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KEYWORDS Mathematics anxiety; problem-solving; control group; gender; senior secondary school students

ABSTRACT This study aimed at determining the effect of problem-solving training in reducing mathematics anxiety among a group of senior secondary school students in Ogun State, Nigeria area. A 2 x 2 pre-test, post-test factorial design (treatment and gender) was used in the study. 120 students who had high scores on the mathematics anxiety scale were randomly selected from the 492 students which responded to the scale. The participants comprised 60 males and 60 females. Mathematics Anxiety Rating Scale-Revised (MARS-R) by Plake and Parker (1982) was used in generating responses from the students. Analysis of covariance was used to analyse the two hypotheses formulated and tested at the 0.05 level of significance. Results revealed a significant effect of treatment on participants' level of mathematics anxiety (F-ratio= 5.81, $P < 0.05$). Students exposed to treatment had reduced levels of anxiety in mathematics compared with those in the control group. The study also revealed that gender affected students' anxiety in mathematics significantly ($P< 0.05$).

INTRODUCTION

Mathematics anxiety is very real and occurs among many students. This assertion is supported by the findings of Sparks (2011) that whenever possible, students avoid taking mathematics classes and avoid situations in which mathematics will be necessary. The question that readily comes to mind then is why students should experience mathematics

anxiety since mathematics in the opinion of Akinsola and Tella (2003) is an important school subject which is associated with more academic and/or career opportunities. Similarly, Burton cited in Agwah and Usman (2003) relates the importance of mathematics to the scientific, industrial, technological and social progress of a society. That mathematics is an important subject is uncontested. It is required in many areas of life and not just at the higher academic levels of schooling. But it is very sad to note that the performance of many students in the subject is not encouraging (Adesemowo, 2005). This can be attributed to the fact that the majority of students have a phobia about mathematics. In supporting this view, Dwyer, (1993) and Webster & Fisher, (2000) find that positive attitude towards mathematics is inversely related to mathematics anxiety. According to Blazer (2011) mathematics anxiety is regarded as the negative emotions that interfere with the solving of mathematical problems.

This high rate of mathematics anxiety among students has been of great concern to stakeholders (educational psychologists, teachers, school administrators and managers, policy makers and planners, counselors, parents, and the likes) in education and to a large extent to students who are the direct beneficiaries or victims of the outcome. Researchers like Sparks (2011) and Legg & Locker (2009) have found that mathematics anxiety disrupts performance as it reduces students' working memory, leaving them unable to block out distractions and irrelevant information or to retain information while working on tasks. Also, in a study carried out by Ashcraft and Moore (2009) on assessment of anxiety in mathematics, its relationship to personal and educational consequences, and its important impact on measures of performance, it was discovered that mathematics anxiety causes an 'affective drop" - a decline in performance. This means that mathematics achievement and proficiency scores for mathematics-anxious individuals underestimate students' true ability. No wonder the chief examiners' report in 2003 cited in Ifamuyiwa (2006), concluded that the performance of the candidates had not improved significantly.

Mathematics failure brings untold hardship and frustration to individual students. Most of them become drop outs instead of being admitted to the university, become gainfully employed and useful to themselves, their parents and the nation at large. Some of them end up in petty trading or small- scale business and their options regarding careers are reduced, thus eroding the country's resource base in science and technology and resulting in a colossal loss in terms of financial investments. Thus, the effects of mathematics anxiety could hinder the effective realization of the individual child's potential and the overall development of the child's skills. Nevertheless, most teachers and parents have tried to solve the problem of mathematics failure among students by caning those who show a dislike for mathematics yet

most of such students end up hating, fearing and avoiding mathematics even more. This makes them have negative classroom experiences and a fear of failure for the said subject. Also, the desire to please their teachers and parents often results in more apprehension and fear of the subject. Most of these teachers and parents fail to realize that there is a need to remove the fear and tension, otherwise known as anxiety about mathematics, before the students can pass the subject. Since the militaristic approach of using force to correct misbehaviour has failed, the emphasis must now be on restructuring the foundation of these mathematics-anxious students through the knowledge of psychology via the use of psychotherapy.

Moreover, there is a dearth of research on the use of problem-solving in reducing anxiety in mathematics among students. It is based on this that the researcher sought to investigate how problem-solving could be used in reducing mathematics anxiety among senior secondary school students. The study therefore is aimed specifically to show how the mathematics-anxious student at senior secondary level can regard mathematics in a positive light. It also investigated the moderating effect of gender on the problem-solving strategy of the senior secondary mathematics- anxious students.

Review of Related Literature

Definition and causes of mathematics anxiety

Tobias (1993) defines anxiety in mathematics as feelings of tension and anxiety that interferes with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations. This definition shows that mathematics anxiety can make a student forget and loose his/her self-confidence if attention is not quickly paid to enhance such students' interest. Smith (2007) also characterized mathematics anxiety as; uneasiness when asked to perform mathematically, avoidance of mathematics classes until the last possible moment, feelings of physical illness, faintness, dread, or panic, inability to perform on a test, and utilization of tutoring sessions that provide very little success. This means mathematics anxiety is more than a dislike toward mathematics. Arem (2003) equates a lot of anxiety in mathematics with mathematics test anxiety, which she says is three-fold: Poor test preparation, poor test-taking strategies and psychological pressures. She says it's exacerbated by poor health habits, especially diet and sleep.

Also, according to Hopper (2003), mathematics anxiety is a learned emotional response to one or more of participating in a math class, listening to a lecture, working through problems, discussing mathematics and so on. This means that mathematics anxiety usually comes from negative experiences in working with teachers, tutors, classmates, parents or siblings. At

other times, anxiety comes from stress or a personal problem that was going on at the same time the student was learning a particular concept. In this case, mathematics
anxiety can be associated with whatever was going on at that time. According to Tobias (1995) and Dossel (1993), the causes of mathematics anxiety can be divided into three areas: environmental, intellectual, and personality factors. Environmental factors include negative experiences in the classroom, parental pressure, insensitive teachers, mathematics presented as rigid sets of rules, and non-participatory classrooms. Intellectual factors include being taught with mismatched learning styles, student attitude and lack of persistence, self-doubt, lack of confidence in mathematical ability and lack of perceived usefulness of mathematics (Miller, Kimmel, Hoffer&Nelson, 1999). Personality factors include reluctance to ask questions due to shyness, low self-esteem, and viewing mathematics as a male domain (Cemen, 1987).

Many researchers attempt to trace the evolution of mathematics anxiety among high school and college students back to their elementary school classroom experiences. When early school experiences receive the blame for mathematics anxiety, the elementary teacher is usually labeled as the responsible party. For instance, in the study of Kelly(1998), mathematically anxious teachers are often doubted as to their effectiveness as teachers of mathematics. Also, in a study of eight adult learners (25+ years old), Zopp (1999) found that unrelated life events, trigger events in education and a lack of support contributed to mathematics anxiety in her subjects. In addition, parents with anxiety in mathematics pass it along to their children, while teachers with anxiety in mathematics pass it along to their students (Fiore 1999). This shows heredity as a factor of anxiety in mathematics which is also confirmed by Smith (2007) who highlighted heredity as one of the causes of anxiety. Phillips (2002) also noted imposed authority, public exposure and time deadlines in the classroom as major causes of mathematics anxiety. On the whole, a major cause of anxiety in mathematics from the view of several authors cited in this work is students' prior negative experience with mathematics especially at the lower levels with teachers and parents (wards) at home. The significance of this therefore lies in the fact that the continuous training and re-training of mathematics teachers especially at the primary level should be taken seriously so that most students would be able to have a good foundation and love for mathematics.

Problem-solving as a Therapy for reducing mathematics anxiety

Diagnosing students with anxiety problems can be very difficult because the variety of its causes and the highly personalized and individualized nature of its symptoms formation make treatment more difficult and complex. According to Huitt (1992) Problem-solving is a

process in which we perceive and resolve a gap between a present situation and a desired goal with the path to the goal blocked by known or unknown obstacles. In general, the situation is one not previously encountered, or where at least a specific solution from past experiences is not known. Hawton & Kirk (1989) found that problem- solving is easy to teach and easy to learn and can be applied to a variety of different problems such as threatened-loss (for instance, of an important relationship or of personal status), actual loss, conflicts in which a person is faced with a major choice (whether or not to leave a situation, take on a new role and the likes), marital and other relationship problems, work difficulties (how to alter current working relationships), study problems, coping with boredom, difficulties concerning child care, and dealing with handicaps resulting from either physical or psychiatric illness.

According to Mental Illness Research, Education, and Clinical Centers (MIRECC, 2008), some of the steps involved in problem-solving training are; problem orientation(which involves recognizing that a problem exists and that solving the difficulty is a worthwhile endeavor); problem definition(involves **a** clear understanding of the difficulty and why the individual is unhappy with the current situation; generation of alternative solutions(this is when the client ask his/herself has been done in the past when the problem occurred and how well has it worked. If the client finds that what had done in the past has not been effective, it would be useful to generate some other solutions that may work better); decision making(this involves narrowing down and examining some of the options that had been generated in the previous step and think about how realistic each is, how likely one would be to implement that solution and the potential drawbacks of each);solution implementation and verification(this involves testing and implementing those solutions to see the degree to which they are solving his/her problem.

Studies indicate that problem-solving is a useful component of treatment for patients experiencing a wide range of difficulties such as depression and anxiety (Andrews, Creamer, Crino, & Page 2003). Also, in a study conducted by Huitt, (1992) on problem-solving and individual differences, it was found that one of the primary benefits to individuals of using this process is that the strengths and weaknesses of the individual can be identified and used or compensated for when making a decision. Furthermore, Aremu (1997) finds that problem-solving stimulate behaviour and that training in problem-solving may be viewed as one of several possible behaviour modification for facilitating effective behaviour. Likewise, Benson (1995) in Adenuga (2004) found that problem-solving skills can be useful for persons with mental retardation and mental illness who are likely to have problem-solving deficits.

Studies on the relationship between gender and mathematics anxiety

Gender issues in mathematics particularly with regard to attitude towards mathematics and anxiety in mathematics have been studied by several researchers (Adebule, 2004; Alonge, 1985; Hembree 1980.The study of Hembree (1980) shows that female students exhibit more test anxiety than male students but as a group, female students are more likely to self- report anxiety. Omirin (1999) found that there were no significant differences between the scores of male and female students on the same instruments developed for measuring attitudes towards mathematics and science oriented subjects. Also, the studies of Levenson (2002) determined that sex differences in anxiety emerged in children as early as 7 years of age. Even when the researchers applied statistical methods to control for gender differences in 11 psychosocial factors, a large gender difference remained. This is why Craske (2003) suggests a gender-linked biological predisposition for anxiety disorder. The study of Adebule (2004) in a comparative investigation as to whether there was any significant difference between the scores of male and female students on a locally standardized rating scale in mathematics for Nigerian students showed that there was no significant difference and that gender issues did not influence the response on the scale. Considering literature on gender and anxiety, it is obvious that it is inconclusive; thus, it was justifiable to speculate that gender could act as a moderating variable in this study.

It was thus hypothesized that:

1) There is no significant difference in the mathematics anxiety of participants exposed to problem-solving training and those in the control group.
2) There is no significant difference in the effect of gender on students' mathematics anxiety.

RESEARCH METHODOLOGY

Research design

The researcher adopted a pre-test and post-test control group quasi-experimental design involving a 2 x 2 factorial matrix. The treatment package (problem-solving training and a placebo treatment for the control group) was crossed with gender (male and female)

The systematic representation for the design is shown below:

Experimental Group I (T1): O_1 X_1 O_2

Control Group (T3): O_1 X_3 O_2

Where:

O_1 = pre-test scores

O_2 = post-test scores

X_1, X_2 and X_3 = treatment in experimental and control groups respectively.

$T_{1=}$ problem-solving training,

T_2 represents placebo treatment given to the control group.

Factorial design was adopted by the researcher because the design accomplishes in one experiment what otherwise might require two or more separate studies. Apart from this, the design also provides opportunity for the study to show the interaction effect of the moderating variables. Screening was done by the researcher to identify subjects that fall into high mathematics anxious group based on their scores on the MARS-R. Mathematics-anxious subjects were therefore assigned randomly to the problem-solving and the control groups. The subjects in the control group were given placebo treatment. (A debate on the most important subject - Mathematics or English language - was organized). The mathematics anxious students in the experimental group were divided according to their gender (male and female). This was also done to the control group.

Instrument

Mathematics Anxiety Rating Scale – Revised (MARSR) was adopted for use in this study. MARS-R, developed by Plake and Parker (1982) measures anxiety in mathematics through 24 self-referencing statements tapping the appraisal and expression of anxiety in themselves. Participants rated the extent to which they agreed or disagreed with each statement on a 5-point Likert- type scale ranging from 1 (no anxiety) to 5 (high anxiety). The MARS-R has demonstrated a coefficient alpha reliability of .98 with the full-scale MARS (Plake & Parker, 1982). Those with scores of 10-24 were classified as having high anxiety, while those with scores of 1-5 were regarded as having low anxiety. The researcher opted for MARS-R for the following reasons: Firstly, Plake and Parker showed that the scale has sound psychometric properties. Secondly, the scale has been used by many scholars beyond the shore of Nigeria such as Gierl and Bisanz (1995), Bernstein, Reilly and Cote - Bonanno (1992), Campbell and Evans (1997), Woodward (2004) and Marci (2006). Thirdly, the scale was found to exhibit good reliability and factorial validity in mathematics classrooms in Southern California (Marci 2006).

Selection of Participants

The researcher used the stratified random sampling technique to select 492 students from two schools which were screened using MARS-R(Mathematics Anxiety Rating Scale-Revised) to select high mathematics anxious students. Out of these 492 students, only 120 were selected. The simple random sampling method was used in selecting the two secondary schools in two local government areas of Ogun State. (Ado-Odo/Ota and Ifo Local Government Areas of

Ogun State). This was imperative to take care of the confounding effect of having more than one treatment group in the same location. The stratified random sampling technique was used in each of these schools to select 60 students from SS II (30 boys and 30 girls). The identified subjects were distributed randomly to the experimental and control groups. Each of the experimental and control groups had 60 participants comprising 30 male 30 female mathematics anxious subjects.

METHOD OF DATA COLLECTION

The data collection was done in three main phases;

1) Pre-treatment Session: Mathematics- anxious subjects were identified through the MARS–R. The identified mathematics anxious subjects were randomly assigned to the treatments and control groups in equal representation of gender.

2) Treatment Session: The experimental group was exposed to eight one- hour sessions of therapy on problem-solving training while the control group went through a debate on whether English or Mathematics was the most important subject.

3) Evaluation of the Treatment Programme: The post-test was administered to determine the use of the treatment package in reducing mathematics anxiety. After this, the researcher thanked the subjects for their cooperation throughout the programme.

Data analysis

Data collected in this study was statistically analysed to determine the effects of the independent variable (problem-solving training) on the dependent variable (mathematics anxiety). The **a**nalysis of covariance (ANCOVA) and t-test. ANCOVA was used to compare the effects of the independent variables as well as take care of differences that might exist between and within the groups while the t-test was used to determine which therapy was more effective in reducing anxiety in mathematics.

RESULTS

A total of 120 high mathematics anxious senior secondary school students participated in this study. This consisted of 60 males and 60 females with different levels of study habit. These were distributed into one treatment group (problem-solving) and a control group. The descriptive statistics of data for the post treatment assessment of mathematics anxiety by treatment and gender are presented in Table 1.

Effect of Problem-solving training on students' mathematics anxiety

Hypothesis 1

There is no significant difference between the anxiety in mathematics of subjects exposed to problem-solving training and those in the control group.

In testing hypothesis 1 ANCOVA was used. Results were tested for significance at P< 0.05 level of significance as presented in Table 1 (which also shows the summary of the results of all hypotheses tested in this study).

Table 1: Summary of ANCOVA of Mathematics Anxiety by Treatment and Gender.

Source	Type III Sum of Squares	DF	Mean Squares	F	Sig.
Corrected model	4057906	21	341.01	94.94	0.01
Intercept	914.57	1	319.41	12.26	0.00
Anxiety in mathematics pre- test	214.75	1	214.75	5.80	.00
Treatment	2866.11	2	179.13	5.80	.00*
Gender	8474.68	1	847.47	122.85	.00*
Treatment “by” gender	759.50	1	759.50	4.40	0.06
Error	1900.39	54	431.11		
Total	5842.01	72			
Corrected total	2132.00	71			

Denotes significance at P < 0.05

Results in Table 1 reveals that:

Significant effect of treatment (F = 5.81); P < 0.05;

A significant effect of gender F = 122.85; P < 0.05.

The results also indicate that the two-way interaction effect of treatment and gender (F = 4.40; P > 0.05) was not significant.

For hypothesis 1, the result revealed a significant effect of treatment on students’ mathematics anxiety (F =5.81, P < 0.05). In other words, a univariate F-ratio of 5.81, P < 0.05 which was found to be significant beyond the predicated 0.05 level was revealed.

This implies that the effect of treatment (problem-solving training) on the mathematics anxiety of students was significant.

Presented in Table 2 are the magnitudes of the mean mathematics anxiety scores of

Students exposed to the different treatment conditions.

Table 2: Test of Significant Difference in the Mathematics Anxiety of Students under Problem-Solving and Control Group

			95% confidence interval	
Treatment	Mean	Std error	Lower bound	Upper bound
Problem-polving	43.45	2.58	38.27	48.62
control Group	72.20	3.04	39.00	104.00

Evaluated at covariates appeared in the model: Anxiety in mathematics pre-test = 89.5417

Based on modified population marginal mean.

The data was exposed to statistical ANCOVA to adjust for the pre- anxiety in mathematics scores as covariate. For students in the problem solving group, the mean score was 43.45 with a 95% confidence interval of between 38.27 and 48.63 with a standard error of 2.58. Students in the control group had a mean score of 72.20 with a 95% confidence interval of between 39.00 and 104.00 with a standard error of 3.04. Also, to further confirm the magnitude of the anxiety in mathematics scores of students exposed to the treatment conditions and the control group, pairwise comparison of the treatment groups was used. The results are presented in Table 3.

Table 3: Pairwise Comparisons of the Mathematics Anxiety Level of Students in the Experimental and Control Groups

					95% confidence interval	
TREATMENT	Treatment	Mean difference (I – J)	Std. error	Sig(s)	Lower bound	Upper bound
Problem-solving	PR	.86	3.36	.79	-5.85	7.59
	CTR	-24.98 (c)	3.28	.000	-31.55	-18.41
Control group	PR	25.85(b)	3.22	.00	19.39	32.30
	CTR	24.98(c)	3.28	.00	18.41	31.55

Based on the estimated marginal means:

The mean difference is significant at the 0.05 level

Adjustment for multiple comparisons: Least significant difference (equivalent to no adjustment).

An estimate of the modified population marginal mean (J)

An estimate of the modified population marginal mean (l)

Effect of gender on students' mathematics anxiety

Hypothesis 2

There is no significant difference in the effect of gender on students' anxiety in mathematics.

The results in Table 4 reveal the differences between mathematics anxiety scores of male and female students.

Table 4: Descriptive Statistics of Mathematics Anxiety Scores of Male and Female Students

			95% confidence interval	
Gender	Mean	Std. error	Lower bound	Upper bound
Male	52.11	2.45	24.00	95.00
Female	42.71	2.01	21.00	84.00

Evaluated of covariates appeared in the model: Anxiety in mathematics pre-test = 89.5417

Based on modified population marginal mean.

Results in Table 4 reveal that the mean score of male mathematics anxious students was 52.11 as opposed to the mean scores of female students which was 42.71. Further analysis was conducted to discover if any significant effect of gender could be found on this difference and the results are presented in Table 5.

Table 5: Pairwise Comparisons of the Differences in the Mathematics Anxiety Scores of Male and Female Students

					95% confidence interval	
Gender (I)	Gender (J)	Mean difference (I – J)	Std. error	Sig(s)	Lower bound	Upper bound
Male	Female	-9.40	3.19	0.05	-3.02	-15.78
Female	Male	9.40	3.19	0.05	3.02	15.78

Based on the estimated marginal means:

The mean difference is significant at the 0.05 level

Adjustment for multiple comparisons: Least significant difference (equivalent to no adjustment).

An estimate of the modified population marginal mean (J)

An estimate of the modified population marginal mean (l)

With the sum of square 8474.70 with a df of 1 and 27 and mean square of 8474.68, the F-ratio of 122.85 was significant at 0.05 level of significance with a significant value of 0.00 for male and female mathematics-anxious students. The result reveals a significant difference effect of gender on students' anxiety in mathematics. The F-ratio value of 122.85 was significant at a df of 1 and 27 which is less than the 0.05 level of significance (that is, $F = 3.872$; $P < 0.05$). The null hypothesis of no significant difference was therefore rejected by this finding.

DISCUSSION

This first hypothesis was rejected because the findings revealed that there was indeed a significant difference in the effectiveness of the treatment on students' anxiety in mathematics when compared to the control group. This indicates that the problem-solving training was effective in treating students' mathematics anxiety. This result confirms the significant influence that the independent variable exerts over dependent variables. The reason for the significant effect of the treatment could be the students' exposure to eight weeks of treatment with problem-solving training. Strupp (1986) confirms that psychotherapists help their clients develop awareness and bring about changes in their behavior, feeling and thinking. This is also supported by Coon (2000) who found that positive changes in behaviour are facilitated by using behavioural techniques. Moreover, Passer and Smith (2004) also confirm that much has been learnt about the effectiveness of the various therapeutic approaches. .

The results indicate that students exposed to problem-solving training showed an appreciable reduction in anxiety in mathematics than those in the control group. This thus confirms the effectiveness of the treatment programme as the researchers taught the problem solving treatment group how to reduce their mathematics anxiety through problem orientation, definition, generating alternative solutions, decision making and solution implementation. For instance, some of the students who discovered that their lack of understanding of mathematics was a cause of their mathematics anxiety generated alternative solutions such as

having extra lessons with friends who understood the subject better, paying more attention in class, creating extra time to practice mathematics at home, speaking to their mathematics teachers for more clarifications and hiring a mathematics lesson teacher at home. Some of these students actually implemented these suggested solutions before the post-test was conducted. Thus, this may have contributed greatly to the differences in their post-test scores compared with their control group counterparts.

Another likely explanation for the non-reduction in mathematics anxiety level of the control group is the distance between the school where the problem-solving treatment was given and the school where the control group was based. As such, the control group did not know what went on in the treatment groups. Thus, the superiority of result shown by the students that underwent the problem-solving treatment could be attributed to the effectiveness of the treatment programme. This finding further confirms the results of Andrew et al (2003) who indicate that problem-solving is a useful component of treatment for patients experiencing anxiety. The findings of this hypothesis confirmed studies of Aremu (1997) who found that problem-solving stimulates behaviour and that training in problem-solving may be viewed as one of several possible behaviour modifications for facilitating effective behavior. The results of this tested hypothesis also agree with the studies of Jeffrey, Bedell, Shalley and Lennox (2005) on the efficacy of the problem-solving treatment over no treatment at all.

The second hypothesis which states that there is no significant difference in the effect of gender on students' mathematics anxiety was rejected because a significant difference was indeed found. The implication of this finding is that gender affects students' mathematics anxiety and that male and female students are not equally prone to mathematics anxiety. In other words, levels of subjectivity to mathematics anxiety among students depend on gender. The reason for this significance may be the traditional belief that mathematics and sciences are for male students and that female students are destined to pursue languages and art-related subjects. (Adebule, 2004). The submission of Gire (1988) that the more a student believes that mathematics is a male or female domain the lower his or her performance will be may also be an explanation for the significant difference in the anxiety in mathematics found between the male and female students in this current study. Also, the studies of Tronsky, Chen, Jackson and Marchant (1999), presented evidence that gender differences in mathematics anxiety exist because boys are faster than girls at retrieving the basic time and mental energy for the other operations needed to obtain the necessary solution. The significant difference in the gender of students who experience anxiety in mathematics may also be explained as Coleman (1961) states, as follows: in adolescent society, more young

females of today have a greater desire to achieve success in school and in career than their predecessors.

The studies of Bernstem, cited in Preis and Biggs (2001) were not in line with the findings in this study as they found that male students have higher anxiety in mathematics than females. However, the findings of this study concur with that of Hembree (1990) who found that female students exhibit more test anxiety than males. The findings of this study did not support the findings of Omirin (1999) who found no significant difference between the scores of male and female students on the instruments developed for measuring attitudes towards mathematics and science-oriented students. Neither did this study agree with that of Bamidele (1988) who found out that there was no significant difference between the performances of male and female school students in biology and mathematics achievement tests. The submission of Wade (1980) is that identical scores for boys and girls are indicative of the same level of anxiety. Moreover, the study of Adebule (2004) on gender difference on a locally standardized anxiety rating scale in mathematics was also in contrast with the results of this study, as it concluded that there is no significant difference between the scores of male and female students on the anxiety in mathematics scale in relation to statistical significance.

In addition, the findings of this study are also inconsistent with the studies of Lusser (1996) as the later failed to find a significant relationship between gender and mathematics anxiety. Lusser states that mathematics background has to be considered. Nevertheless, the use of gender as a moderating variable in this present study is significant despite the great disparities among researchers on its significance to anxiety in mathematics.

CONCLUSION

This research work has been able to provide meaningful insight into the use of problem-solving training as a strategy for reducing mathematics anxiety among secondary school students. This suggests that counselors should use this study as a theoretical and empirical basis for adopting problem solving training as a suitable method of reducing mathematics anxiety.

RECOMMENDATIONS

Based on the results of this study, it is recommended that teachers should cooperate with the school counselors by referring the mathematics anxious students to the counselors as quickly as possible instead of using cane or forcing them to perform better in mathematics. They should also re-examine their traditional teaching methods which often make learning

mathematics a trial instead of being enjoyable. Recognizing children's psychological problems, adapting their teaching styles and aids to the psychological characteristics of different children and establishing a psychological climate (which facilitates learning) in the classroom will go a long way to assist teachers in making mathematics more enjoyable.

In line with this, the government should also sponsor seminars/workshops for counselors on how problem-solving training could be used more effectively to help identify mathematics-anxious students. Schools should also be equipped with material resources like psychological tests which can be used by counselors (since it has been observed that it is difficult for teachers to identify highly test anxious students).This should be done by federal, state and local government as well as proprietors of private institutions.

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