INFLUENCE OF MATHEMATICS ANXIETY ON ACADEMIC ACHIEVEMENT OF SECONDARY SCHOOL STUDENTS IN MINNA METROPOLIS, NIGER STATE

BY

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ABSTRACT

This study examined the influence of Mathematics Anxiety on Academic Achievement of Secondary School Students in Minna Metropolis, Niger State. Relevant literature materials to the study were reviewed. The subjects were composed through a multistage random sampling technique from Private, Missionary and Government schools. The subjects were senior secondary two (SS2) students and they were three hundred (300) in number of both Male and Female. One instrument was used for the collection of data relevant to the study, Mathematics Anxiety Rating Scale (MARS), the research developed a self-designed five scale structured questionnaire titled "Mathematics Anxiety Rating Scale" the reliability of the instrument was determined using cronbach alpha formula, the correlation cofficient of 0.72 obtained which implies that the instrument was highly reliable for the study. The instrument was validated by two experts. The data obtained were analyzed using descriptive statistics of Mean and Standard Deviation for answering research questions while ANOVA and t-test were used to analysed the null hypotheses were tested at 0.05 level of significance. The results of the study revealed gender did not have any significant influence on students' Mathematics achievement. Also school ownership did not have any significant influence on students' Mathematics achievement. Following the findings, the educational implications were pointed out and recommendations made. Mathematics teachers are encouraged to employ teaching practices that do not promote gender bias and must consider giving the same treatment and Mathematics tasks to both Males and Females.

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CHAPTER ONE

1.0

INTRODUCTION

1.1. Background to the Study

The need for mathematics remains on the increase considering its usefulness and application in everyday living and various disciplines. This explains why Mathematics is compulsory at Primary and Secondary school levels and also a basic requirement for admission into mist degree courses in the Nigerian tertiary institutions. Meremikwu (2018) stated that the goal of teaching Mathematics with emphasis at Primary level is to prepare pupils to develop critical and creative outlook as they confront the challenges of daily life. But despite the relevance of Mathematics it was noted by Okeke (2016) that there was a general fear and hatred for Mathematics. Mathematics represents the foundation or core of all science, technology and engineering disciplines (Igbokwe, 2013) and is therefore imperative of the training of necessary manpower and personnel to drive the National engine of economic, technological and industrial development.

In Nigeria, many students perform poorly in Mathematics at all levels of education (Agwagah, 2015). This poor performance in Mathematics is not only prevalent among students in tertiary institutions but cut across the elementary, junior and senior secondary levels of education as well. For instance, Ahiakwo (2016) reported that students' Mathematics academic performance at the primary, secondary and tertiary levels of education had deteriorated over the years. Consequently, this has led to a low percentage of students enrolling in Mathematics-related courses at the Nation's tertiary institutions (Salman, 2011). Education at secondary school level is supposed to be the bedrock and the foundation towards higher knowledge in tertiary institutions. It is an investment as well an instrument that can be used to achieve a more rapid economic, political, technological, scientific and cultural development in the country. The National Policy on Education (FRN,

2015) stipulated that secondary education is an instrument for National development that fosters the worth and development of the individual for further education and general development of the society and equality of educational opportunities of all Nigerian children, irrespective of any real or marginal disabilities. Whereas Elliot (2013) has identified anxiety, interest, gender and location of school environments as the factors that affect learning. 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, 2016). According to (Truttschel, 2012), Mathematics anxiety can have detrimental effects for college students including feeling of nervous tension, fear of rejection, and stress. Many students who suffer from mathematics anxiety have little confidence in their ability to do mathematics and tend to take minimum number of required mathematics courses, greatly limiting their career choice options. Mathematics is the foundation on which the whole essence of living revolves and the platform for scientific and technological innovations. Anxiety refers to a feeling of distress or alarm caused by danger or pain that is about to happen (Tobias, 2013). Mathematics knowledge is necessary for secondary school students; it is very useful for higher education. Mathematics anxiety is one of the psychological barriers that students encounter when they are performing a mathematics task. Mathematics anxiety can negatively impact an individual's initial learning mathematical problem in wide variety of ordinary life and academic situation. Yesile (2012), submits that anxiety is a term used for several disorder that cause nervousness fear, apprehension and worrying. According to him, these disorders affect the way we feel and behave. Many students with mathematics anxiety possess little or no confidence in their ability to solve mathematical problem. According to Ashraft and Kirk (2011), the correlation between mathematics anxiety on academic achievement of students is negatively significant. The finding of Hembree (2010) shows that a student with high level of mathematics anxiety has lower levels of mathematics achievement.

There has been a renewed debate on the controversial issue of gender difference in mathematics and science achievement. Other research has also shown a decline in the difference between the genders in the past few decades on standardized test, suggesting that the more exposure females are getting on mathematics and science classes, the better their scores. Thus, according to Eccles (2012) found that gender differences in enrollment in Mathematics courses in high school are mediated by gender differences in expectations for success in Mathematics and Physics and perceived value of competence in Mathematics. Jeff (2012) found that self-concept of ability and task value in Mathematics decline for both genders between first and twelfth grades with no real difference between male and female trajectories over time. Even though female have made great strides in the law, medical, and social science professions, very few can be found in graduate programs or professions in Mathematics, Computer science, Physics, Engineering, or Information technology jobs (gyenum, 2012). Many ideas have been put forth on why high achieving female may not been entering these professions including discrimination, gender-typed socialization, and self-concept of ability in these areas, and the value and interest that female have in these professions (Morgan, 2012). School ownership with respect to Government schools, Missionary schools and Private schools may also play in students' anxiety and achievement. It has been observed (that students in Missionary schools are more composed and their teachers are more dedicated to service so the students achieve better.

In spite of the importance of the middle years of school, the majority of research on Mathematics anxiety on academic achievement has involved adult students. The study described here attempts to address the gap on students who experienced mathematics anxiety. The difficulties associated with alleviating mathematics anxiety and minimizing the

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chances of its development are worthy goals in themselves and even more important given the impact of Mathematics anxiety on students' abilities to learn the subject (Ashcraft & Kirk, 2017). Evidence of students' poor achievement in mathematics is abundant in spite of all the researches on the influence of some factors on Mathematics anxiety on academic achievement. Most of the studies have considered the influence of each of these factors on mathematics achievement but this study seeks to investigate the combined influence of all these factors on Mathematics anxiety on academic achievement. An issue of urgent attention at this point is to check out the influence of Mathematics anxiety on academic achievement in order to alleviate the dilemma students have been experiencing studying mathematics.

1.2. Statement of the Research Problem

The role of secondary education is to lay a solid foundation for further education and if a good foundation is laid at this level, there are likely to be no problem at subsequent levels. It is generally known in Nigeria that bigger number of students will in general pick non mathematics related courses while looking for admission to higher organizations. The quantity of students offering non mathematics related courses in higher establishment is in excess of multiple times the number contribution science related courses. This can be identified with mathematics anxiety. Students sees science as a troublesome subject which is hard to see, consequently they invested little energy, premium and focus on it. Be that as it may, the scientist is looking at the impression of students on the circumstances and end results of arithmetic nervousness among students of tertiary establishments.

Therefore, it is very dangerous to neglect the adverse effects of anxiety in mathematics. Various attempts have been made by several researchers (Arega & Sokan, 2003; Hassan, 2013; Sofesan, 2012; Wiseman, 2015) to examine the causes of poor academic performance. They discovered causes like intellectual ability, poor study habit, achievement motivation, lack of vocational goals, socio economic status and anxiety; few of them have actually dwelt on anxiety as a major cause of poor academic performance and its reduction among students. However, this study investigates the influence of mathematics anxiety on academic achievement of students in Minna metropolis, Niger State

1.3. Aim and Objectives of the Study

The aim of this study is to investigate the influence of mathematics anxiety on academic achievement of secondary school students in Minna metropolis, Niger State. Specifically, the objectives of the study are as follows:

1. To determine the influence of mathematics anxiety on academic achievement of the student.

2. To determine the influence of mathematics anxiety on academic achievement of the students based on gender.

3. To determine the influence of mathematics anxiety on academic achievement of the students based on school ownership

1.4. Researcher Questions

The following research questions will provide a guide to the study.

- 1. What is the influence of mathematics anxiety on academic achievement of the students?
- 2. What is the influence of mathematics anxiety on academic achievement of the students based on gender?
- 3. What is the influence of mathematics anxiety on academic achievement of the students based on school ownership?

1.5. Null Hypotheses

The following null hypothesis guided the study at 0.05 level of significant

HO₁: There is no significant difference in the mathematics anxiety on academic achievement of the students.

HO₂: There is no significant difference in the mathematics anxiety on academic achievement of the students based on gender.

HO₃: There is no significant difference in the Mathematics anxiety on academic achievement of the students based on school ownership.

1.6. Scope of the Study

The scope is restricted to secondary school students in Minna metropolis, Niger State. The class that will be used for this study is SS2 Mathematics students from three (3) co-educational students in Bosso and Chanchaga Local Government Area, of Niger State. Co-educational schools will be used because of gender differences and school ownership, the researcher wants to find out the influence of mathematics anxiety on academic achievement of secondary school students in Minna metropolis, Niger State.

This study will cover the influence of mathematics anxiety on academic achievement of secondary secondary school students in Minna metropolis, Niger State. The study work is proposed to last for five (5) months.

1.7. Significance of the Study

This study will be significant in the following ways:

Ministry of Education: Ministry of Education are saddled with the responsibility of formulating Educational policies and curriculum. So, this study would help the Ministries of Education formulate policies that would ensure that only qualified Mathematics teachers are employed to teach in Secondary Schools. It would help also the Ministry to organize seminars to enlighten parents on how best to help their children improve their achievement in Mathematics. This would go a long way to encourage the active participation of parents in the school system.

Teachers: This study will enable the teachers to carry everybody (students) along whether male or female by encouraging them to help them bring out the best in them.

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Students: The students on the other hand will through this work be made known that, they can all do it, and that no gender is better than the other. Thereby, putting aside their low self-esteem.

Finally, this study will serve as a source of literature to scholars and educational researchers because the result gotten from the survey will serve as a guide an even as a support for further research in the future.

1.8 Operational Definition of Major Terms

Below are some words that are clearly defined.

Mathematics: This is the subject that involves critical thinking and has lots of applications in real life.

Anxiety: A worry or fear about something.

Critical: Serious, uncertain and possibly dangerous.

Empirical: Base on experiments or experience rather than ideas or theories.

Achievement: A thing that somebody done successfully especially using their own effort and skill.

Bedrock: A principle from which other truth can derive.

Prevalent: Superior or dominant

Deteriorate: To grow worse, to be impaired in quality, to degenerate.

Ownership: A state of having complete legal control of the state of something.

Gender: The biological sex of an individual usually male or female.

Mathematics Achievement: This is the attainment, accomplishment or successful performance in a mathematics examination, measured in scores that a candidate obtains in an examination.

Mathematics anxiety: Has been defined as the feelings of tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems.

CHAPTER TWO

2.0

REVIEW OF LITERATURE

2.1. Conceptual Framework

2.1.1. Current state of Teaching and Learning of Mathematics

Mathematics education in Nigeria has been receiving special attention and recognition upon the country's efforts towards scientific and technological advancement. It occupies a leading position in the program for secondary and tertiary institutions so much so that many people are found wanting if they don't have a pass grade in mathematics. Despite the recognition given to Mathematics at all levels, the unfortunate situation is that most students continue to manifest non-challant attitude towards the subject. A study conducted by the Ministry of Secondary Education on performance of students in Nigeria General Certificate of Education Examination has confirmed student poor performance in mathematics. Despite the efforts of some Mathematics educators, associations, examination bodies, the ministries of basic and secondary education, and the government, Mathematics has not secured its rightful position in the mind of students due to the lack of interest as a result of poor tuition and aversions (the teaching and learning processes which may lead to failure) (Nekang,2011).

Students' prior negative experiences in mathematics class and at home when learning Mathematics are often remembered and cause a lack of understanding of mathematics. Thus they are scared of the subject. Most often there is lack of instructional materials like textbooks, calculators, etc. There is inadequate number of qualified teachers, even the ones on the job suffer from delay of their salaries (Amoo, 2018). Some teachers in the preprimary and primary levels prepare poorly for instructions and do not make enough efforts in terms of devotion and dedication to duty, due to maybe the policy of teaching every subject by the teacher. Others relate the failure of the students to teachers' incompetence or ineffectiveness (Amoo, 2018). The teacher then stands out at the center of the teaching and learning endeavor.

Students today have a need for practical Mathematics. Therefore, Mathematics needs to be relevant to their everyday lives. Students enjoy experimenting. To learn Mathematics, students must be involved in exploring, conjecturing, and thinking rather than, engaged in rote learning of rules and procedures. Mathematics must be looked upon in a positive light to reduce anxiety that is it must be taught in a way that is appealing to all the students such that everyone benefits from the lessons equally irrespective of their gender. A person's state of mind has a lot of influence on his or her success. It is based on this premise that the researcher seeks to explore the influence of gender and school ownership on Mathematics anxiety and achievement of secondary school students in Minna metropolis, Niger State.

2.1.2. Causes of Mathematics Anxiety

Mathematics anxiety is a serious and pervasive problem, especially in the community-school setting. Students are prone to experience mathematics anxiety in many forms and degrees, from "freezing up" during a mathematics exam, to attempting to avoid anything that has to do with numbers or calculations. The symptoms of it may be physical or psychological. The physical symptoms may include nausea, shortness-of-breath, sweating, heart palpitations and increased blood pressure. While some of the psychological symptoms may include memory loss, paralysis of thought, loss of self-confidence negative self-talk, math avoidance and isolation (thinking you are the only one who experiences it). These symptoms and other negative math experiences may lead to a vicious cycle in which fear of math interferes with learning math which leads to more negative mathematics experiences (Preis & Biggs, 2014). It was explained by (Blazer; 2011) that mathematics anxiety takes place in a complex fashion, resulting from a combination of personal, intellectual, and environmental factors stemming from many years of negative experiences. Personal factors present as low selfesteem, frustration not easily handled, and various levels of shyness, while intellectual factors include a student's lack of ability to understand how to handle mathematics concepts. Environmental factors, according to (Blazer; 2011) stem from various home, classroom, and social situations, such as demanding or undemanding parents, negative school experiences, over emphasis on memorization and repetitive worksheets, poorly trained teachers, poorly written textbooks, peer pressure, and excessive school absences. Each of these factors can cause various levels of anxiety for students.

In the book Overcoming Mathematics Anxiety by (Mitt, 2012) submits a set of environmental factors that many girls are exposed to that may influence their heightened anxiety. (Ashcraft & Humbree in Wei, 2016 p 10) have indicated that although factors that make learners feel anxious when confronting Mathematics is not yet determined, but learners with higher Mathematics anxiety show a strong tendency to avoid learning Mathematics, they hold negative attitudes towards Mathematics, and have weak self-confidence in doing Mathematics". Furthermore, (Geist; 2014 p.24) says that in general, there is little empirical research about the causes of Mathematics anxiety and Newstead (2017) says it is not an easy task to determine the causes of Mathematics anxiety, where and how it begins and grows. Therefore, the primary aim of this research then is to investigate the perception of students and teachers on the causes of Mathematics anxiety among students of senior secondary school.

2.1.3. Concept of Mathematics Anxiety on Academic Achievement

Anxiety is a psychological construct employed in the description of a state of fear, which borders on uncertainty in the individual (Mkpaoro, 2016). If the state of anxiety for mathematics is allowed to thrive and grow among secondary school students the attainment of the much-desired scientific and technological advancement may fall. Mathematics anxiety describes the states of mind developed through personal experience, and individual emotional responses to those experiences. According to Sheffield and Hunt (2017), Mathematics anxiety in many ways is easy to describe and define. It is the feelings of anxiety that some individuals experience when facing Mathematical problems. Like other forms of anxiety, students may feel their heart beat more quickly or strongly, they may believe they are not capable of completing mathematical problems, or they may avoid attempting Mathematical courses. Mathematics anxiety 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 of Mathematics. It usually comes from negative experiences in working with teachers, tutors, classmates, parents or siblings (Yenil mez et-al, 2015). Many students who suffer from mathematics anxiety have little confidence in their ability to do mathematics and tend to take the minimum number of required mathematics courses, greatly limiting their career choice options. This is unfortunate especially as society becomes more reliant on mathematical literacy (Gary, 2015). Barnes, (2016) stated that mathematics anxiety could be caused by a number of things: unpleasant past experience with mathematics in the classroom, a parent conveying the message to their children that mathematics is boring and useless, or from the attitudes of the teachers themselves. Mathematics anxiety is a problem for many college students, not only those in secondary school. If a technique is found to facilitate the alleviation of mathematics anxiety for students through improved pedagogies, information and resources, it could remedy students' Mathematics anxiety while helping them acquire the necessary Mathematical skills required for degree completion (Johnson, 2013). According to Perry (2014), the Mathematics student can seriously hamper his or her achievement by being nervous and insecure towards mathematics. Most Mathematics teachers would agree that mathematics anxiety stems primarily from students' fears of failure and feeling of inadequacy. In most cases, Mathematics anxiety is not extreme or overwhelming, yet it continues to haunt most students throughout their encounter with mathematics.

Academic achievement has indeed attracted a lot of research studies in recent years. Several of these studies have sought to find out what factors influence it, how it is measured and how it can be enhanced. Many believe that nature sets the limits and other factors like personality and environmental factors determine how much of this limit is actually achieved. There is need to continuously seek ways of improving the achievement of students in Mathematics

in this era of technological advancement, therefore this forms the basis for a study of this nature.

2.1.4. Misconceptions about Mathematics Anxiety

Misconceptions about mathematics abilities and stereotypes need to be dispelled to students to ensure mathematics anxieties and mathematics avoidance does not creep into a student's life (Blazer, 2011). The first misconception that people have about mathematics is that males are better in mathematicians than the females. When males and females are treated differently with respect to ability and stereotyping, levels of anxiety and achievement are affected.

The second misconception is that individuals that are good in mathematics are born good at it. Parents preserving the notion that mathematical ability is inborn or inherited may also be a contributing factor to mathematics anxiety. When parents feel their child receives bad grades in mathematics because the child simply does not have a mathematics mind and blame a child's poor performance on their inability to do mathematics, this can be detrimental to a child's success in mathematics (Godbey, 2018). Likewise, teachers play an important role in ridding this misconception in the classroom.

The third misconception is that there is only one way to solve a mathematics problem as viewed by Blazer (2011). For instance, when students are told lower years in school that all fractions are written with the biggest number on bottom and then told at their upper year that the biggest number can be on the top, a student's mathematical world may crumble. Having have been told two conflicting rules about fractions, students must now take their current teacher's word on which is the correct procedure. A teacher showing multiple representations of problems, solutions, and explanations can stop students from believing in only one way to do mathematics (Blazer, 2011).

The fourth misconception is that all mathematicians can solve problems quickly in their heads. Solving all mathematics problems quickly in one's head does not make that individual more intelligent than someone who completes the work on paper. When all these misconceptions are not addressed, students' mathematical anxiety may begin to take a new dimension. A simple idea that a student will never be able to perform better in mathematics because of their gender or parents' attitudes often keeps students from attempting higher levels of mathematics. Consequently, other, more serious symptoms will continue to emerge from students, creating a student who is anxious about mathematics. Teachers must be aware of the many factors leading to the causes of mathematics anxiety to students.

2.1.5. Gender Differences in Mathematics Anxiety on Academic Achievement

Gender often plays a role in most efforts Koller (2011) studied gender differences in mathematics achievement, which favoured males in achievement, interest, and placement in advanced mathematics courses. Literature on gender differences in mathematics suggest that the number of female students pursing mathematics up to the higher level reduces (Gabes 2016) but various research report that gender differences in mathematics attitudes of students may still be prevalent. Abian (2018), found that no significant relationship between gender and achievement among Nigeria schools

Mathematics anxiety is a state of discomfort associate with performing mathematics tasks, is thought to affect a notable proportion of thy school age population. Some research has indicated that mathematics anxiety negatively affects mathematics performance and that female students may report higher level of mathematics anxiety than male students on the other hand some research has indicated that male students' mathematics performance is more negatively affect by Mathematics than female students' performance. Modern psychological studies have shown that gender as a variable relates to performance (Ezeugo & Agwagah, 2014). For instance, Olagunju (2013), observed that male choose science courses in high

schools than female especially Mathematics, Chemistry and Physics. This is due to the long held view that female are weaker vessels who cannot stand the stress and strain involved in problem solving. To this end, Ugwumi (2017) argued that at present, females are struggling to fight the oppression, suppression and domination by their male counterparts. This was supported by Azuka (2014) who stated that significant difference in the performance of males and females on geometric proofs does not exist. Agwagah (2015) found out that female students performed significantly higher than their male counterparts in Mathematics. Mathematics anxiety has also received considerable attention for its role in explaining sexrelated differences in Mathematics achievement and course enrollment patterns (Meece etal, 2016). The scores of Mathematics anxiety have indicated that female experienced more level of Mathematics anxiety than male (Gary, 2015). In general Mathematics anxiety has been found to be higher among females in all levels of schooling (Baloglu, 2013).

One explanation has been that female students are more self- critical in evaluating their anxiety and performance in Mathematics than are males (Zettle & Houghton, 2018). Nevertheless, others have failed to find significant differences between male and female regarding their levels of Mathematics anxiety (Maguire & Ferdinand, 2014). For example, Gierl and Bizanz (2011) find no significant gender difference for Mathematics anxiety in early grades. Lusser as cited in Tahira and Sadia (2010) rejects gender as an anxiety contributor based on his findings. It is on these bases that this study therefore seeks to investigate the influence ofmathematics anxiety secondary school students in Minna metropolis, Niger State.

2.1.6. School Ownership influences on Mathematics Education

School inputs and school processes are important factors that have been examined. Resources and students are considered to be confounding factor that affect mathematics education because parents with full-time job and steady income send their children large schools with more resources (Maggy, 2012). Kyei and Nemaorani (2014), have found school location and type to affect secondary students' mathematics performance. Then there exist the Lay private schools, Missionary schools and Government schools.

Private school: Private schools are owned and managed by private individuals and are coeducational schools, where students are from average homes that is moderate Socioeconomic Status (SES). Admission into the school is very competitive. The proprietors are interested in making money and so they charge a moderate fee and admit as many students as the want come in order to fetch money. These has implications on the quality students admitted and consequently on their output. The private schools are based on competitions.

Missionary school: Are schools owned and managed by religious group. In order to get admission to a Missionary school, the student must excel in entrance examination, the reason being that the Missionary schools usually require a standard number of students which they can easily manage and cannot take above that number and oft

Government school: Are the last category considered in this study. These schools are medium co-educational schools run by government directly or indirectly through aids and are widely known among general public. Tuition fees in these schools are very meager and generally, students from low socio-economic status of the society flood these schools.

It has been observed that students in Missionary schools have positive attitude towards studies and strive to perform excellently. There is serious supervision of all their programs by the combined efforts of the missionaries and staff checked by the Missionaries. The private schools are for the students to strive for their survival. The private individuals managing such schools are not able to cope with the overcrowding and yet they continue to admit the students as they come. In government and government aided schools the situation is uncontrollable. The school managers have a non-challant attitude for they know there is no one or little supervision to monitor their activities and whether students perform well or not they will always have their salaries.

On school ownership and achievement, opinions and positions of many researchers have shifted with time. Concluding that private schools are more integrated than public schools and that private school produce better cognitive outcomes even as they control for student quality. It maybe imperative to ascertain whether the school ownership has an influence on achievement and hence or otherwise on Mathematical anxiety. In order to avoid the controversy of students not wanting or wanting to enroll in some particular schools. However, there are not much research studies on school ownership and Mathematics anxiety. There is, therefore, need to determine the influence of mathematics anxiety on academic achievement of secondary school students

Although, many studies have explored the influence of some variables on Mathematics anxiety on academic achievement, there is still a constant negative trend in academic achievement and Mathematics anxiety still persist particularly among secondary school students. There is need to determine why there is this persistent trend in Mathematics anxiety and achievement.



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Figure 2.1 above is a summary of the conceptual framework

2.2. Theoretical Framework

The theoretical framework for this study is derived from Bandura's general social cognitive

2.2.1. Bandura's General Social Cognitive Theory

In this theory, a person's choice of behavior and how much effort the person will expend and for how long they will sustain that effort in spite of obstacles and adverse experiences (demonstrating persistence) is governed by one's perception of self-efficacy (Bandura, 2010). A person will have lower performance (efficacy) believe that they are not able to be successful due to personal inadequacies rather than due to the particular situation they find themselves to be in. Self-efficacy expectations are independent of performance and are a better predictor of behavior than is the actual capability of the person (Pajares & Miller, 2009). According to Bandura, "anxiety is learned response to an unpleasant stimulus-avoid the unpleasant stimulus reduces anxiety, a person learns to avoid unpleasant stimulus. Bandura defines efficacy as "the product of a complex process of self-persuasion that relies on cognitive processing of diverse sources of efficacy information". These sources of efficacy information include performance mastery, watching others to see how the person's capabilities measure up, verbal persuasion and other social influences from others that indicate the person's capabilities. If students judge that they do not have the confidence to be successful; they will avoid potentially threatening situations and activities by adopting defensive behaviors such as avoidance even if they are not anxious at that particular moment. This "defensive behavior", according to Bandura is maintained because it is successful in reducing anxiety-causing event like enrolling in mathematics courses. This avoidant behavior is difficult to eliminate even if the threat no longer exists. Thus, the student's defensive behaviors may have become so successful in avoiding mathematics courses that

over time his or her level of mathematics anxiety may have been greatly reduced or even eliminated because the threat of taking future mathematics courses has been eliminated. Since, the student's Mathematics anxiety has been reduced, the mathematics avoidance behavior is reinforced (Gary, 2015). Students who were mathematics anxious in elementary and or middle school may not be mathematics anxious in high school if they were successful in avoiding mathematics courses they viewed as potentially threatening in secondary school and high school. Such students may not remember being mathematics anxious because they are no longer taking threatening mathematics courses and so no longer suffer from mathematics anxiety. Although it appears on the surface that these students may be successful in the lessening or elimination of Mathematics anxiety, they actually may be limiting their career options by avoiding challenging mathematics courses. Self-efficacy expectations are independent of performance and are a better predictor of behavior that is the actual capability of the person because they determine what the person will do with the knowledge and skills they have (Pajares & Miller, 2011). This helps to explain why people with similar skills and knowledge perform differently. Even though two students may have the same skill level, if one of the students perceives him /herself to be inadequate, that student will not perform as well as the student who perceives him/herself as being capable of attaining the desired performance. The theory is related to the study because according to Bandura when students lack confidence in themselves they are likely to develop anxiety avoid threatening situations and in this study school ownership and gender may pose a threat to the students and so generate anxiety in them thus influencing their achievement in Mathematics.

2.3.0 Empirical Studies

2.3.1. Gender Differences in Mathematics Anxiety

Meece et al (2010) investigated the influence of past Mathematics grades, Mathematics ability perceptions, performance expectancies and value perceptions on the level of Mathematics anxiety of young adolescents. The population was 860 students in 5^{tth} --through 12th grade but the sample was 250 students made up of 7th - through 9th - grade students. A second set of analysis examined the influence of these performance, selfperception, and affect variables on students' subsequent grades and course enrollment intentions in Mathematics. The instrument for the study was the Student Attitude Questionnaire (SAQ) and the data were analyzed using means and standard deviations. To test for possible sex-related differences in children's self-perceptions concerning Mathematics and Mathematics grades, one-way analysis of variance (ANOVA) was used. The findings indicated that compared with females, males have higher perceptions of their own Mathematics ability and higher performance expectancies in Mathematics. Girls expressed more anxiety about Mathematics than boys. In the study Students' Attitude Questionnaire was used to collect data which cannot give actual information on students' Mathematics ability perceptions and performance expectancies thus limiting the findings of the study. ANOVA was used to analyze the data just like in the present investigation.

Woodard (2014) investigated the Effects of Mathematics Anxiety on Post – Secondary Developmental students as related to Achievement, Gender and Age. The objective of the study was to determine if differences in Mathematics anxiety scores were related to gender or age, and if there was a relationship between Mathematics anxiety scores and achievement scores (exit exam). A total of 125 developmental Mathematics were used in the study. The instrument for data collection was the Mathematics Anxiety Rating Scale (MARS). The method of data analysis was Pearson product moment correlation procedure. The results indicated a significantly low negative relationship between exit exam scores and Mathematics anxiety scores meaning that as Mathematics anxiety scores increase, achievement scores decrease. Independent t-tests were used to test for any differences in the anxiety levels of males and females. The results indicated that female Mathematics students were significantly more anxious than male students. A major limitation of the study is that students were selected only from one school so it is not possible to generalize the results of the study. Also the study involved specifically Mathematics students unlike the present investigation which involves all the students of junior secondary since at that level mathematics is compulsory.

2.3.2. Gender Differences on Academic Achievement

In mathematics and most mathematics related fields (science courses), the tendency is to have more males than females. For instance, among the ancient mathematicians the celebrated names included: Euclid, Erastosthenes, Pythagoras, Pascal and others, all of whom were men. This trend makes one to wonder why such imbalance. Could it be that the female's brain is weaker than that of the male (Olagunju, 2010). Commonwealth report as cited in Olagunju (2012) stated that there exists gender preference in the labour market, especially in sciences and engineering fields. One wonders if all these had contributed to dampen the morale of female gender and thus generating anxiety in them.

Khata *et al* (2011) in a study investigated the influence of age and gender on students' achievement in Mathematic. The purpose of this study was to determine if age and gender influence the achievement in high school Mathematics. This study utilized the student's grade point average (GPA) for Mathematics during high school years to measure achievement. The data for this study came from the National Assessment of Educational Progress (NAEP) High School Transcript Study (HSTS) 2009. The study described the graduating high school students in the U.S. by age, gender and their academic achievement in Mathematics. The study compared the Mathematics achievement between age groups and gender. The comparison revealed that there were statistically significant differences in

Mathematics GPA scores between age groups and gender; however, the effect sizes were small. This study is related to the present work in the sense that it considers the influence of gender on Mathematics achievement just as it is in the present study. The study was conducted for high school students unlike the present study which is for secondary school student for it is necessary to determine the influence of this variable early enough to address the problems students experience in Mathematics with regards to gender.

Ozofor (2011) in a study investigated the effects of two modes of CAI in Enugu using a sample of 10 intact classes. The purpose of the study was to determine the effects of two modes of CAI in Enugu. The data collected were analyzed using mean, standard deviation and ANCOVA. The results revealed that females were superior to males in achievement, interaction was significant. The study is related to the present investigation for it considers gender influences on academic achievement just like the present study which considers the influence of mathematics anxiety on academic achievement. The limitation of the study is that it did not take into consideration the influence of other variables on achievement.

Ezenwa (2016) determined the effect of gender and school type on the Mathematics achievement of students. The purpose of the study was to determine if gender and school type affect Mathematics achievement. A sample of 132 males and 106 females were randomly selected from three schools in Minna, for the study. The data was collected using 30 multiple choice items on three Mathematics concept areas. The analyses of data revealed that male students were superior to the female in Mathematics achievements. This study is related to the present investigation for the fact that it explores how gender and school type affect Mathematics achievement just like the present study, but the study is limited because only three schools were used thereby making it difficult to generalize the results of the study. Also the content scope was limited to 3 topics only unlike the present study which made use of 6 topics out of 12.

2.3.3. School Ownership on Mathematics Anxiety

Sadia (2010) in a study on Mathematics anxiety among secondary school students in India and its relationship to achievement in Mathematics had as objectives to determine the ambiguity among the variables affecting Mathematics anxiety. The population in the study consisted of 1652 students from different management types of school. Investigators developed 'Mathematics Anxiety Scale' (MAS) and 'Mathematics Achievement Test' (MAT) instruments and used for data collections while the variance analysis, t-test and correlation techniques were used for statistical analysis. According to the result of the analysis, nearly half of the secondary school students have moderate level of mathematics anxiety and female display more anxiety towards mathematics than the male. High level of mathematics anxiety was observed in students of Government and Government aided schools. Findings also revealed a significant negative correlation (-0.48) between Mathematics anxiety and Mathematics achievement. The study is related to the present study because it considers students from three different school types just like the present study does.

2.3.4. School Ownership on Academic Achievement

Alimi *et al* (2012) in a study investigated School Types, Facilities and Academic Performance of Students in Senior Secondary Schools in Ondo State, Nigeria. The study investigated the influence of school types and facilities on students' academic performance in Ondo State. It was designed to find out whether facilities and students' academic performance are related in private and public secondary schools respectively. Descriptive survey design was used. Proportionate random sampling technique was used to select 50 schools in Ondo state. Two set of research instruments named School Facility Descriptive and Students Academic Performance Questionnaire (SFDAPQ) for principals; and School Facility Descriptive Questionnaire (SFDQ) for the teachers were used for the study. T- test

was used to analyze the data. All hypotheses were tested at a significant level of 0.05. The study revealed a significant difference in facilities available in public and private schools in Ondo State. It however revealed no significant difference in academic performance of students in the two types of secondary schools. Suggestions for the procurement of more facilities in public secondary schools were made in order to enhance students' academic performance. This study considered the influence of one variable only on students' achievement whereas the present study takes many variables into consideration.

2.4. Summary of Literature Reviewed

Literature revealed that Mathematics has occupied a special position at all levels of education from primary through secondary to tertiary. This is because of the important role it plays towards technological advancement and so it is the basis for all science related courses. The literature search showed that Mathematics is unavoidably found in many areas of human activities. Therefore, there is need to develop the students' ability to see Mathematics in a wide variety of situations and to use the knowledge to solve problems that may arise from it. The literature reviewed the influence of mathematics anxiety on academic achievement of secondary school students and its implications in the teaching and learning of mathematics. The review of theory highlighted the theory of anxiety and learning of mathematics.

The empirical studies highlighted some of the factors considered to be influencing students' Mathematics anxiety and achievements. Furthermore, the literature reviewed on gender and mathematics anxiety showed that earlier studies revealed that male students have higher performance expectances in mathematics than their female counterparts and that girls express more anxiety in mathematics than boys (Meece *et al* 2010). Thus males may have better achievement. However, some findings revealed that there is no clear evidence at present on which of the gender achieved lower in mathematics due to school ownership type.

Also the issue of which gender expresses more anxiety for Mathematics was not obvious. This is explained in some recent studies where it was observed that there was no significant difference between male and female students' anxiety in mathematics (Gierl & Bisanz, 2011). The literature reviewed along this line also showed school ownership and their implications in the teaching and learning of mathematics and thus on mathematics anxiety and achievement. With regards to school ownership it seems no school ownership could be clearly considered to be influencing anxiety in students. From the foregoing it seems the issue of gender and school ownership influence on Mathematics anxiety and achievement has remained inconclusive, which therefore calls for the need to reconsider gender and school ownership differences in mathematics anxiety and achievement. The literature reviewed pointed out that although achievement is a product of a variety of factors, one might still argue that anxiety of students' plays an important role in every academic pursuit. Finally, literature has revealed that the results of students in ordinary level CGCE mathematics have remained persistently poor over the years. The review provides enough evidence that students' achievement in Mathematics remains a major concern for Mathematics educators and if not the general public. This persistence in poor achievement will continue to prompt the search for the factors that promote students' anxiety and low achievement in mathematics so as to make mathematics more appealing to the students and the teachers

CHAPTER THREE

3.0

RESEARCH METHODOLOGY

3.1. Research Design

The research design adopted for the study is cross-sectional design. Cross-sectional design is the collection of data at one given point in time across a sample population or a pre-defined subset. It was designed to investigate the Influence of mathematics anxiety on academic achievement of secondary school students in Minna metropolis, Niger State.

3.2. Population of the Study

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The total population of this study includes all the Public, Private and Missionary Coeducation Seniors Secondary Schools. there are thirty-four (34) registered Senior Secondary Schools in Minna Metropolis, and ten thousand two hundred and fifty (10,250) SSII Students (Ministry of Education, Minaa 2021)

3.3. Sample and Sampling Techniques

In order to obtain the sample, a simple random sampling techniques was used in selecting three schools for the study. Out of the total population of the three selected schools which was three thousand (3000), the total number of three hundred (300) SSII Students were randomly selected for the study which is 10th percent of the total population of the three sampled schools. The names of the schools are:

- 1. Ahmadu Bahago School, Minna, Chanchaga.
- 2. Abu-Turab Islamic College Minna, Bosso.
- 3. St. Clement's Secondary School, Gbaiko, Minna, Bosso.

3.4. Research Instrument

The instrument developed by the researcher for the data collection is questionnaire. Questionnaire on mathematics anxiety rating scale (QMARS).

The questionnaire on mathematics anxiety rating scale (QMARS) consisted of set of fifteen (15) items structure to provide answer to the major research question. Five (5) point scale rating: Strongly Agreed (SA), Agreed (A), Undecided (U), Strongly disagreed (SD) and disagreed (D).

3.5. Validity of the Research Instrument

Experts in mathematics education and test and measurement validated the instrument. The validators chosen include two experts in mathematics education and one from test and

measurement all in the department of science education, Federal University of Technology, Minna, Niger State.

3.6. Reliability of the Research Instrument

To test the reliability of the instrument, a trial testing of the instrument was carried out on a randomly selected five (10) male and five (8) female students making the total of ten (18) students which were part of the targeted population but not part of the sampling size. The mathematics anxiety rating scale (MARS) was administered on the students from the separate population but with similar background. Cronbach alpha formula was used to get the correlation coefficient of 0.72. Split-half method was employed in establishing the reliability of the instrument. This reliability coefficient showed that the instrument was reliable for use.

3.7 Method of Data Collection

The researcher with two of his friends visited the selected schools to submit the letter of permission for collection of data collected from the department. The letter was presented to vice principal academic of the selected schools to seek for permission from the school authority for data collection. The letter was approved by the vice principal academic for the data collection. The questionnaire was administered, led by mathematics teachers of each selected school to the students from the selected schools in the area of study by researcher. The students filled the questionnaire on the spot, and it was collected back from them by the researcher with his friends for data analysis.

3.8 Method of Data Analysis

Descriptive statistics mainly Mean and Standard Deviation was used to answer the research questions. Inferential statistics of t-test and Analysis of Variance (ANOVA) mainly were used to analyzed the null hypotheses at 0.05 level of significance using package for social science (SPSS Version 20.0)

CHAPTER FOUR

4.0

RESULTS AND DISCUSSION

4.1. Analysis of Research Questions

4.1.1. Research Question One

What is the influence of mathematics anxiety on academic achievement of the students?

Statement	Mean(x)	SD	Remark
1. I become physically worried when the mathematics	3.68	1.347	Agree
teacher comes to class			
2. I am fearful about being asked to go to the board to	2.67	1.410	Disagree
explain or solve a problem or do any mathematics			
work			
3. I fear mathematics more than any other subject	3.50	1.295	Agree

Grand Mean	3.47	1.381	Agree
difficult			
15. For some reason mathematics seems unusually	2.77	1.407	Disagree
14. I don't think that I could advance in mathematics	3.97	1.256	Agree
13. I am afraid to ask questions in mathematics classes	3.81	1.371	Agree
12. Mathematics makes me lose confidence in myself	3.70	1.406	Agree
11. I consider mathematics as a subject I will rarely use	3.15	1.424	Agree
mathematics			
10. Am always scare I may not get good grades in	3.25	1.434	Agree
9. I get very nervous during mathematics test	3.11	1.532	Agree
correctly			
shouts at me when I don't answer a question			
8. I am worried because my mathematics teacher always	3.75	1.334	Agree
classmates who are afraid of mathematics like me			
7. I am more comfortable when I am discussing with my	3.82	1.501	Agree
in groups in mathematics class.			
6. My worst moment is when the teacher ask us to work	3.64	1.373	Agree
class			
5. I am afraid I won't be able to keep up with rest of the	3.60	1.401	Agree
too soon			
4. I am worried that mathematics is going to get difficult	3.58	1.225	Agree

Source: Field Work, 2021

Table 4.1.1 shows the respondents responses on influence of mathematics anxiety on academic achievement of the students. From the result of the analysis, 13 statements on the table were agreed upon, among these are the fact that; they becomes physically worried when the mathematics teacher comes to class, fear mathematics more than any other subject, worried that mathematics is going to get difficult too soon, afraid of being unable to keep up with rest of the class, having worst moment is when the teacher ask us to work in groups in mathematics class, get very nervous during mathematics test with mean values of 3.68, 3.5 0, 3.58, 3.60, 3.64 and 3.11 respectively.

While on the other hand, student responses disagree on the fact that; they are fearful about being asked to go to the board to explain or solve a problem or do any mathematics work and for some reason mathematics seems unusually difficult mean values of 2.67 and 2.77 respectively.

The grand mean of 3.47 indicate that there is influence of mathematics anxiety on academic achievement of the students.

4.1.2. Research Question Two

What is the influence of mathematics anxiety on academic achievement of the students based on gender?

	Male		Fe	male	Remark	
Statement	\overline{x}	SD	\overline{x}	SD		
1. I become physically worried when the	3.71	1.216	3.66	1.495	Agree	
mathematics teacher comes to class						
2. I am fearful about being asked to go to the	2.87	1.284	2.45	1.526	Disagree	
board to explain or solve a problem or do						
any mathematics work						
3. I fear mathematics more than any other	3.32	1.077	3.69	1.491	Agree	
subject						
4. I am worried that mathematics is going to	3.32	1.137	3.86	1.274	Agree	
get difficult too soon						
5. I am afraid I won't be able to keep up with	3.52	1.180	3.70	1.636	Agree	
rest of the class						
6. My worst moment is when the teacher ask	3.77	1.305	3.50	1.453	Agree	
us to work in groups in mathematics class.						
7. I am more comfortable when I am	3.94	1.263	3.69	1.734	Agree	
discussing with my classmates who are						
afraid of mathematics like me						
8. I am worried because my mathematics	3.65	1.380	3.86	1.297	Agree	
teacher always shouts at me when I don't						

Table 4.1.2 influence of mathematics anxiety on academic achievement of the stude	ents
based on gender	

Grand Mean	3.44	1.275	3.50	1.493	Agree
unusually difficult					
15. For some reason mathematics seems	2.77	1.383	2.76	1.455	Disagree
mathematics					
14. I don't think that I could advance in	3.73	1.172	4.21	1.315	Agree
mathematics classes					
13. I am afraid to ask questions in	3.80	1.270	3.83	1.490	Agree
in myself					
12. Mathematics makes me lose confidence	3.77	1.334	3.62	1.498	Agree
rarely use					
11. I consider mathematics as a subject I will	3.06	1.289	3.24	1.573	Agree
grades in mathematics					
10. Am always scare I may not get good	3.23	1.359	3.28	1.533	Agree
9. I get very nervous during mathematics test	3.10	1.472	3.11	1.618	Agree
answer a question correctly					

Source: Field Work, 2021

Table 4.1.2 shows the respondents gender based responses on influence of mathematics anxiety on academic achievement of the students. From the result of the analysis, 13 statements on the table were agreed upon by both male and female, among these are the fact that; they becomes physically worried when the mathematics teacher comes to class, fear mathematics more than any other subject, worried that mathematics is going to get difficult too soon, afraid of being unable to keep up with rest of the class, having worst moment when the teacher ask us to work in groups in mathematics class, get very nervous during mathematics test with mean values of (3.71, 3.66), (3.32, 3.69), (3.32, 3.86), (3.52, 3.70), (3.10, 3.11) respectively for both male and female.

While on the other hand, student (male and female) responses disagree on the fact that; they are fearful about being asked to go to the board to explain or solve a problem or do any mathematics work and for some reason mathematics seems unusually difficult mean values

of (2.87, 2.45) and (2.77, 2.76) respectively.

The grand mean of (3.44, 3.50) indicate that there is influence of mathematics anxiety on academic achievement of both male and female students.

4.1.3. Research question three

What is the influence of mathematics anxiety on academic achievement of the students based

on school ownership?

Table 4.1.3 influence of mathematics anxiety on academic achievement of the studer	nts
based on school ownership	

Statement	Private		Missionary		Government		Remark	
	\overline{x}	SD	\overline{x}	SD	\overline{x}	SD		
1. I become physically worried	3.85	.933	4.00	1.124	3.20	1.765	Agree	
when the mathematics teacher								
comes to class								
2. I am fearful about being asked to	2.99	1.572	2.95	1.317	2.00	1.124	Disagree	
go to the board to explain or								
solve a problem or do any								
mathematics work								
3. I fear mathematics more than	3.45	1.276	3.95	.999	3.10	1.483	Agree	
any other subject								
4. I am worried that mathematics is	3.85	.988	3.30	1.174	3.60	1.465	Agree	
going to get difficult too soon								
5. I am afraid I won't be able to	3.95	1.079	3.89	1.243	3.00	1.654	Agree	
keep up with rest of the class								
6. My worst moment is when the	3.79	1.182	4.55	.605	2.53	1.389	Agree	
teacher ask us to work in								
groups in mathematics class.								
7. I am more comfortable when I	4.10	1.410	4.15	1.182	3.20	1.735	Agree	
am discussing with my								
classmates who are afraid of								
mathematics like me								
8. I am worried because my	3.74	1.408	4.35	.933	3.15	1.387	Agree	

Gr	and mean	3.62	1.306	3.78	1.130	3.00	1.496	Agree
	seems unusually difficult							
15.	For some reason mathematics	2.70	1.380	2.80	1.281	2.80	1.609	Disagree
	advance in mathematics							
14.	I don't think that I could	4.25	1.118	4.26	1.147	3.37	1.342	Agree
	mathematics classes							
13.	I am afraid to ask questions in	4.20	1.196	4.11	.994	3.15	1.631	Agree
	confidence in myself							
12.	Mathematics makes me lose	3.70	1.525	4.20	1.005	3.20	1.508	Agree
	subject I will rarely use							
11.	I consider mathematics as a	3.10	1.518	4.00	.973	2.35	1.268	Agree
	good grades in mathematics							
10.	Am always scare I may not get	3.35	1.424	3.15	1.461	3.25	1.482	Agree
	mathematics test							
9.	I get very nervous during	3.16	1.573	3.10	1.518	3.06	1.589	Agree
	answer a question correctly							
	shouts at me when I don't							
	mathematics teacher always							

Source: Field Work, 2021

Table 4.1.3 shows the categorization of respondent's responses based on type of school on influence of mathematics anxiety on academic achievement of the students. From the result of the analysis, 13 statements on the table were agreed upon by across the school (private, missionary and government), among these are the fact that; they becomes physically worried when the mathematics teacher comes to class, fear mathematics more than any other subject, worried that mathematics is going to get difficult too soon, afraid of being unable to keep up with rest of the class, having worst moment when the teacher ask us to work in groups in mathematics class, get very nervous during mathematics test with mean values of (3.85, 4.00, 3.20), (3.45, 3.95, 3.10), (3.85, 3.30, 3.60), (3.79, 4.55, 2.53) and (3.16, 3.10, 3.06) respectively for private, missionary and government.

While on the other hand, responses from private, missionary and government, all disagreed on the fact that; they are fearful about being asked to go to the board to explain or solve a problem or do any mathematics work and for some reason mathematics seems unusually difficult mean values of (2.99, 2.95, 2.00) and (2.70, 2.80, 2.80) respectively.

The grand mean of (3.62, 3.78, 3.00) indicate that there is influence of mathematics anxiety on academic achievement among students of private, missionary and government schools.

4.2 Analysis of Null Hypotheses

4.2.1 Hypothesis One

HO₁: There is no significant difference in the mathematics anxiety on academic achievement of the students.

Variable	Ν	df	\overline{x}	SD	t-val	p- value	Decision
Anxiety	60	59	3.47	1.381	1.36	0.732	NS
*Academic Achievement		0,		11001	1100	01702	112

Table 4.2.1 t-test analysis for difference in the mathematics anxiety on academic achievement of the students.

*NS = Not Significant

Source: Field Work, 2021

Table 4.2.1 shows the one sample t- test analysis for difference in responses of student on the influence mathematics anxiety on academic achievement of the students. The outcome of the result shows average means responses is 3.47and the SD= 1.381, df = 59, with p-value of 0.732, at 0.05 level of significance; this shows no significant difference in responses of student on the influence mathematics anxiety on academic achievement of the students. Null

hypothesis one is here accepted. Hence, there was no statistical significant difference in responses of student on the influence mathematics anxiety on academic achievement of the students.

4.2.2 Hypothesis Two

HO₂: There is no significant difference in the mathematics anxiety on academic achievement of the students based on gender.

Table 4.4.2 t-Test analysis for significant difference in the mathematics anxiety on academic achievement of the students based on gender.

Variable	Ν	df	\overline{x}	SD	t-val	p- value	Decision
Male	31		3.44	1.275			
Female	29	58	3.50	1.493	4.736	0.09	NS
I cillate	29		5.50	1.775			

*NS = Not Significant

Source: Field Work, 2021

Table 4.4.2 shows the t- test analysis for significant difference in the mathematics anxiety on academic achievement of the students based on gender. The outcome of the result shows that the male student means responses is 3.44and the SD= 1.275, df = 58, while the female mean scores is 3.50, SD = 1.493, with p-value of 0.09, therefore the null hypothesis; significant difference in the mathematics anxiety on academic achievement of the students based on gender was not rejected. Hence, there was no statistical significant different between male and female student responses on influence of mathematics anxiety on academic achievement.

4.2.3. Hypothesis Three

HO3: There is no significant difference in the Mathematics anxiety on academic achievement of the students based on school ownership.

Table 4.2.3 Summary of Analysis of Variance (ANOVA) comparison in the Mathematics anxiety on academic achievement of the students based on school ownership.

Groups	Sum of Squares	df	Mean Square	F	Sig
Between groups	15037.076	1	15937.076	169.648	.014
Within groups	8266.880	57	93.942		
Total	24203.956	58			

Source: Field Work, 2021

Table 4.2.3 shows the results of the analysis of variance OF anxiety on academic achievement of the students based on school ownership. As shown in (Table 4.5) revealed F (1, 57) = 169.648 p=0.14. With p >0.05, the null hypothesis was accepted. Therefore, there was no significant difference in the mean response of students on the influence mathematics anxiety on academic achievement of the students based on school ownership.

4.3. Discussion of Findings

The findings of the study on research question one shows the respondents responses on influence of mathematics anxiety on academic achievement of the students. From the result of the analysis, it was agreed upon that; the student becomes physically worried when the mathematics teacher comes to class, fear mathematics more than any other subject, worried that mathematics is going to get difficult too soon, afraid of being unable to keep up with rest of the class, having worst moment is when the teacher ask us to work in groups in mathematics class, get very nervous during mathematics test among others. This finding is in line with that of (Meece *et al*, 2010).

The findings of the study also disclosed influence of mathematics anxiety on academic achievement of the students on based gender. From the result of the analysis, both male and female, students unanimously agreed that; they become physically worried when the mathematics teacher comes to class, fear mathematics more than any other subject, worried that mathematics is going to get difficult too soon, afraid of being unable to keep up with rest of the class. The findings is in agreement with that of (Woodard, 2014) while it contradict that of (Khata *et al*, 2011).

The findings of the study also showed the categorization of respondent's responses based on type of school on influence of mathematics anxiety on academic achievement of the students. From the result of the analysis, it was agreed upon by across the school (private, missionary and government), among these are the fact that; they become physically worried when the mathematics teacher comes to class, fear mathematics more than any other subject, worried that mathematics is going to get difficult too soon, afraid of being unable to keep up with rest of the class, having worst moment when the teacher ask us to work in groups in mathematics class among others. This is vein with the findings of (Alimi *et al.*, 2012).

The finding on hypothesis one showed that at 0.05 level of significance; there was no significant difference in responses of student on the influence mathematics anxiety on academic achievement of the students. Null hypothesis one is here accepted. Hence, there was no statistical significant difference in responses of student on the influence mathematics anxiety on academic achievement of the students.

The finding on hypothesis two showed that at 0.05 level of significance, there was no significant difference in responses of student on the influence mathematics anxiety on academic achievement of the students based on gender.

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The finding on hypothesis three showed that at 0.05 level of significance p > 0.05, the null hypothesis was accepted. Therefore, there was no significant difference in the mean response of students on the influence mathematics anxiety on academic achievement of the students based on school ownership.

The finding on hypothesis two showed that at 0.05 level of significance with p-value of 0.08, this shows no significant difference on student responses on the impression on their reason for mathematics anxiety. Null hypothesis four is here accepted.

4.4 Summary of Findings

It was discovered that:

1. Gender has no influence on students' achievement in mathematics and there was no significant difference between the mean achievement scores of male and female students Mathematics.

2. School ownership has no influence on students' achievement in mathematics and there was no significant difference in mean achievement scores of students in Mathematics due to School ownership.

3. Male and female students had a moderate mathematics anxiety level and there was no significant difference in mean anxiety scores of male and female students in Mathematics.

4. Government, Missionary and Private school students had a moderate mathematics anxiety level and there was no significant difference in mean anxiety scores of students in Mathematics due to school ownership.on students' mean anxiety scores in Mathematics.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS5.1. Summary of the Study

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In the study, cross-sectional designed was used. The researcher used three hundred (300) students as sample size which was drawn from the target population of 3000 students in Minna metropolis Niger State.

Mathematics Anxiety Rating Scale (MARS), was adopted for the study. The instruments were face validated by Mathematics education and test Measurement and experts, all in the department of science education, federal University of technology Minna. The instrument was trial tested and data collected were used for the test of reliability. After the administration of the instrument data generated were analyzed using mean and standard deviation for the research questions and ANOVA and t-test for the hypotheses. Significance was tested at 0.05 level of significance. The results from the data showed that:

1. There is no significance differences on mathematics anxiety on student academic achievement

2. Male and female students have Mathematics anxiety and there was no significant difference in Mean anxiety score of students in Mathematics due to school ownership.

3. Government, Missionary and Private students have Mathematics anxiety and there was no significant difference in the Mean anxiety scores of students in Mathematics due to school ownership.

The implications of the findings were examined and it was recommended that teachers in the field and those in training should be encouraged to employ teaching styles that are not gender bias and use relevant teaching learning aids in their lessons. It was also suggested that seminars, workshops and conferences should be organized by educators and the ministry of secondary education to acquaint and re-orientate teachers with teaching styles that can limit Mathematics anxiety and gender stereotypes. The limitations of the study were also highlighted and suggestions for further research made. Based on the findings of this study, it was concluded that gender and school ownership do not influence students' Mathematics anxiety and achievement. No significant interaction influence existed for gender and school ownership on Mathematics anxiety and achievement.

5.2. Conclusion

There are evidences in the present study which show that there is no significance differences on mathematics anxiety of students. There is no gender differences of male and female students in Mathematic anxiety. Gender was not a significant factor in the study. For the influence of school ownership on Mathematics anxiety, there was no significant influence. Also the influence of gender on Mathematics anxiety was not significant likewise the influence of school ownership on Mathematics anxiety was not significant.

5.3. Recommendations

The implications of the findings of this study lead to the following:

1. Since gender has no influence on Mathematics anxiety, Mathematics teachers should be encouraged to avoid practices that promote gender bias and must consider giving the same treatment and Mathematics tasks to both males and females. By so doing none of the gender will feel neglected and so achievement for both will continue to be equal. This type of intervention should start at the primary school.

2. Teacher training institutions should make Mathematics compulsory and make it a necessary requirement for students in such institutions to have a pass grade in Mathematics to be able to graduate. This is because of the impact teachers have on their students. Beginning with arithmetic in kindergarten, teachers' own attitudes about Mathematics influences students' attitudes. Teachers' behavior makes a difference in students' achievement. It is important that all their students and themselves feel comfortable with Mathematics teaching and learning. If this is not the case, many students will enter secondary school with a negative attitude towards Mathematics putting these students at a disadvantage for the 21st century career market.

3. Since school ownership has no Influence in mathematics achievement, parent and guidance are encouraged to take their children or wards to any school be it Private, Government or Missionary school.

4. It is suggested that in order to encourage female into Mathematics, Science and information technology fields, interventions need to be designed that focus not on academic achievement of female but in how to make Mathematics and science-related occupations more interesting for young, high achieving female students. This type of intervention should start in the academic careers for these young female students.

5.4. Contribution to Knowledge

The outcomes of this study have direct importance for teachers, administrators and governmental entities. The present findings could possibly help dispel the rumor that Private and Missionary schools are just money-making schools without good academic standards. Indeed, in this study, the mean of students in Missionary schools is a little better than those in Private Government schools. This difference is however not statistically significant. As revealed by the study, male and female students achieve equally in Mathematics. There is need to continuously emphasize equal learning environment for both gender, since gender differences will arise due to the differential disciplinary measures in the classroom and gender stereotypes in the curriculum and instruction. Since the interaction due to gender and school ownership on Mathematics achievement was not significant, it implies that both male and female students achieve of their school ownership.

Again, the present study has shown that gender and school ownership have no influence on Mathematics anxiety. This implies that both male and female students have the same anxiety levels and no difference exists in anxiety of students of different school types. The Ministry of secondary education should organize seminars, workshops and conferences for

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Mathematics teachers on the influence of gender and school ownership on Mathematics achievement and anxiety.

5.5. Limitations of the Study

The study was limited to some selected secondary students of both Private, Missionary and Government schools in Minna metropolis, Niger State. Some of the problems encountered during the research are: Financial constraints, delay in school approval of letter of permission for data collection and out of three hundred questionnaire distributed, only one hundred and eighty- seven (187) were retrieved and analysed. These problems led to the delayance and backwardness in conducting the research.

5.6. Suggestions for Further Research

The findings of the study have generated some areas for further research. Against this background, suggestions for further research include:

- 1. Student's Gender and classroom behavior as a factor in Mathematics achievement.
- 2. Student's factor as correlates of Mathematics anxiety
- 3. Making Mathematics appealing to those with special needs.

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APPENDIX 1

QUESTIONNAIRES ON MATHEMATICS ANXIETY RATING SCALE (QMARS)

SECTION A

Instruction: Please tick [$\sqrt{}$] the column

1. Respondent's gender

1. Male [] b. female []

2. Respondent's school

a.Private school [] b. Missionary school [] c. Government []

SECTION B

Responses of the respondents.

KEYS: Strongly agreed = SA, Agree = A, Undecided = U, Disagreed = D, Strongly disagreed = SD

S/N		SA	А	U	D	SD
1	I become physically worried when the					
	mathematics teacher comes to class					
2	I am fearful about being asked to go to					
	the board to explain or solve a problem					
	or do any mathematics work					
3	I fear mathematics more than any other					
	subject					
4	I am worried that mathematics is going					
	to get difficult too soon					
5	I am afraid I won't be able to keep up					
	with rest of the class					
6	My worst moment is when the teacher					
	ask us to work in groups in					

	mathematics class.			
7	I am more comfortable when I am			
	discussing with my classmates who are			
	afraid of mathematics like me			
8	I am worried because my mathematics			
	teacher always shouts at me when I			
	don't answer a question correctly			
9	I get very nervous during mathematics			
	test			
10	Am always scare I may not get good			
	grades in mathematics			
11	I consider mathematics as a subject I			
	will rarely use			
12	Mathematics makes me lose			
	confidence in myself			
13	I am afraid to ask questions in			
	mathematics classes			
14	I don't think that I could advance in			
	mathematics			
15	For some reason mathematics seems			
	unusually difficult			