42	56.02	14.00
Experimental Group Students' Test- Anxiety and Achievement					
Male	75	1.54	0.28	60.52	6.93
Female	79	1.91	0.44	67.15	9.55

Table 2 displayed Male and Female Students' Mean Test-Anxiety and Achievement Scores in Senior Secondary School Mathematics. The table revealed that the female students had a slight higher test-anxiety mean score of 1.71 and higher achievement mean score of 56.02 than their male counterparts with the students' test anxiety and achievement mean scores of 1.51 and 53.63 respectively. This observation was replicated in the Experimental group where the female students had a slight higher test-anxiety mean score of 1.91 and higher achievement mean score of 67.15 than their male counterparts with the students' test anxiety and achievement mean scores of 1.54 and 60.52 respectively. The table also revealed that the female students had higher standard deviation score both at the students' anxiety and achievement scores which means that the female students had more extreme scores than their male counterparts. According to Obodo (2004), this implied that the female students' mean scores are not reliable and are not homogeneous because of the higher standard deviation.

Question 3: What is the relationship between the test-anxiety and students' achievement mean scores in senior secondary school mathematics?

Table 3

Pearson Correlation Coefficient of Students' Test-Anxiety and Students' Achievement Mean Scores in Senior Secondary School Mathematics

	Criterion	N	Correlation Coefficient 'r'	Interpretation
Test-Anxiety	Achievement	310	-0.331	Low Negative Relationship

Table 3 above displayed the result of Pearson Correlation Coefficient of Students' Test-Anxiety and Students' Achievement Mean Scores in Senior Secondary School Mathematics. From the result of the analysis, it showed that the correlation coefficient of the Students' Test-Anxiety and their achievement scores in Senior Secondary School Mathematics was -0.33. The result showed that there was low negative relationship between Students' Test-Anxiety and their achievement in Senior Secondary School Mathematics.

Hypothesis One: There is no significant relationship between the students' test-anxiety and students' achievement mean scores in senior secondary school mathematics.

Table 4

Regression Analysis of the Students' Predictive Variable (Students' test-anxiety) on Student' Achievement in Senior Secondary School Mathematics

Model		Sum of Squares	df	Mean Square	F	Sig.	Dec.
1	Regression	14088.856	1	14088.856	37.787	.000[c]	S
	Residual	114837.172	308	372.848			
	Total	128926.028	309				

Educational Thought
Volume 10 , No. 2, 2020.
ISSN: 1596-969X

Multiply R=-.331[c], R square=.109, Adjusted R square= .106, Std. Error of the Estimate=19.30927

a. Dependent Variable: PostMAT
b. b. Weighted Least Squares Regression - Weighted by PreANXIETY
c. Predictors: (Constant), PostANXIETY

Table 4 showed the Regression Analysis of the Students' Predictive Variable (Students' test-anxiety) on Student' Achievement in Senior Secondary School Mathematics. From the result of Regression ANOVA in Table 4, it revealed that the multiple correlation coefficients R was-0.331. This indicated that there was low negative relationship between the predictor variable and the criterion variable. The table also indicated that R^2 yielded 0.109, which was 10.9% of the variation in the Student' Achievement in Senior Secondary School Mathematics was attributable to the joint effect of Students' test-anxiety. The Analysis of Variance (ANOVA) for the regression (predication) showed that F-ratio was 37.787 and was significant at 0.000. Since 0.000 was not less than 0.05, the null hypothesis 1 was rejected as stated. Hence, the study concluded that there was a significant relationship between the students' test-anxiety and students' achievement mean scores in senior secondary school mathematics. This implied that both the low negative relationship between the predictor variable and the criterion variable, and 10.9% of the variation in the Student' Achievement in Senior Secondary School Mathematics was attributable to the joint effect of Students' test-anxiety were significant, which means that the students' test-anxiety can affect the students' achievement in Senior Secondary School Mathematics negatively. Based on this result in table 4, there is need to find out the relative contributions of test anxiety to Students' achievement in Senior Secondary School Mathematics, a test of regression weight was carried out and the result is presented in Table 5.

Table 5

Test of Regression Weights for the Contribution of Students' Test Anxiety on students' Achievement in Mathematics

Model	Unstandardized Coefficients		Standardized Coefficients	t-ratio	Sig.	Decision
	B	Std. Error	Beta			
(Constant)	36.366	3.107		11.706	.000	S
ANXIETY	-11.425	1.859	-.331	6.147	.000	S

a. Dependent Variable: PostMAT
b. Weighted Least Squares Regression - Weighted by PreANXIETY

Table 5 showed the Test of Regression Weights for the Contribution of Students' Test Anxiety on students' Achievement in Mathematics. From the result in Table 5, it was revealed that students' achievement in Senior Secondary School Mathematics which is constant had a t-statistic value of t=11.706and was significant at 0.000. Other hand, On the other hand, cognitive test anxiety has a t-statistic values of t=6.147 which is significant at 0.000 as regards to students' achievement in Senior Secondary School Mathematics. This implied that Students' test anxiety and Student' Achievement in Senior Secondary School Mathematics were statistically significant since that their significant values were less than 0.05. The unstandardized coefficient measured the extent to which the independent variable can predict the dependent variable. From the table, it was discovered that for any increase of additional unit of 36.366% (Beta=36.366) of the Students' achievement, the Students' test anxiety level in Mathematics is predicted to decrease by 11.425% (Beta=11.425). Based on the obtained results, the null hypothesis was rejected as stated and the alternative accepted which means that Students' test anxiety can significantly predict students' achievement in Senior Secondary School Mathematics.

Hypothesis 2: There is no significant difference between the mean scores of the male and female students' test-anxiety in senior secondary school mathematics.

Table 6

Analysis of Covariance (ANCOVA) of the Mean Scores of the Male and Female Students' Test-Anxiety in Senior Secondary School Mathematics

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Decision
Corrected Model	3.080[a]	1	3.080	24.072	.000	
Intercept	802.058	1	802.058	6269.567	.000	
SEX	3.080	1	3.080	24.072	.000	S
Error	39.402	308	.128			
Total	847.643	310				
Corrected Total	42.482	309				

WHERE S= Significant at P < .05; a. R Squared = .072 (Adjusted R Squared = .069)

Table 6 showed the Analysis of Covariance (ANCOVA) of the Mean of the Male and Female Students' Test-Anxiety in Senior Secondary School Mathematics. From the result of ANCOVA in Table 6, it was observed that SEX (Male and Female) gave an F-value of 24.072 and was significant at 0.000. Since 0.000 was less than 0.05, the null hypothesis 2 was rejected as stated. Hence, the study concluded that there was significant difference between the mean scores of the male and female students' test-anxiety in senior secondary school mathematics.

Hypothesis 3: There is no significant difference between the male and female students' mean achievement scores in senior secondary school mathematics.

Table 7

Analysis of Covariance (ANCOVA) of the Mean Scores of the Male and Female Students' Achievement in Senior Secondary School Mathematics.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Decision
Corrected Model	442.293[a]	1	442.293	2.974	.086	
Intercept	931137.596	1	931137.596	6261.501	.000	
SEX	442.293	1	442.293	2.974	.086	NS
Error	45802.175	308	148.708			
Total	979051.000	310				
Corrected Total	46244.468	309				

WHERE S = Significant at P < .05; a. R Squared = .010 (Adjusted R Squared = .006)

Table 7 showed the Analysis of Covariance (ANCOVA) of the Mean of the Male and Female Students' Achievement in Senior Secondary School Mathematics. From the result of ANCOVA in Table 7, it was observed that SEX (Male and Female) gave an F-value of 2.974 and was not significant at 0.086. Since 0.086 was not less than 0.05, the null hypothesis 3 was not rejected as stated. Hence, the study concluded that there was no significant difference between the male and female students' mean achievement scores in senior secondary school mathematics.

Discussion

The study discovered that students' test anxiety had a poor predictive effect on the students' achievement in Senior Secondary School Mathematics. The study discovered that for any increase of additional unit of 36.366% of the Students' achievement, the Students' test anxiety level in Mathematics is predicted to decrease by 11.425%. This finding tallied with the assertions and findings of Amalu (2017) who revealed that students' test anxiety had a negative impact on students' academic achievement in mathematics and that students' test anxiety is the factor most consistently found to be associated with decline in students' achievement in Senior Secondary School Mathematics because it involves negative thought, self-criticism or concern about the negative consequences of failure that occurs during test situation. Students' test anxiety negatively predicts changes in academic achievement (Eysenck, Derakshan, Santos & Calvo, 2007). The negative effect of students' test anxiety is because according to Eysenck (2001), test-anxiety created irrelevant thoughts, preoccupation, and decreased interest and concentration thus, leads to academic difficulties.

Also, the study discovered that the female students significantly had higher test-anxiety mean score than their male counterparts which implied that the female students worry more than their male counterparts but the higher test-anxiety mean score does not make the female students to achieve below their male counterparts. The higher achievement mean score that the female students had (as was discovered in table 2) was because the female students had more extreme scores than their male counterparts and the extreme scores were far variant from their mean scores unlike their counterparts. This finding tallied with the findings of Amalu (2017) who revealed that the female students have more test anxiety than the males. In terms of male and female students' achievement score in Senior Secondary School Mathematics, the study discovered that the finding of this study tallied with the findings of Ogbu (2006) who revealed that there was no significant difference between the male and female students' mean scores in Mathematics. The implication of this finding is that although the female students had more students' test anxiety more than their male counterparts in Senior Secondary School Mathematics but the proportional effect in the students' achievement scores in Senior Secondary School Mathematics is relatively the same.

Conclusion

The study discovered that students' test anxiety had a poor predictive effect on the students' achievement in Senior Secondary School Mathematics and that the female students significantly had higher test-anxiety mean score than their male counterparts which implied that the female students worry more than their male counterparts but the higher test-anxiety mean score in the female students does not make any difference in the mean achievement scores of the male and female students.

Recommendations

Considering the findings in the study, the following recommendations are made:

1. Federal/State Ministries of Education, Nigerian Educational Research and Developmental Council (NERDC) should develop Mathematics curriculum that is inclusive of strategies of coping with test anxiety and they also should organize conferences, seminars and/or workshops for mathematics teachers on the strategies that could reduce students' test anxiety level and boost students' achievement in Senior Secondary School Mathematics.

2. Mathematics teachers should offer the same and equal opportunities to both male and female students in Senior Secondary School Mathematics.

3. Female students should be taught strategies to manage anxiety in mathematics lessons.

4. Mathematics students should also have adequate rest before being administered Mathematics tests and avoid last minute rush revision.

References

Ali M. S., & Mohsin M.N. (2013). Relationship of test anxiety with students' achievement in science. *International Journal of Educational Science and Research (IJESR)* 3(1), 99-106.

Amalu, M. N. (2017). Cognitive test anxiety as a predictor of academic achievement among secondary school students in Makurdi metropolis Benue state. *International Journal of Scientific Research in Education,* 10(4), 362-372.

Anibueze, C.O., & Ugwuanyi C.C. (2020). Effect of parent-child communication patterns on junior secondary school students' self-esteem in mathematics. *International Journal of Research and Scientific Innovation (IJRSI)*, 6(12); 47 – 53

Anibueze, C.O. (2017). Effect of mathematics scrabble game on junior secondary school students' achievement and interest. *A Master's Dissertation of the Department of Science and Technology, Enugu State University of Science and Technology (ESUT), Enugu.*

Cakici, D. (2016). *The correlation among EFL learner's' test anxiety, foreign language* anxiety and language achievement. *English Language Teaching, 9*(8), 190-203.

Chapell, M. S.; Blanding, Z. B.; Silvestein, M.E.; Takahashi, M. N. B.; Newman, B. Gubi, A. & McCain, N. (2005). Test anxiety and academic performance in undergraduate and graduate students. *Journal of Educational Psychology*, 97 (2): 268-274.

Daskzan, J. (2004). Prevalence of test-anxiety and its' related to academic problems. *Research center of organization education in Kurdistan province.*

Dordinejad, F., Hakim, Ashouri, M. Dehghen, M., Zeinali, Z. & Daghighi R. (2011). On the relationship between test anxiety and academic performance. *Procedia Social Behaviour Science, 15*, 3774-3778.

Driscoll, R., Evans, G. Ramsey, G., & Wheeler, S. (2009). High test anxiety among nursing students. *Education Resources Information Centre, 14*(4), 350-356.

Eysenck, M. W., & Calvo, M. G. (1992). Anxiety and performance: the processing efficiency theory. *Cognition & Emotion*, 6(1), 409-434.

Eysenck, M. W., Derakshan, N., Santos, R., Calvo, M. G. (2007). Anxiety and cognitive performance. *Attentional Control Theory Emotion* 7 (1), 336-356.

Eysenck, M.W. (2001). *Principles of cognitive psychology*. Hove, East Sussex: Psychology Press.

Eze F.D. (2016). The Effect of constructivist teaching strategy on students' achievement and Retention in Trigonometry. *An Unpublished Masters' thesis of the Department of Science*