ANALYSIS OF PSYCHO-SOCIAL FACTORS IN CLASSROOM ENVIRONMENT AS PREDICTORSOF PERFORMANCE IN MATHEMATICS AMONG SENIOR SECONDARY STUDENTS IN ZARIA KADUNA STATE, NIGERIA

BY

Idris MUHAMMAD
B.Sc. MATHEMATICS (B.U.K., 2009)

P16EDSC8015

DEPARTMENT OF SCIENCE EDUCATION,
FACULTY OF EDUCATION,
AHMADU BELLO UNIVERSITY,
ZARIA

SEPTEMBER, 2021

ANALYSIS OF PSYCHO-SOCIAL FACTORS IN CLASSROOM ENVIRONMENT AS PREDICTORSOF PERFORMANCE IN MATHEMATICS AMONG SENIOR SECONDARY STUDENTS IN ZARIA KADUNA STATE, NIGERIA

BY

Idris MUHAMMAD
B.Sc. MATHEMATICS (B.U.K., 2009)

P16EDSC8015

DEPARTMENT OF SCIENCE EDUCATION,
FACULTY OF EDUCATION,
AHMADU BELLO UNIVERSITY,
ZARIA

A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA-NIGERIA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF EDUCATION DEGREE IN MATHEMATICS EDUCATION

SEPTEMBER, 2021

DECLARATION

I, Idris MUHAMMAD (P16EDSC8015) declare that this dissertation titled "Analysis of Psycho-Social factors in Classroom Environment as Predictors of Academic Performance in Trigonometry among Senior Secondary Students in Zaria Educational Zone, Kaduna state, Nigeria" has been carried out by me under supervision of Dr. S.M. Tudunkaya and Dr. U. A. Ginga in the Department of Science Education, Faculty of Education, A.B.U Zaria. All information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this dissertation was previously presented for another degree or diploma at this or any other institution to the best of my knowledge.

_____ _____

Idris MUHAMMAD Date

P16EDSC8015

CERTIFICATION

This Dissertation "Analysis of Psycho-Social Factors in Classroom Environment as Predictors of Performance in Trigonometry among Senior Secondary Students in Zaria Educational Zone Kaduna State Nigeria" written by Idris MUHAMMAD (P16EDSC8015) meets the regulations governing the award of Master's Degree in Mathematics Education of Ahmdu Bello University, Zaria and is approved for its contributions to knowledge and literary presentation.

_____ _____

Dr. S.M. Tudunkaya Date

Chairman, Supervisory Committee

_____ _____

Dr. U. A.Ginga Date

Member, Supervisory Committee

_____ _____

Prof. S. S. Bichi Date

H.O.D Science Education

_____ _____

Prof. S. A. Abdullahi Date

Dean, School of Postgraduate Studies

ACKNOWLEDGEMENTS

Glory, honor and thank are due to Almighty Allah who made it possible for me to undertake and complete the dissertation successfully in spite of family and work problems faced during the period of this research.

My profound gratitude goes to Dr. S.M. Tudunkaya my major supervisor for his guidance, constructive criticisms, suggestions and cooperation without which the study could never have been completed. I also wish to appreciate most sincerely Dr. U. A. Ginga my second supervisor for his advice, relentless efforts and supports despite his tight schedule.

I am most grateful to Prof. Y. K. Kajuru (former Dean Faculty of Education), Prof. M. Musa, Dr. M. O. Ibrahim, Prof. I.A. Usman, Prof. S.S. Bichi, Dr. M.K. Falalu and Mallam I. H. Usman, Prof. Bolaji, Prof. Kankia respectively for their advice and guidance towards the success of this research work. I am also grateful to all the staff of the Department of Science Education and that of Director's office, Institute of Education Ahmadu Bello University, Zaria for their cooperation throughout the contact periods.

I feel it mandatory also to be grateful to my parents Alhaji Muhammad Abdullahi, HajiyaAishatu Muhammad and my beloved step mother HajiyaHauwa'u Muhammad, my wife Fatima (Zahara'u) Abdul-Kadir and my children Maryam Idris, Abdul-KadirIdris, Abdul-Rahaman and Abdul-Aziz Usman for the unlimited support, sacrifice and encouragement given to me throughout my period of study. I also appreciate my brothers and sisters Usman and his wife Hauwa'u, sister Aisha Muhammad, Hadiza Muhammad, Amina Muhammad, Fatima Muhammad, Ibrahim Muhammad, Fatima Muhammad, Abdullahi Muhammad, Abubakar Muhammad, Isah Muhammad, Habiba Muhammad, Fatima Muhammad, ZainabMuhammad,

Balkisu Muhammad and Aisha (Baby) Muhammad for their prayers and moral support throughout the period of the study.

My sincere appreciation goes to former Director General NTI Dr. AminuLadanSherehu (MatawallenZazzau), current Director General and Chief Executive National Teachers Institute Prof. G. DahuwaAzare, Mal. Bashir Mamman (Director Examinations), Dr. Ibrahim Bala (Deputy Director Test Development), Mrs Fatima Abbas Jega (Deputy Director Test Administration), Mal. Hashimu Umar, YunusaAbdullahi, Mal. LawandiSule Musa, JafarHussainiAliyu, Ibrahim Abubakar, AliyuNasir and Mal. YahayaSaniRigachikun for their moral support and prayers throughout the period of this study. I am also grateful to all my M.Ed colleagues for their moral support and prayers throughout the period of this study. There are too many to mention but few such as Shamsudeen Sale, Bala Musa, Ayee John merit mention for their steadfastness and support throughout my study in A.B.U. Zaria.

Finally, my gratitude goes to the students, principals and teachers of the schools used in this research work. I am very grateful to all whose books, journals and web site materials have been quoted or read for this research. I equally recognize all those who contributed in one way or the other to see that this research becomes a reality.

DEDICATION

This Dissertation is dedicated to my parent Alhaji Muhammad Abdullahi, HajiyaAishatu Muhammad and beloved step mother HajiyaHauwa'u Muhammad.

ABSTRACT

This study investigated the psycho-social factors in classroom environment as predictors of academic performance in Trigonometry among senior secondary school in Zaria Educational Zone, Kaduna state, Nigeria. Survey design of correlational type was used. Three hundred and forty seven (347) sampled students were used from a total population of three thousand six hundred and one (3,601) students in the study area. Trigonometry Performance Test (TPT) and Psycho-social Factors in Classroom Environment Inventory (PSCI) were used as instruments for data collection in this research work. The data collected were analyzed and presented using mean and standard deviation, Pearson's correlation t-test statistics test were used to test hypotheses one to six (1-6) and Mann-Whitney (U) and independent sample test were used to test hypothesis seven (7) at $P \leq 0.05$ level of significant. The findings of the study showed that there were no significant relationships between individual Psycho-social factors: satisfaction, friction, competitiveness, difficulty and comprehensiveness in classroom environment and students' academic performance in trigonometry. The hypothesis one to six were retained which shows that there is no significance relationship between psycho-social factor in classroom environment and academic performance in trigonometry. Therefore, psycho-social factors in classroom environment such as satisfaction, friction, competitiveness, difficulty and comprehensiveness are not predictors of academic performance in Trigonometry. However, the result equally revealed that there is no significant difference between male and female students academic performance in trigonometry, this showed that academic performance in trigonometry is gender friendly. Based on the findings of this study, it was recommended among others that socially and psychologically conducive classrooms environment should be encouraged in the teaching and learning of trigonometry in Nigeria. A teacher should develop an environment that accepted individual differences and allowed all students to develop a feeling of belonging. The professional bodies and Educational agency like Mathematical Association of Nigeria (MAN), Nigerian Mathematical Society (NMS), National Mathematical Centre (NMC), National Teachers' Institute, Kaduna (NTI), should organize workshops and train teachers on psycho-social factors in classroom environment for conducive classrooms for learning mathematics.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

TABLE **PAGE**

LIST OF APPENDICES

LIST OF ABBREEVIATIONS

TPT	Trigonometry Performance Test
PSCI	Psycho-Social Classroom Inventory
NERDC	Nigerian Educational Research Development Council
NMC	National Mathematical Centre
MAN	Mathematical Association of Nigeria
STAN	Science Teachers Association of Nigeria
NTI	National Teachers' Institute

OPERATIONAL DEFINITION OF TERMS

Classroom Environment: It is the perceived atmosphere both positive and negative resulting from physical, psychological and social setting available for the major stakeholders (teachers and students).

The Physical Environment: include classroom arrangement, seating, bulletin boards, black and white board displays and the physical climate, lightening and temperature which may affect academic achievement.

Psychological Classroom Environment: A psychological classroom environment is that environment where learning takes place in a quantifiable and perceptible characteristic.

Social Classroom Environment: A social classroom environment generates an intellectual environment where support, respect and collaboration are central.

Psycho-social Factors of Classroom Environment: Psychological and social environment exist in the classroom where factors like teachers support, peer group interaction, mutual respect and choices on the subject matter are guaranteed.

Classroom Cohesiveness: A cohesive classroom refers to the extent in which students are friendly and helpful towards each other.

Classroom Friction: Friction is the amount of tension that exists among students and staff.

Classroom Satisfaction: Classroom satisfaction is the extent to which students enjoy a class.

Classroom Competitiveness: This is a classroom environment whereby rivalry is emphasized.

CHAPTER ONE

THE PROBLEM

1.1 Introduction

The teaching and learning of mathematics in secondary schools in Nigeria need to be taken seriously because mathematical knowledge continues to receive attention in today's modern world of science and information technology. This is because of its inherent usage in every aspect of our development. Mathematics is a powerful social entity that plays a key role in sharpening how individuals deal with the various spheres of private, social and civil life (Kajuru&Popoola, 2010). Mathematics resolves around conceptual dissemination and skills attainment and enhancement. This enables learners to acquire new mathematical skills and knowledge or concepts to consolidate the old ones (Sumaila, 2018). Mathematics is an important school subject because it is associated with more academic and or career application of mathematics opportunities (Akinsola, 2008;Tella, 2003&Sumaila, 2018). Application of mathematics cut across all areas of human knowledge (Tella, 2008; Sumaila, 2018). Robinson (2009) stated that the field of mathematics has been valued for its applications in national defense, industrial processes, finance management, medicine, and technology.

Trigonometry comes from the Greek word 'trigonometria' put together from these three words Tri (three) gonoia (angle), metria (measure). It's a branch of mathematics which deals with triangles specifically a right angled triangle. Trigonometry is an aspect of mathematics that deals with the study of the relationship between the sides and angles of a right angled triangle. A right angled triangle is a triangle that has one of its angles equals to ninety degrees. The sides of the right angled-triangle are called adjacent (the side to the base of the right angle), opposite (the side opposite the right angle triangle) and the longest side opposite the right angle is the

hypotenuse. Trigonometry is like the other aspects of mathematics where mastery of content and skills are practically achieved. The process of mastery and skills remain the same thus: take time to comprehend, write things down for practice, engage in drawing figures as translation of the problem given in word problem and work out the exercises to get acquainted with the process. Knowing how to get the answer is the goal of the practice.

Gender in an ordinary convention refers to the sexual distribution between male and female. A number of studies have documented that boys are more interested in mathematics than girls (Fredricks&Eccles, 2002; Jacobs et al., 2002 OECD, 2004; Watt, 2004; Sumaila, 2018). Eliot (2009) state that girls were found to do better in certain subject areas such as Mathematics and Science when boys are not in the class. Eliot (2009) stated that the literature on gender differences provides evidences that gender issues impact achievement in mathematics notably that female students show less interest in mathematics and the steady decline in the girls' liking of mathematics perhaps account for the corresponding decline in their performance in the subject over the years.

Psycho-Social factor in classroom environment is a classroom where the psychological and social environment exists. It is that environment where factors like teachers support, peer group interaction, mutual respect and choices on the subject matter, cohesiveness, distraction, friction, satisfaction, competitiveness, interests, motivation, anxieties, confusion and the difficulty of the classroom learning activities are guaranteed (Igwebuike, 2005 &Mutum, 2016). Patrick, Ray & Kaplan (2007) pointed that these are factors must be properly handled by teachers to provide challenging environment for mathematics teaching. Research findings by Anderson (2007) and Mutum (2016) had revealed that in most schools mathematics teachers do not provide intellectually challenging environment for mathematics students. Most often they dominate

mathematics lessons by method full of information which is stringent, factors which may impede the performance of students of different cognitive characteristics (Chidiebere, 2009)and (Ali, 2017). Another reason for this dominance may be that majority of the students are concrete operational and field dependent who require teachers support, peer group interaction, competition, satisfaction, motivation, and cohesion (Okebukola, 2007; Ernest, 2013).

Classroom satisfaction is the extent to which students enjoy a class. An effective school climate has been described by (David, 2012) as a school environment in which the staff, students, and patrons attain high levels of satisfaction and productivity. Jon (2011) stated that climate consists of two major dimensions satisfaction and productivity. Jon (2011) described satisfaction as the sense of fulfillment of needs an individual experiences, along with enjoyment and happiness, as a result of the environment.Physical environment of classrooms have a vital role in students satisfaction, and a higher level of satisfaction can increase the level of skills mentality and knowledge of students. Student satisfaction is an important indicator of the quality of learning experiences (Mutum, 2016).This variable if properly handle by the teacher may enhance the performance of the students in trigonometry.

Classroom Competitiveness this is a classroom environment whereby rivalry is emphasized. One extremely important consideration in the development of classroom climate was that of cooperation versus competition. A cooperative goal structure existed when students perceived that their own achievement goals were dependent on how well other students achieved their goals. Cooperative goal structures resulted in the most accurate communication between students, constructive conflict management, a decreased fear of failure, increased levels of trust, greater peer acceptance, and improved support and emotional involvement in learning (Kolawole, 2008, Mutum, 2016). Competitive goal structures existed when students competed

with each other for achievement goals. Competitiveness some time lead to negative attitudes which include: weakens the student intrinsic motivation and heightens the level of anxiety /threat.

Difficulty is the extent to which students have trouble with the work in the class. A final component in determining classroom climate was that of difficulty. Awosiyan (2006) and Mutum (2016) stated that challenge was a factor incorporated in the design and structure of a learning task. They argued for tasks that offered personal challenges to students. According to their study, when tasks were enriched with such a motivational embellishment, the tasks were more likely to create an intrinsic purpose in learning. Awosiyan (2006) and Mutum (2016) reported that students tended to try to meet established performance standards as long as they were perceived to be achievable. When standards were set too high and learning tasks became too difficult, however, the results were discouraging and diminished performance.

A comprehensiveness classroom refers to the extent in which students are friendly and helpful towards each other. As early as 1962, Maslow posited a psychological hierarchy in which the need for belonging took precedence over needs for knowledge and understanding. According to Okoh (2011), students who worked together liked school more than students who were not allowed to do so. They were more likely to say that they wanted their classmates to do well in school and that they wanted their classmates to do well in school and that they felt their classmates also wanted them to do well. By participating in social-climate setting activities, both students and teachers came to better understand each other's value systems and began to create a cohesive environment. This enabled them to work together toward the common goal of social and academic achievement (Studivant, 2015).

Classroom Friction is the amount of tension that exists among students and staff, was another factor of interest involving the environment.

To achieve academically means scoring student above minimum level of proficiency at standardized test. It is to accomplish or gain by effort or do something successfully with an effort and skill. Obeka (2009) and Antecol (2012) on the other hand maintained that academic achievement concerns intellectual skills which lead to satisfactory means of adjustment, social sensitivity, and adequate self-concept. It should be noted that academic achievement is based on the degree of intellectual simulation that the child could receive from learning situation in which psycho-social factors like peer dynamisms, satisfaction, competition, friction, difficulty and comprehensiveness among others are factors that have to be played. The teacher plays a very crucial role in the development and achievement motive of the learner by providing a conducive environment.Student academic achievement in mathematics can be high, low, or on the average based on the classroom climate.In this study, the researcher carried out an analysis of Psycho-Social Factors (such as satisfaction, competition, friction, difficulty and comprehensiveness) in Classroom Environment as Predictors of Performance in Trigonometry among Senior Secondary Students in Zaria Kaduna State.

1.2 Statement of the Problem

The importance of Mathematics as a bedrock for science and technological development of the nation cannot be overemphasized. It is unfortunate however that WAEC Chief Examiner (2012, 2013, 2014, 2015, 2016, 2017, 2018& 2019) as presented in table 1.1 has indicated that students generally performed poorly in the trigonometric aspects, Students made unnecessary errors in their approach to obtaining the correct solutions, candidates' inability to interpret word problems and draw required diagrams correctly were observed, especially in bearing. It has been observed

that trigonometry as an aspect of mathematics in secondary school in Nigeria faces several problems in relation to its instructional strategies and curricular content delivery by the mathematics teachers; and that trigonometry has been neglected by the learners and its content delivery by teachers has been slow. This stress may be coming from the attitude of teachers to Psycho-social factors in the classroom discourse which may exert an adverse effect on students functioning and cause them to develop an unpleasant attitude to mathematics at the senior secondary level. Poor teaching method was observed as possible cause to poor performance in mathematics. Classroom environment might also be another course of failure in Trigonometry.

Table 1.1 Showing results of students in Mathematics from 2012 to 2019 in WAEC.

Table 1.1: Showing WASSCE Result in Mathematics (May/June, 2012-2019)

Year	No of Reg. students	No passed at credit level	Percentage at credit level (100%)	No. of failure (below credit)	Percentage at below credit (100%)
2012	1675224	819390	49.00	852834	51.00
2013	1543683	555726	36.00	987957	64.00
2014	1692435	529732	31.30	1162703	68.70
2015	1539442	544638	34.18	1048804	65.82
2016	1544234	597310	38.68	946924	61.32
2017	1578843	786016	49.98	792830	50.02
2018	1578246	765113	48.93	813133	51.07
2019	1596161	1020519	64.18	569,654	35.8

Source: Statistics Division WAEC Office, Yaba Lagos (2019)

There may also be emotional outcomes such as decline in self-esteem with the resultant effects of declining academic performance. Classroom behavior of teachers may also have motivational effects on learning process and on the performance of students. From what has been discussed so

far, there is need to tryother factors such as classroom environment to see whether or not students' academic performance will be enhanced, since other variables such as teaching methods, attitude have been used and there is not much progress. Poor classroom organization, management techniques and poorly coordinated students activities have been observed as some of the factors which threaten students and young teachers from deriving maximum benefits during class work. Research in this area to support this claim is however relatively sparse. The understanding of the nature of the learning environment for a meaningful organization of learning process is important. Therefore, in this study, analysis of Psycho-social Factors of the Classroom Environment has been investigated to see whether it is a Predictor to Academic Performance in Trigonometry of Senior Secondary School (SS II)Students in Zaria Educational Zone of Kaduna State.

1.3 Aim and Objectives of the Study

The aim of this study is to conduct an analysis of psycho-social factors in the classroom environment as a predictor to academic performance in Trigonometry of senior secondary school (SS II) students. The specific objectives are to:

1. determinethe relationship between satisfactionin classroom environment and student academic performance insenior secondary trigonometry.
2. determinethe relationship between friction in classroom environment and student academic performance in senior secondary trigonometry.
3. determinethe relationship between competition in classroom environment and student academic performance in senior secondary trigonometry.
4. determinethe relationship between difficulty in classroom environment and student academic performance in senior secondarytrigonometry.

5. determinethe relationship between comprehensiveness in classroom environment and student academic performance in senior secondary trigonometry.
6. determinethe perceived psycho-social factors (competition, friction, comprehensiveness, difficultly and satisfaction) in classroom environment as predictors student academic performance ofsenior secondary Trigonometry.
7. investigatethe differences between male and female students' psycho-social factors (competition, friction, comprehensiveness, difficultly and satisfaction) in classroom environment as predictors academic performance of senior secondary Trigonometry.

1.4 Research Questions

The following research questions are formulated to guide the study:

1. What is the relationship between thesatisfaction in classroom environment and student academic performance in senior secondary trigonometry?
2. Is there any relationship between thefriction in classroom environment and student academic performance insenior secondary trigonometry?
3. Do any relationships exist between thecompetitiveness in classroom environment and student academic performance insenior secondary trigonometry?
4. What is the relationship between the difficulty in classroom environment and student academic performance insenior secondary trigonometry?
5. Is there any relationship between thecomprehensiveness in classroom environment and student academic performance insenior trigonometry?
6. Do any relationships exist between thecomprehensiveness, satisfaction, friction, difficulty and competitionin classroom environment andstudent academic performance insenior secondary Trigonometry?

7. Whatis the difference between male and female students'comprehensiveness, satisfaction, friction, difficulty and competition in classroom environment and academic performance in trigonometry?

1.5 Null Hypotheses

The following null hypotheses are statedand tested at $P \leq 0.05$, level of significance:

H_{01} There is no significant relationship between student's satisfaction in classroom environment and academic performance insenior secondary trigonometry.

H_{02} There is no significant relationship between student's friction in classroom environment and academic performance insenior secondary trigonometry.

H_{03} There is no significant relationship between student's competitiveness in classroom environment and academic performance insenior secondary trigonometry.

H_{04} There is no significant relationship between student's difficulty in classroom environment and academic performance insenior secondary trigonometry.

H_{05} There is no significant relationship between student's comprehensiveness in classroom environment and academic performance insenior secondary trigonometry.

H_{06}. There is no significant relationship between comprehensiveness, satisfaction, friction, difficulty and competition in classroom environment and student academic performance in senior secondary Trigonometry.

H_{07} There is no significant difference between male and female students'comprehensiveness, satisfaction, friction, difficulty and competition in classroom environment and academic performance in trigonometry.

1.6 Significance of the Study

This study analysed psycho-social factors in classroom environment as predictors of performance in trigonometry among senior secondary students in Zaria, Kaduna State Nigeria.

Therefore, findings of this study would provide insight into the factors responsible for poor performance of students in Trigonometry, which when catered for with the aidPsycho-social factors (satisfaction, friction, competitiveness, difficulty and comprehensiveness) will facilitate class control, students' interactive engagement and foster contents coverage by teachers and students. It would also be of tremendous benefit to all those involved in the teaching and learning process specifically on trigonometry. It is hoped that this study would help to increase satisfaction and comprehensiveness of students in trigonometry (Mathematics) concepts. It would also benefit students, mathematics teachers, curriculum planners, textbook publishers, researchers, and professional bodies in the following ways:

Mathematics Students would hopefully improve their performance in learning mathematics concepts, not only that, it would help the students in decreasing their difficulty in learning trigonometry. Mathematics teachers would hopefully improve their effectiveness, efficiency and confidence in the classroom instructions; it will provide more efficient ways of teaching trigonometry at senior secondary schools.

Curriculum planners such as Nigerian Educational Research and Development Council (NERDC), Educational Resource Centre (ERC) and Ministry of Education Kaduna (MoE) would be beneficial by knowing that the use of general curriculum could no longer meet the need of other learners in making good policies.

Textbook publisher would find this work useful to reframe their books on trigonometry concepts so that new textbooks would be based on consideration of psycho-social factors in order to decrease difficulties in trigonometry concepts.

Researchers in mathematics education would also hopefully add new information to the existing literature. Professional bodies like Mathematics Association of Nigeria (MAN), Science Teachers Association of Nigeria (STAN) and National Teacher's Institute (NTI) Kaduna would benefit from this research and also assist them to organize seminars and workshops for mathematics teacher on the use of Psycho-social factors in teaching learning trigonometry aspect of mathematics.

The findings of this study will give parents information on how to make their children, wards, have conducive classroom environment by giving social, psychological and physical environment to their wards, children, to enhance conducive learning environment. These include counseling, financial assistance. This research would provide useful information to mathematics educators regarding the strength and weakness of students' performance in trigonometry. Such strength and weakness is as reported by the WAEC chief examiner's reports on trigonometry performance of student as the implication for teachers.

1.7 Basic Assumptions

This study has the following assumptions:

(i) It assumes that psycho-social factors in classroom environment may be used to predict Studentsacademic performance in trigonometry.

(ii) It is assume that students are aware of their classroom environment.

(iii) The students use the same Mathematics syllabus.

(iv) It is also assume that the teachers have minimum qualification for teaching Mathematics in secondary school.

1.8 Scope/Delimitation of the Study

This study is on the analysis of psycho-social factors of classroom as a predictor to performance of Trigonometry students in Zaria educational zone of Kaduna state. The zone is made up of 17 government senior secondary schools. The schools are single and mix sex schools consisting of both boarding and day schools within Zaria educational zone of Kaduna state. This study focused only on the determination of the existence or non-existence of the relationship between Psycho-social factors such as (Satisfaction, Friction, Difficulty, Comprehensiveness and Competition) and academic performance of Trigonometry. The study is also delimited to trigonometry content of the SS II mathematics syllabus (Trigonometry ratios of sine, cosine and tangent of angles, ratios of complementary angles, Pythagoras' theorem, Angles of Elevation and Depression, Trigonometric Graphs and Bearing) and the instruments that were used for the study are: Psycho-social Classroom Inventory Questionnaire which was used to collect data for the environmental studies while the Trigonometry Performance Test (TPT) was used to collect data on performance.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This study investigated the relationships that exist between classroom environment and academic performance in trigonometry among secondary school students. In this chapter, relevant literatures were reviewed under the following subheadings:

2.2 Theoretical Framework

2.3 Nature and Teaching of Trigonometry at Senior Secondary Schools

2.4 Academic Performance in Trigonometry.

2.5 Classroom Environment inMathematics Education

2.5.1 Classroom Physical Environment

2.5.2 Psychological Classroom Environment

2.5.3 Social Classroom Environment

2.5.4 Psycho-social Factors of Classroom Environment.

2.5.4.1 Classroom Cohesiveness as a Predictor to Academic Performance in Trigonometry.

2.5.4.2 Classroom Friction and Academic Performance in Trigonometry.

2.5.4.3 Classroom Satisfaction andAcademic Performance in Trigonometry

2.5.4.4 Competitiveness and Academic Performance in Trigonometry

2.5.4.5 Difficulty and Academic Performance in Trigonometry

2.6 Classroom Climate in Mathematics Education.

2.7 Socio-Economic Status in Mathematics Education.

2.8 Overview of Similar Studies

2.9 Implications of Literature Reviewed of the Study.

2.2 Theoretical Framework

The study of classroom environment is an outgrowth of environmental theory. Lewin (1935) in his development of field theory was a forerunner of the social environmental/climate theory. He referred to the environment as a field or niche which contains the person and the psychological environment as it exists for him. Component of the psychological environment include past and present experiences, feelings, the learners character, motivation, cognitive structure, and ways of perceiving. The target of this study is premised on students, teachers, and student environment. Therefore, the theories that have to do with the characteristics of these entities as they affect learning would be applicable since the learning of any subject matter depend on the way it is presented to the learner by his or her teacher, the way the learner interact with the learning experiences presented to him and the environment within which the learning takes place. It is therefore expected that these entities should be affected by the five psycho-social dimensions that is friction, cohesiveness, satisfaction, difficulty and competition will be considered in the study.

The study of Maslow (1954) would therefore provide theoretical bases for the study. Maslow's motivational theory as a social and psychological factor expresses that there are two groups of needs these are deficiency needs and growth needs. When the deficiency needs are made, people are likely to function at the higher levels (that is growth needs level) this means that when the deficiency needs are made self-directed learning or the desire to know and understand would be engaged in more easily.

Maslow's Hierarchy of Needs Model

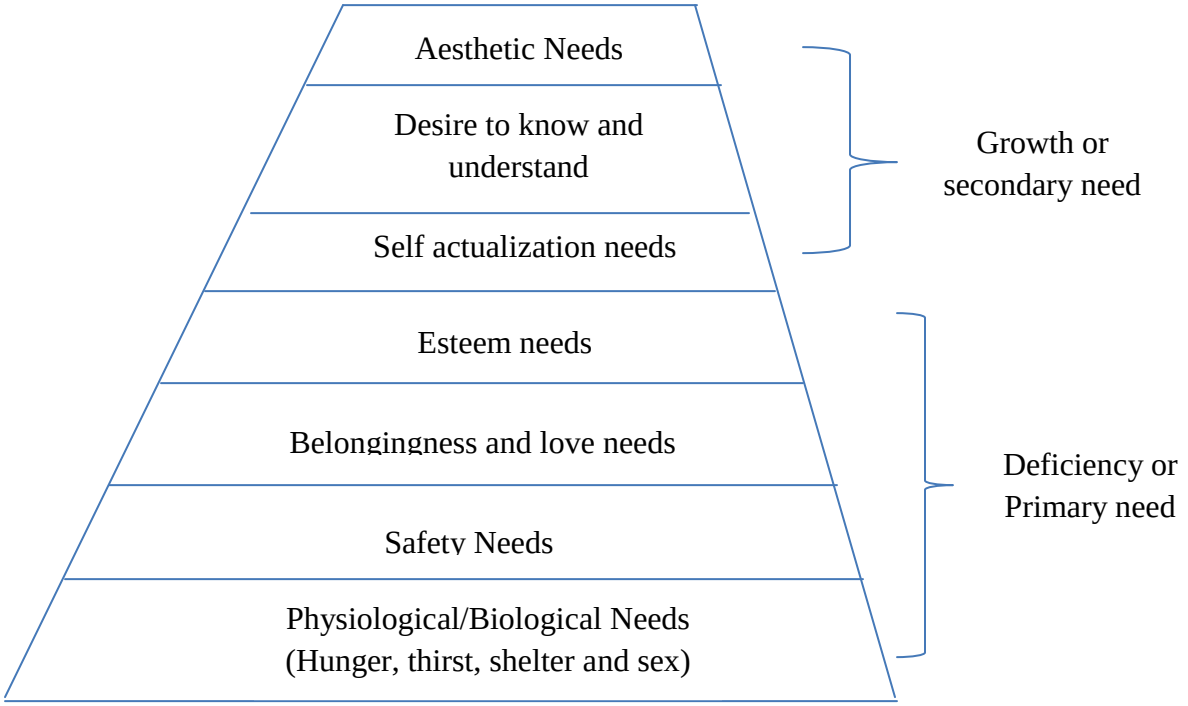


Figure1. 1: Maslow's Hierarchy of Needs Model (1954)

Physiological Needs: Physiological needs are the basic needs that human beings need for survival. These include food, water, rest, oxygen, emptying of bowel. If these needs are not met, the individual will not have the urge, drive or motivation to meet any other needs. Also, children who feel uncomfortable due to hunger or irritating physical conditions may not be interested in learning, while classroom satisfaction is the extent to which students enjoy a class. An effective school climate has been described by David, (2012) as a school environment in which the staff, students, and patrons attain high levels of satisfaction and productivity. Jon (2011) stated that climate consists of two major dimensions; satisfaction and productivity. He described satisfaction as the sense of fulfillment of needs an individual experiences, along with enjoyment and happiness, as a result of the environment. This lead the researcher to the analyze satisfaction in classroom as predictor student academic performance in trigonometry.

Safety needs: These include the need for protection, security and freedom from anxiety. Effective learning can only take place in a secured environment. Therefore, the teacher should create a non-hostile and non-threatening environment in the class room which is free of friction among students and staff. School environment should guarantee adequate security and safety of learners to his/her satisfaction.

Belonging and love needs: every individual wants to have a sense of belonging to a group. Failure to satisfy these needs may lead to a feeling of loneliness and isolation. Learners who feel that they are loved and accepted will be more interested in learning than those who feel rejected, misunderstood, ignored and maltreated. Therefore, all children should be appreciated unconditionally by the teacher. They should be made to know that they are important. Favouritism should be avoided. Effort should be made at giving every child a responsibility within the class. Therefore, teacher should provide a comprehensive classroom environment that will make students to be friendly and helpful towards each other. As early as 1962, Maslow posited a psychological hierarchy in which the need for belonging took precedence over needs for knowledge and understanding. According to Okoh (2011), students who worked together liked school more than students who were not allowed to do so. They were more likely to say that they wanted their classmates to do well in school and that they wanted their classmates to do well in school and that they felt their classmates also wanted them to do well. By participating in social-climate setting activities, both students and teachers came to better understand each other's value systems and began to create a cohesive environment. This enabled them to work together toward the common goal of social and academic achievement (Studivant, 2015).

Esteem Needs: these include the self-esteem and need for others' esteem. Self-esteem is the positive way one perceives one's self. For instance, one may perceive one's self as competent,

strong and an independent person. The need for others' esteem is a desire to have a good reputation, to obtain recognition and status. Inability to satisfy the esteem needs may lead to inferiority complex. Therefore, teachers should encourage learners to do task on their own no matter how difficulty the task is, and praise them for their efforts. Teachers should allow learners to express themselves and to believe in themselves. Teachers should use words that build rather than words that can shatter their confidence.

Need for Self Actualization: At this level, individual strives for personal growth, discovery and realizing ones potentialities. It is a stage that individuals compete to achieve higher and greater goals to become the very best person they can be. Therefore, the teacher must observe and identify children's areas of interests, capacity and potential. The school counselor should guide students to identify and select subjects they are best suited for.

Desire To Know And Understand: this is the stage where an individual thirsts and craves for more knowledge and understanding. For example a person may wish to have the Master degree, Ph.D or venture into other academic fields. Therefore, the teacher should encourage learners to fully maximize their talents to the peak of their chosen career especially the gifted pupils.

Aesthetic Needs: this is the last stage under the growth needs. It is the need to have and maintain beauty and cleanliness of self and environment. Therefore, teachers should encourage students to keep their environment clean and tidy student should also be encouraged to keep themselves clean and tidy.

The implications of these are teachers can encourage pupils to meet their growth need by enhancing the attractiveness of learning situation. In the light of these, when the environment where the child is learning (relationship dimension, personal growth, system maintenance and

change dimension) is attractive effective learning is likely to take place. In this study therefore, an investigation into correlation between psycho-social factors of classroom environment as a predictor to academic performance was carried out to find out if any of the factors is a motivation of performance.

2.3 Nature and Teaching of Trigonometry at Senior Secondary Schools

Trigonometry was developed for Astronomy and Geography. In addition to other fields of mathematics, trigonometry is used in Physics, Engineering and Chemistry. The kind of trigonometry needed to understand positions on a sphere is called spherical trigonometry. As earth is sphere, trigonometry is used in geography and in navigation. Joyce (1997) andSumaila, (2018) stated that trigonometry began as the computational component of geometry and that if there is anything that distinguishes trigonometry from the rest of geometry, it is that trigonometry depends on angle measurement and quantities determined by the measure of an angle as all of geometry depends on treating angles as quantities, but in the rest of geometry, angles aren't measured, they're just compared or added or subtracted.

Although trigonometry was first applied to sphere, it has had greater application to planes. Joyce (1997) further said that surveyors have used trigonometry for centuries also that engineers both military engineers and otherwise, have used trigonometry but later all branches of physics use trigonometry, for, trigonometry aids in understanding of space, trigonometry has wider applications in architecture, cartography, civil engineering, computer graphics, electrical engineering, physical sciences and surveying etcetera. The learning of trigonometry would depend on the way it is presented to the learner as students learn mathematics generally through the experience teacher provide, the way the learner actively interacts with the learning experiences presented to him and the environment within which the learning takes place.

Students understanding of trigonometry, their ability to solve problem, their confidence are shaped by the type of teaching they came across in school.

Trigonometry is an area of mathematics that students believe to be particularly difficult and abstract compared with the other aspects of mathematics (Orhun, 2002; Ernest, 2013). Delice (2002) and Ernest (2013) identified that students partially answered the questions on trigonometry at the first and second levels and inadequately answered the questions at the other levels; the students have misconceptions and learning complexities, which is attributed to the fact that before learning the trigonometry concepts, the students learn some concepts, pre-learning concepts, incorrectly or defectively. These concepts are fundamental for learning the concepts of the trigonometry such as unit circle, factorization, and so on.(Durmus, 2004; Sumaila, 2018) indicated that students are not motivated to do trigonometry whereas (Akkoc, 2008;Sumaila, 2018) state that students have difficulty in understanding trigonometry.

The failure to understand trigonometry concepts on the part of the learners has a ripple effect on the success rate of the learners in mathematics. The trigonometry content area has a weighting of 40% in senior secondary school Mathematics, hence it has a large impact on the senior secondary schools performance. Therefore, failure to understand trigonometry concepts on the part of the learner has a ripple effect on the success rate of the learners in Mathematics as founded by Sumaila (2018). It was revealed by a research conducted by Olubuku (2015) that trigonometry is one of the difficult topics in senior secondary school mathematics content as perceived by the mathematics students. It becomes glaring that there have been no appreciable improvement in the general performance of the senior secondary students that sat for WAEC over the years and the failure rate has been consistent for the past years.

Amongst the goals of learning mathematics are the followings: the need to master basic mathematical skills in order to cope with the necessary demands of life which may include being numerically knowledgeable, gaining the required apparatus for future employment, developing the prerequisites for further education, and appreciating the relationship between mathematics and technology; mathematics is also the language of all the physical sciences, and many other disciplines depend on mathematics as a means of communication; its paramount importance in life skill is also in decision-making looking at descriptive and inferential statistics. The importance and relevance of the mathematics as a subject and a discipline cannot be overemphasized as it relates to everyday functioning, educational attainment and career advancement.

As part of achievement in trigonometry, NCTM (2012) requires the students to know the six trigonometric functions of angles of any magnitude namely sine, cosine, tangent, secant, cosecant and cotangent. They should be able to understand the terms 'amplitude' and 'period', relationships between graphs and sketch graphs of the trigonometric functions. According to NCTM (2012) Trigonometry is a rich mathematical content area that blends geometric, graphical, and algebraic reasoning. (Sarac&Fatma, 2013) hold that trigonometry is a product of algebraic techniques, geometrical realities and trigonometric relationships. According to Tuna (2013) trigonometry improves students' cognitive skills and has great use in daily life and also that trigonometry provides transition from algebra to geometry as pre-requisite knowledge for trigonometric functions.

The nature and teaching of trigonometry in senior secondary schools was made to be activity based in the modern mathematics as such the teaching needs more detail approach to carry the students along. Trigonometry is generally taught via teacher-active method to facilitate the

learning and the knowledge is gained by repeating the processes. The teaching of trigonometry ought to be sequential, as sequencing of learning tasks provides linkage between what has been learnt and what is to be learned. For the students to be able to acquire these abilities and skills there is a need for an organized and interactive classroom session and a qualified teacher to take them through. Trigonometry lessons require the use of tools and techniques (a technique is a mode of solving a task and involves a variety of package of reasoning and routine work) for the activities to be undertaken successfully as trigonometry deals with real life situations. If association with real life situations and the importance of learning and using of trigonometric concepts are explained to students, these concepts may be learned better (Sumaila, 2018).

Other trigonometry lessons mainly focused on the students' ability to solve trigonometric equations, graph sketching of sine, cosine and tangent functions and proving trigonometric identities. Trigonometric functions are taught by using their graphs as students understand a concept better when it is pictured, interpreting graphs and using them to make predictions is a fundamental skill required of the students to be developed (Sumaila, 2018).

Students performance in trigonometry can be affected by the course nature (subject difficulty because of its complexity in using symbols and in computations), habits of concentration and study time, study habits and attitude in preparing and taking examinations, attitude towards trigonometry and the school-related factors (Sumaila, 2018). Since learning of trigonometry still has problem despite several variables such as teaching methods, teaching strategies, interest, the researcher feel that there is a need to try analysis of psycho-social factors of classroom environment as predictor of student academic performance in senior secondary trigonometry in Zaria, Kaduna state.

2.4 Academic Performance in Trigonometry

Trigonometry is a branch of mathematics that study relationship involving length and angles in triangles (David, 2012). Performance was defined by him as a quality of results produced by students as reflected in the quality of their examination scores. According to this definition, trigonometric performance can be defined as the quality of results produced by students in trigonometry as reflected in the quality of their examination scores. Meanwhile, Anthony (2012) defined academic performance as a scores in all academic disciplines, in a class as well as in extracurricular activities such as excellence in sporting, behavior, confidence, communication skills, punctuality, assertiveness, art, culture, to mention but a few. In the context of trigonometry, performance in trigonometry is a quality of results produced by students in trigonometry as reflected in the quality of their trigonometric examination scores. Hence, knowledge of trigonometry provides experience that help students develop understanding of relationship between length and angles in triangles. It enable students to solve relevant problems and to apply trigonometry knowledge to a real world situations NCTM (2012).

National council of Teachers of mathematics (NCTM, 2012) endorsed that trigonometric is one of the ten proposed basic skills area and is a basic that should be taught to students of all ability levels.Trigonometric attitudes have been considered as a base for learning mathematics. So this subject has been studied by many researchers (Sumaila, 2018). The importance lies within the fact that trigonometry is not only related to mathematical courses, but also concern with the development of students' cognitive skills such as investigation, researching, criticizing, creative thinking, illustrating what they have learned and self-expression. Due to the importance of trigonometry, there were number of studies attempted to improve geometric learning in particular some studies put effort to integrate computer technologist into trigonometric learning

due to interactive, manageable, dynamic, flexibility, replay able and controllable nature of computer-based environment NCTM (2012).

Trigonometric teaching activity should be able to encourage student to absorb meaningful trigonometric concept and develop computer program to provide with trigonometric basic ideas that can be manipulated on screen. Successful solutions of geometric problems depend upon combination of resource knowledge. Trigonometric plays an important role in mathematics curriculum because it provides opportunity to students to improve on deductive reasoning. According to Sumaila (2018) in as much as trigonometry is important, the main goal of trigonometry as a branch of mathematics is to improve students' partial skills by giving various representation in teaching of relations between lengths and angles. As can be noted trigonometry is a unifying team of the entire mathematics curriculum as such is a huge source of visualization for arithmetical algebraic and statistical concepts (Kumar-Das, 2005; Sumaila; 2018).

Kumar-Das (2005) stated that learning trigonometry may not be very easy, as a large number students fail to develop an adequate understanding of trigonometry. This is true because if students were giving opportunity to make choice of questions to attempt in examination, many will avoid trigonometric based questions. The lack of understanding in trigonometric often causes discouragement among student which lead to poor trigonometric performance in particular and poor performance in mathematics in general.

However,despite the importance of trigonometry in mathematics, the Basic Education Certificate Mathematics Examination Chief Examiner's Report (2010, 2011, 2012, 2013, 2014 & 2015)reported that questions on trigonometry were poorly attemptby candidates. One of the

major factors which had been identified for such poor performance is lack of understanding of the concepts and sub-conceptsin trigonometry Johnson (2000).

Meanwhile, Chief Examiners report on students' areas of deficiency in Junior School Certificate Mathematics Examinations (BECE) had always indicated that students have poor performance in trigonometric concepts as shown by their performance (2010, 2011, 2012, 2013, 2014 & 2015). Most students avoid trigonometric questions or haphazardly attempt them. Not surprising, students negative attitudes towards trigonometry seems to have been translated into law academic performance. Research report indicate that many reason account for this problem which include poor teaching strategies, and lack of confidence in the subject on the part of teachers Johnson (2000). Johnson (2000).further noted that heterogeneous class where students of different ability are taught together, only a few of the students achieve higher scores in trigonometry performance test. According to Ernest (2013).the ugly trend of high failure rate in mathematics is a national disaster; therefore this calls for mathematics educators to intensify effort in research for solution that will ameliorate the situation.

However, the trends of students' performance in Basic Education Certificate Mathematics Examinations between 2010 and 2015 depicted that the overall performance of students who passed at credit level was 45.17% (less than 50%) of the total entry of the candidates. Thus, this support the statement that students' performance in the subject in both BECE and WAEC internal and external examinations has remained consistently poor (Ernest, 2013). It is well known fact that lecturing to a class is not a very effective way to deliver instructions because it does not actively involve students in the lesson. Teachers can use performance test to assess the level of performance of students after exposureto content materials. The classroom teachers usually have considerable flexibilities in determining how to assign marks to learners and

grading system are based on comparison (Ernest, 2013). He further explains that comparisons of students with other students establish standards, aptitude, actual versus potential effort and actual versus potential improvement. By implication, the influence of attitudes, values, and personality characteristics on performance outcomes including participation in the learning of mathematics is important considerations for every teacher and mathematics educators. In this study, the researcher carried out analysis of psycho-social factors of classroom environment as predictors of student academic performance in senior secondary trigonometry in Zaria educational zone.

2.5 Classroom Environment in Science and Mathematics Education

Classroom environment encompasses a broad range of educational concepts, including the physical setting, the psychological environment created through social contexts, and instructional components related to teacher characteristics and behaviors (Patrick, Ryan & Kaplan, 2007; Iloba, 2009). It is the perceived atmosphere both positive and negative resulting from physical and social setting available for the major stakeholders (teachers and students). Studivant, (2015) opined that studies on classroom environment have been widespread across nearly all sub specializations of educational psychology. Researchers are interested in relationships between environment constructs and multiple outcomes, including learning, engagement, motivation, social relationships, and group dynamics. Early researchers recognized that behavior is a function of people's personal characteristics and their environment (Moos, 2009, Mutum, 2016).

In the educational setting, UrieBronfenvrenner's work on ecological contexts secured a place in educational research for studies of classroom environment. Bronfenbrenner's Ecological systems Theory encompasses the layered environmental system of evolution in which human development takes place and emphasizes the importance of family, teachers, schools, and the larger sociocultural environment on the developmental process. Bronfenbrenner's research has

evolved from examining purely physical elements of the environment to more complex models of psychosocial relationships between students in the classrooms as well as between the teacher and students. Environmental research beginning in the mid-1990s has focused on classroom environment variables with numerous positive and negative student outcomes. In addition to the wide array of outcomes investigated in relationship to classroom environment, psychosocial study has also been of interest to methodologists as the data structure poses a unit of analysis dilemma; in terms of examining classroom variables in combination with student outcomes. The study was carried out analysis of psycho-social factors of classroom environment as predictors of student academic performance in senior secondary trigonometry in Zaria educational zone.

2.5.1 The Physical Classroom Environment

The Physical aspect of the classroom environment include classroom arrangement, seating, bulletin boards, black and white board displays and the physical climate, lightening and temperature which may affect academic performance. More frequently a focus in earlier studies of classroom environment, the physical environment has continued to appear in contemporary studies as an influence on behavioral and academic outcomes. Current studies of the physical environment have investigated aspects such as class composition, class size, and classroom management (Kristy, 2012).

The physical condition of the classroom include: age of the classroom building, colour of the walls, availability of infrastructures (seats and desks), good ventilation, good lighting, roofing/ceiling and smooth floor. Most frequently a focus in earlier studies of classroom environment, the physical environment has continued to appear in contemporary studies as an influence on behavioural and academic outcomes. Studies of physical environment have investigated aspect such as composition, class size and classroom management (Ernest, 2013).

While the social environment will be influenced by the relationship, based on teacher development and school culture (which include clear directives, delegation of responsibility and accountability) and how these affects classroom environment and outcome between students and teachers, students and teaching materials, students and students, teachers and teaching instructional materials. Research on psychological environment to determine interactions of key players in the classroom namely students and teachers; have varied greatly and proliferated during the early twenty first century (Studivant, 2015). Studies have been particularly concentrated on student's classroom participation rates, teachers support, and communications of learning goals, use of instructional materials, attitude, among others.

Class composition studies examine classroom grouping methods, including ability grouping of students, single-sex classrooms and cooperative learning groups. Okebukola (2007), studies on class size have examined how class size influences student and teacher behaviors. In general, smaller classes are associated with students who are less stressed and are more frequently on-task with fewer reported behavior problems than students in larger classes. Although teachers tend to use similar instructional strategies whether teaching large or small classes, there is some evidence to suggest that more class time is spend on administrative tasks for larger classes, leaving less time available for instruction. Some research has suggested that differences in academic outcomes based on class size are due to differences in student behaviors. Overcrowded facilities, too many students in certain classes, and lack of teachers' assistants are three major issues cited as potentially creating problems due to increased stress levels of students and increased teacher-reported incidences of behavioral problems (Studivant, 2015). These stress levels and behavior problems found in larger classrooms are frequently accompanied by lower levels of academic achievement.

Teacher-to-child ratios are also of interest to many researchers (Usman, 2007; Sumaila, 2018) because the number of reported behavioral problems seems to increase as class size increases. Many researchers as reported by Kristy (2012) have observed that large classes, with 30 or more students, tend to have a larger number of students off task more often with fewer students engaged with the teacher than children in small classes of 20 students or less. Yet there may be a social cost for students in small classes; other researchers found that smaller classes also had high incidences of children engaging in a social and exclusionary behavior. Whether students are engaging in on-task or disruptive behavior can also be influenced by effective classroom management instructions and consistency of teacher enforcement. The timing of classroom management and organization also impacts students' perceptions of the teachers. Therefore studies on the children psychological, social exclusionary behavior and class management is very necessary and suggested. This study was carried out to find out which of the factors i.e. comprehensiveness, friction, satisfaction, difficulty and competition are predictors to academic performance of Trigonometry.

2.5.2 Psychological Classroom Environment

Beyond the physical arrangement of a classroom a psychological environment is also created, based on the interaction of key players in the classroom, namely students and teachers. Research in this area has varied greatly and proliferated during the early twenty-first century. Studies have been particularly concentrated on student class participation rates, teacher support, and communication of learning goals (Kolawole, 2007; Mutum, 2016). A psychological classroom environment is that environment where learning takes place in a quantifiable and perceptible characteristics. Students are engulfed by environmental information specific target. These attract students' interest, choices, support, participation that enhances mutual understanding. According

to Kelly, (2010). Many teachers equate student engagement and on-task behavior with classroom participation, typically a top concern for teachers. Researchers support teachers' intuition of a difference in the participation style of the different genders. Whereas girls are more likely to participate as part of the relational responsibility they feel toward the teacher, boys tend to respond more often if they feel the class is interesting and less often if the class is perceived as boring-indicating that for these students, teachers may be equally responsible for the participation level and learning (Patrick, Ray & Kaplan, 2007, Kanit, 2015).

The notion of feeling supported as students has also been extensively examined in the classroom environment literature. Helen Patrick and colleagues (Patrick, Ray & Kaplan, 2007; Kitty, 2011) found that there is a strong, positive relationship between students' level of motivation and engagement and their perception of a climate of mutual respect is required in order for students to increase their use of effective study strategies and increase feelings of confidence about their ability to successfully complete assignments. Furthermore, when students perceive that they receive emotional support and encouragement from their teachers and academic support from their peers they are more likely to be on-task in the classroom and use self-regulated strategies. This study was carried out to find out which of the factors i.e. comprehensiveness, friction, satisfaction, difficulty and competition are predictors to academic performance of Trigonometry.

2.5.3 Social Classroom Environment

This is the support, mutual respect task related interaction that exist amongst student and teachers with lesser focus on competition and friction in the classroom. A social classroom environment generates an intellectual environment where support, respect and collaboration are central. Positive educational environments are necessary to facilitate optimally adaptive student outcomes, including learning, motivation, school adjustment, and achievement Okoh,

(2011).Researchers, (Okonkwo, 2010, Peter, 2010 &Okoh, 2011) have been noting for some while that school success does not only involved academics. Schools and classrooms are inherently social places, and students go about their work in the presence of many peers. To understand students' success at school, therefore, we must attend to their relationships with others at school and ways that the environment promotes different types of social interactions and relationships. The classroom social environment is comprised of students' perceptions about how they are encouraged to interact with and relate to others (for example. Classmates, the teacher), and encompasses dimensions of:

i. Teacher support,
ii. Promoting mutual respect
iii. Promoting student task-related interaction, and
iv. Promoting performance goals.

Recent research has indicated that these various dimensions of the classroom social environment are separate, can be measured quickly and reliably, and relate significantly to students motivation, self-regulated learning, classroom behavior (both positive and negative), social relationships, and achievement (Patrick, Ryan & Kaplan, 2007; Fraser, 2012). The emphasis on the importance of the classroom social environment, including support, mutual respect, task-related interaction among students, and a lesser focus on competition among students, is apparent in reform recommendations. For example, the American, National Science Education Standards include explicit reference to teachers creating a social and intellectual environment with support, respect, and collaboration as central features. The American, National Council of Teachers of Mathematics (2009) also explicitly addressed these social norms when they outline what teachers

should strive to create in their class. For example, they advocate that students be ‘encouraged to share their ideas and to seek clarification until they understand.

To achieve this kind of classroom, teachers need to establish an atmosphere of mutual trust and respect. When teachers build such an environment, students understand that it is acceptable to struggle with ideas, to make mistakes, and to be unsure. This attitude encourages them to participate actively in trying to understand what they are asked to learn because they know that they will not be criticized personally, even if their Mathematical thinking is critiqued (Kanit, 2015).

Although the social environment of the classroom is likely to be important to motivation and engagement for students of all ages, it may be particularly important for adolescent students. Adolescence has been identified as a particularly precarious stage regarding changes in achievement beliefs and behaviors (Kanit, 2015). Certainly, for some adolescent students, the increases in self-reflection, autonomy, and identify exploration lead to new academic interests, increased self-regulated learning, and a commitment to education (Fraser, 2012). However, for many children early adolescence marks the beginning of a downward trend in academics. More so than at other ages young adolescent doubt their abilities to succeed at their school work, question the value of doing their school work, and decrease their effort towards academics (Kanit, 2015). This study was carried out to find out which of the factors i.e. comprehensiveness, friction, satisfaction, difficulty and competition are predictors to academic performance of Trigonometry.

2.5.4 Psycho-social Factors of Classroom Environment

Psycho-social classroom environment has been widespread across nearly all sub-specializations of educational psychology (Studivant, 2015). In such studies mentioned three theoretical dimensions in the classroom, the relationship dimensions, personal growth or goal dimensions and system maintenance and change dimensions. The concept comprises of dimensions of involvement, affiliation, and teachers support as relationship dimensions task. Orientation and competition as personal growth or goal orientation dimensions and finally order, organization and rule clarity as system maintenance and change dimensions. Patrick, Ray and Kaplan (2007) & Kitty (2011) defined environment as the totality of circumstances surrounding an organization or group of organisms. In effect, the environment is an influential factor that could enhance or affect learning irrespective of the individual's intellectual ability or skills. Classroom learning environment therefore is an embodiment of the physical, sociological and psychological conditions of the classrooms.

The classroom environment encompasses a broad range of educational settings which include the physical setting, the psychological environment creates through social context and numerous structural components related teacher, characteristics and behavior (Okebukola, 2007; Mutum, 2016). Okebukola (2007) maintained that effective learning is only possible if the classroom environment is organized to provide stimulation for learning and calls for needs for the study.

A classroom where the psychological and social environment exists is that environment where factors like teachers support, peer group interaction, mutual respect and choices on the subject matter are guaranteed. Students and instructors agreed that teacher support was the most prevalent dimension of the actual classroom environment. Both groups also ranked Organization

and clarity and Task Orientation second and third in the actual classroom. The students placed involvement and affiliation as fourth and fifth, while the instructors reversed the order to these two subscales. The two groups agreed on the order of the last two subscales, Personal goal Attainment and Student Influence.

Despite the agreement in the order of the elements, there were significant differences between the students and the instructors with regard to the levels of the classroom environment elements. The study's comparison of the development studies students' views of the actual classroom environment with those of the instructors indicated that the instructors perceived more of every subscale of Adult Classroom Environment Studies (ACES) than the total group of students, Personal Goal Attainment and Student Influence. They saw their classrooms as places in which students were more actively involved in the class activities and more interactive than students reported. Instructors focused attention on their interest in students' accomplishments. They also placed importance on working with the students on the task necessary to obtain needed skills (Kanit, 2015).In this study, the researcher carried out analysis of psycho-social factors of classroom environment as predictors of student academic performance in senior secondary trigonometry in Zaria educational zone.

2.5.4.1 Classroom Comprehensiveness and Academic Performance in Trigonometry

A comprehensiveness classroom refers to the extent in which students are friendly and helpful towards each other. As early as 1962, Maslow posited a psychological hierarchy in which the need for belonging took precedence over needs for knowledge and understanding. According to Okoh (2011), students who worked together liked school more than students who were not allowed to do so. They were more likely to say that they wanted their classmates to do well in school and that they wanted their classmates to do well in school and that they felt their

classmates also wanted them to do well. By participating in social-climate setting activities, both students and teachers came to better understand each other's value systems and began to create a cohesive environment. This enabled them to work together toward the common goal of social and academic achievement (Studivant, 2015).

Cohesion within the classroom was of great importance and was another aspect that needed to be examined before a positive social climate could be established (Anca, 2009). Anca, (2009) described cohesion as 'the sum of group members' feelings about their group as a whole'. In comprehensiveness classrooms students valued their classmates, were involvedwith and cared about each other, tried to help one another, and were proud of their membership in the group. They wanted to be competent doers and producers, and wanted to be known by others for their accomplishments. Educators who recognized that it was normal for students to yearn for success and recognition created learning experiences that helped to establish equilibrium and ensured success for all students for all students (Kanit, 2015).In this study, the researcher carried out analysis of psycho-social factors of classroom environment as predictors of student academic performance in senior secondary trigonometry in Zaria educational zone.

2.5.4.2 Classroom Friction and Academic Performance in Trigonometry

Friction is the amount of tension that exists among students and staff, was another factor of interest involving the environment. Researchers tried to determine whether or not a relationship existed between friction and academic performance. In this study, the researcher carried out analysis of psycho-social factors of classroom environment as predictors of student academic performance in senior secondary trigonometry in Zaria educational zone.

2.5.4.3 Classroom Satisfaction and Academic Performance in Trigonometry

Classroom satisfaction is the extent to which students enjoy a class. An effective school climate has been described by David, (2012) as a school environment in which the staff, students, and patrons attain high levels of satisfaction and productivity. Jon (2011) stated that climate consists of two major dimensions satisfaction and productivity. He described satisfaction as the sense of fulfillment of needs an individual experiences, along with enjoyment and happiness, as a result of the environment. Since the 1950s the literature has consistently reported that the relationship between satisfaction and productivity is neither predictive nor causal. This lack of predictive link between satisfaction and productivity led most researchers and theorists to conclude by the 1960s that morale studies were important only if measures of satisfaction were sought, but such studies were relatively meaningless for use in making inferences about productivity (Jon, 2011). This stimulated a number of studies based on the assumption that a direct and casual link between human satisfaction and human productivity exists.

Jon (2011) wanted to measure the relationship between school climate (as defined by teacher satisfaction), classroom climate (as defined by students' satisfaction), and students' performance. He investigated the magnitude of the relationships between eight school climate domains and a measure of global school satisfaction among 2,049 middle and high school students.In West Virginia USA, test of moderator effects were conducted to determine if the magnitude of the relationships between the school climate domains and school satisfaction differed as a function of students' gender, grade, age, GPA, or SS. Multiple regression analyses suggested that five school climate domains are significantly related to school satisfaction ($p < 0.02$). academic support (beta weight=0.17), Positive Student-Teacher Relationships (0.12), School Connectedness (0.11), Order and Discipline (0.13), and Academic Satisfaction

(0.12). In addition, the importance of the school climate variables to students' school satisfaction appeared invariant across the demographic variables and academic performance level. The inclusion of school climate and school satisfaction measures may form a foundation for more comprehensive assessments for understanding and monitoring the experiences of students in schools. This study therefore intends to analyses student's satisfaction as a predictor to academic performance in Trigonometry.

2.5.4.4 Competitiveness and Academic Performance in Trigonometry

This is a classroom environment whereby rivalry is emphasized. One extremely important consideration in the development of classroom climate was that of cooperation versus competition. A cooperative goal structure existed when students perceived that their own achievement goals were dependent on how well other students achieved their goals. Cooperative goal structures resulted in the most accurate communication between students, constructive conflict management, a decreased fear of failure, increased levels of trust, greater peer acceptance, and improved support and emotional involvement in learning (Kolawole, 2008; Mutum, 2016). Competitive goal structures existed when students competed with each other for achievement goals. When competing cliques evolved, students were more likely to focus on negative attributes of others and were more likely to become social isolates, rejected by others. Kolawole, (2008) and Kanit (2015) reported that social comparison in the public classroom was extensive, including announcement of high and low scores, charts of students' progress, ability grouping, and displays of selected papers and achievements.

The impact of this type of competition on students when they compared unfavorably could be seen in the students' of their own ability, avoidance of risk taking, use of less effective learning strategies, and negative effect directed toward self. Students' self-evaluations of their ability

were more negative when the students were focused on winning than when they were focused on improving their performance. In classrooms characterized by public evaluation, students became more focused on their ability and the distribution of ability in the classroom group. Many students not only came to believe that they lacked ability, but this perception became evident among peers. Because performance oriented or competitively oriented environments encouraged a focus on ability, they did not support the use of strategies that required sustained effort over time. Another large body of educational research has focused on the communication of learning goals to students in combination with the individual goals and expectations of students. Some students and classrooms are more focused on obtaining grades than on mastery of objectives; these students and classrooms are said to be performance oriented rather than mastery oriented.

A multitude of studies have examined this social-cognitive aspect of classrooms and found that the classroom-level learning goal can be linked to both behavioral and academic outcomes. Students in classrooms where performance is emphasized are more likely to engage in cheating, avoid help-seeking, and exhibit lower levels of academic engagement. In contrast,students who are in a classroom where the focus is on learning and improvement demonstrate higher levels of self-efficacy and engagement as well as more positive affect. At the personal goal level researchers have found that whereas students who are more focused on grades tend to have higher grades, those students who are more focused on mastering objectives tend to engage in more academically challenging tasks and retain information learned for a longer period of time.

According to Kolawole (2008), an important goal for teachers was to develop an environment that accepted individual differences and allowed all students to develop a feeling of belonging. Competition fostered cautious, defensive interaction and misleading and threatening communication. Individualistic goal structures were formed to separate students, reduce

interaction, and allow independent learning experiences. In individualistic settings, students worked by themselves without interacting with one another (Kanit, 2015). In order to avoid such isolation the teacher may have chosen to incorporate varied groupings. Kolawole (2008) found that a diversity of grouping arrangements providing opportunities for peer cooperation and cooperative learning minimized individual fears of failure and competition. The use of cooperative groups was also found to be more effective in creating a positive atmosphere (Kanit, 2015).

Compared with traditional methods, cooperative learning was found to promote better relationships among different ethnic groups and greater acceptance of students who had disabilities (Kanit, 2015). When students' psychosocial needs were met, they performed well academically. Interpersonal student relationships were important to meeting psychosocial needs. In classes where students disliked one another, factors such as hostility, competitiveness, distrust, insecurity, and aggression developed, preventing students from performing well (Kolawole, 2008). This study was carried out to analyze students' competitiveness as a predictor to academic performance in Trigonometry.

2.5.4.5 Difficulty and Academic Performance in Trigonometry

Difficulty is the extent to which students have trouble with the work in the class. A final component in determining classroom climate was that of difficulty. Awosiyan (2006) and Mutum (2016) stated challenge was a factor incorporated in the design and structure of a learning task. They argued for tasks that offered personal challenges to students. According to their study, when tasks were enriched with such a motivational embellishment, the tasks were more likely to create an intrinsic purpose in learning.

Awosiyan (2006) and Mutum (2016) reported that students tended to try to meet established performance standards as long as they were perceived to be achievable. When standards were set too high and learning tasks became too difficult, however, the results were discouraging and diminished performance. This study looked into the attitude of primary school mathematics teachers towards the use of Activity-Based Learning (ABL) methods in teaching mathematics in Nigerian Schools. Some two hundred and twenty four (224) primary school teachers made up of 60 males and 164 females were sampled using purposive sampling from Damaturu LGA of Yobe State of Nigeria. Four research questions and tree hypotheses guided the study. Simple frequency counts, percentages, t-test and analysis of variance were used to analyze the data. The result of the study showed that primary school mathematics teachers are positively disposed to the use of Activity-Based learning methods in the sense that they understand it and prefer to use it in schools. The study also showed that the teachers agreed that Activity-Based Learning is very significant to the students learning and that ABL enhances students learning experiences. The study further identified lack of materials and time as the major impediments to Activity-Based Learning in Nigerian schools.

The study further showed that gender and years of experience of the teachers do not affect the attitude of primary school mathematics teachers towards the use of Activity Based Learning in schools. However, the study showed that there is a significant difference in the primary school mathematics teachers' attitude towards the use of Activity-Based Learning between the University degree graduate and College of Education graduate teacher (Azuka,2013). Studivant (2015) found a positive relationship between difficulty of work in class and performance gains for low ability girls. However, high ability students showed no significant relationship between subject difficulty and performance gains. Anderson's findings suggested students performed best

when challenged. The study also suggested that students only worked hard enough to achieve a certain level; but when the work was perceived as difficult, students probably prolonged their efforts before assuming they had reached their personal goal. Stated in another way, students applied themselves out of a fear of failure, and they continued to work hard as long as their fear existed. Limited research was available in the area of subject difficulty, and the results were inconclusive. This study was carried out to analyze the concept of difficulty as a predictor to academic performance in Trigonometry.

2.6 Classroom Climate in Mathematics Education

The concept "classroom climate" is a synonym for classroom environment, and it deals with the processes createdas a result of mutual activity taking place in the educational environment, which is the classroom. This conceptdeals with the personal, social, educational and cultural characteristics of the students found in that educationalenvironment, and with the way in which they perceive the events in it, as a result of the interaction between thestudents and themselves and between the teacher and his students, as well as between the profession and thestudied subject (Ernest, 2013). It was found that, the classroom climate is connected to the socialfield, to the emotional field and to the educational field together, and influences educational achievements,interest in studies and willingness to continue to learn in class (Ernest, 2013). Classroom climate, is created,amongst others, through a social interaction based on expectations, norms and routines (Iloba, 2009).

Educational and social events and interactions take place in the classroom, which are ascribed an influence on thequality of learning; and on the educational product, both in the personal norms (self-concept, personal load,satisfaction), and also at the group level (the feeling of belonging, interpersonal relations, coherence) (Ali,& Wan, 2017).

Mutum (2016) defines the classroom climate as a totality of environmental factors- norms, positions, execution oftasks, democracies, help, cooperation, interpersonal expectations, coherence, patterns of communications -influencing the exclusive character of the interaction in class and the patterns of behavior. Following the activityof dynamic social processes, the trend is reinforced seeing in the class as social organization acting in smallsubgroups. The learning groups in class are perceived as task-oriented- educational and dynamic social groups,operating whilst stressing the educational- social climate, which helps social- emotional and cognitive-theoreticalcare (Walberg & Anderson, 2007).Anderson (2007) deal with two central aspects in the classroom climate, the study aspect, focusing on thepositions, expectations and beliefs of the teachers and students in the process of teaching, achievements andassessment; and the social aspect, connected to the quality of relations between the teacher and his students andthe students and themselves, and to their connection one to another, as well as to behavioral expectations andpatterns of communication.

Two central assumptions exist in the classroom climate research: the one states that differences exist in theclassroom climate and in its factors, and thus it is possible to investigate systematically the factors influencing itscreation; the second assumption supports the fact that the classroom climate is found in interaction withphenomena which can contribute to the personal development of the student, influence his self-image, hisconfidence, his positions towards the subject and his educational achievements (Kitty, 2011).

2.7 Overview of Related Studies

A number of studies have been conducted both in Nigeria and abroad; that are relevant to present study. Most of such studies revealed mixed results with regard to psycho-social factors, teacher-

students classroom interactions as correlates of students' interest and their academic performance. Such studies include the following among others:

Wilson & Hart (2001) stated that research on gender in mathematics has generally indicated that boys perform better than girls. A number of studies have documented that boys are more interested in mathematics than girls (Fredricks&Eccles, 2002; Jacobs et al. 2002; OECD, 2004; Watt, 2004). In recent years research efforts (Zhang and Manon, 2000; Johnson, 2000) show no significant differences in achievement between boys and girls as they start getting acquainted with mathematics. Nonetheless, differences favoring male students begin to emerge with time (Mullis, 2002). However, (Kolawole, 2007) said it has been noted that girls' performance tends to be better than boys' on tasks or problems with well defined procedures; and also that, boys exhibit better performance than girls on problems with less apparent problem solving strategy.

Okwu and Aligba (2004) carried out a study to assess the effect of gender on mathematics achievement of secondary school students as well as identify the influence of location on mathematics achievement of secondary school students while the researcher conducted research on gender performance in trigonometry.Okwu and Aligba (2004) usedA sample of 160 female students and 160 male students from both rural and urban area in Katsina-Ala Local Government Area of Benue State. JSS III and SS III classes were used while in this research SS II 223 male and 124 female students were used in Zaria educational zone. Okwu and Aligba (2004) used a 20 item multiple choice senior mathematics achievement Test was administered in six secondary schools in the area while in this research 50 multiple choice items were. A t-test statistic was used to test the Null Hypotheses. The findings show that there was no significant difference between the performance of boys and girls in the mathematical test. However, location had a significant effect on mathematics achievement of students.But, this study was carried out to

examined the analysis of Psycho-Social Factors of Classroom Environment as Predictors to Student Academic Performance of Senior Secondary Trigonometry Students in Zaria Educational Zone.

Abiem and Odok (2006), conducted a study in an attempt to determine whether gender of students contribute to different mean scores in each branch of mathematics. Subjects for the study were 100 students randomly drawn from the senior secondary one (SS1) classes of five randomly selected schools in Ikom local government area of Cross River state. The researchers used the stratified random sampling technique based on gender. 49 males and 51 females from SS1 classes of the five schools were used for the study. A 50 item multiple choice Mathematics Achievement Test (MAT) was constructed and validated with 0.81 reliability coefficient. The items were drawn to proportionately cover the five branches of mathematics. Two research questions and one hypothesis were formulated respectively to guide the study. Chi-square statistic was used to test the null hypothesis.The result indicate that no significant relationship between gender and achievement in number and numeration, algebraic processes and statistics. However, there exist a significant relationship between gender and achievement in mathematics even though the degree of relationship was weak. While this research work analysis of psych-social factors in classroom environment was conducted in Zaria educational zone and used independent sample t-test to test the hypothesis. A study conducted by Abiem and Odok (2006), revealed that girls achieved better than boys in number and numeration, while boys outperformed the girls in all the branches such as trigonometry, geometry.But, this study was carried out to examine the analysis of Psycho-Social Factors of Classroom Environment as Predictors to Student Academic Performance of Senior Secondary Trigonometry Students in Zaria Educational Zone.

Mohammed (2006) intended to find out whether teacher characteristics, teaching methods, use of teaching resources and student attitudes towards mathematics affect students‘ performance in mathematics or not. The study was conducted in Banadir region of Somalia, which has a total of seventy secondary schools with form four-student population of 2500. The study employed a survey research design. Stratified sampling technique was used to select 12 secondary schools for the study. Three research instruments namely, mathematics teachers' questionnaire (MTQ), form four students questionnaire (FFSQ), and classroom observation schedule (COS), were employed. The validity and the reliability of the instruments were enhanced by a pilot study. A reliability coefficient of 0.75 was obtained for this study. Data collected for objectives (a) to (e) were of descriptive nature, therefore descriptive statistics were used to analyze them. Statistical Package for Social Sciences (SPSS) was used to get descriptive statistics such as, percentages, frequencies and tabulations. The results were presented in frequency tables and charts. The findings were then interpreted to make observations. The observations were discussed correspondingly to the research questions and objectives. The study found that 37.5% of the teachers felt that teaching methods played a major role in students‘ performance in mathematics. Incidentally, expository approaches of teaching mathematics were the only methods used in mathematics classes in Banadir region, leading to student poor performance. Methods of providing feedback to students were inadequate. In review of these findings, the study concludes that there was need to address for mathematics education such as teacher training curriculum reviewed in Banadir region.But, this study was carried out to examine the analysis of Psycho-Social Factors of Classroom Environment as Predictors to Student Academic Performance of Senior Secondary Trigonometry Students in Zaria Educational Zone.

Kolawole (2007) conducted a study titled Gender issues and academic performance of Senior School students in Mathematics computational tasks in Ekiti State, Nigeria. The study investigated into gender issues, in order to find out whether boys performed better than girls in Mathematics computational tasks and that type of school a student attends enhances his performance in Mathematics computation. The sample of this study consisted of 500 students in Senior Secondary School three classes randomly selected from eleven secondary schools in Ekiti State, Nigeria. Stratified sampling technique was used to divide the state into three strata. Three hypotheses were generated and tested with student's t-test analysis at P = 0.05 level of significance. The result of the study showed that students in single sex schools performed better than those students in mixed schools in Mathematical computation and boys in boys' schools did not perform significantly better than girls in girls' schools.But, this study was carried out to examine the analysis of Psycho-Social Factors of Classroom Environment as Predictors to Student Academic Performance of Senior Secondary Trigonometry Students in Zaria Educational Zone.

Obioma and Salau (2007) titled: the predictive validity of Public Examinations: A Case Study of Nigeria across the six geo-political zones with a sample of 4,904 (2,631 males, 2,273 females) candidates obtained from 22 Nigerian universities that satisfied certain predetermined criteria. A Correlation and ex-post facto designs (researcher-designed format were employed to investigate the relationship that exists between the performance in public examinations (predictor variables) and university students' academic achievement (criterion variable). While in this research work analysis of Psycho-Social Factors in Classroom Environment as Predictors to Student Academic Performance of Senior Secondary Trigonometry Students was conducted in Zaria Educational Zone with population of 3601 SS II student and used random sampling

techniques. Obioma and Salau (2007) analyzed Data collected using the Pearson Product Moment Correlation Coefficient and forward inclusion stepwise multiple linear regression analyses. The study revealed that there was a low but positive relationship between each of the predictor variables under study.But, this study was carried out to examine the analysis of Psycho-Social Factors of Classroom Environment as Predictors to Student Academic Performance of Senior Secondary Trigonometry Students in Zaria Educational Zone.

Maliki, Anthony and Julie (2009) the research titled Analysis of Students' Performance in Junior Secondary School Mathematics Examination in Bayelsa State of Nigeria. The sample size of this study was 600 students randomly selected from the population of 12, 436 J.S.S. 3 students examination for 2006 in Bayelsa State. The J.S.S.C.E mathematics objective paper for 2006 formed the instrument used for data collection. Inferential survey design was considered appropriate because of its descriptive nature, as it involves the collection of data to accurately and objectively describe existing phenomena. The statistical tools used were the t-test for one sample mean and independent t-tests. The finding of this study showed that students' performance in 2006 JSS Mathematics test was high. The result showed that male students obtained higher mean score than the females with the calculated t-value significant.

Higgins (2011) investigated the association of psychosocial factors (parental involvement, family rules, and family socio-economic status & homework) with academic performance using 3,932 participants from the National Education Longitudinal Study (NELS), eastern Kenturky University. Questionnaire was used to measure parental involvement, while Achievement Test was used to measure academic performance. The researcher employed bivariate correlation analysis between parental involvement and homework, family socio-economic status and homework, homework and academic performance. While this work

Analysis of Psycho-social factors of Classroom Environment as Predictors Performance of Trigonometry was conducted in Zaria Educational Zone, with the population of 3601 SS II and random sampling techniques was used.Higgins (2011) point that the results showed that parental involvement and family socio-economic status were positively correlated with academic performance. The study did not examine peer group influence and academic self-efficacy as part of the psycho-social factors and also teacher-student interaction; which the present study did. Also, bivariate correlation analysis was used to analyze the data, and in the present study multiple regression analysis was employed. The present study Analysis of Psycho-social factors of Classroom Environment as Predictors Performance of Trigonometry in Zaria Educational Zone.

Milad and Sayid (2011) examined the role of parental involvement in children's academic performance using 200 boys in Tehran, Iran. The researchers used questionnaire to measure parental involvement and previous semester examination marks/scores in literature and mathematics were used to measure academic performance. Correlation research design was adopted for the study .The statistical tools used to analyze the data were t-test statistic and Pearson correlation at $p \leq 0.05$ level of significant. The results showed that parental involvement and academic performance have positive and significant correlation. The results also revealed that the academic performance of children in family with high parental involvement is better than children in family with low parental involvement. This study also did not examine the psycho-social factors of classroom environment. This is the gaps the present study intends to fill by investigating whether psycho-social factors of classroom environment as a predictor to performance of Trigonometry in Mathematics in Zaria Educational Zone.

Yi-lung (2011), investigated the roles of the psychosocial factors of motivation, social control, and self-regulation, in the prediction of 10th grade academic achievement for a large sample of 8th grade students. The differential effects of PSFs for male and female students with different levels of 8th grade achievement were also examined. Of the 4,660 middle-school students in the ACT database, 1,384 8th grade students were included in the study. The Student Readiness Inventory-Middle School (SRI-MS) was used to assess three broad Psychosocial factors based on ten scales, which were named motivation (consisting of Academic Discipline, Commitment to School, and Optimism), social control (consisting of Family Attitude toward Education and Family Involvement, Relationships with School Personnel, and School Safety Climate), and self-regulation (consisting of Managing Feelings, Orderly Conduct, and Thinking before Acting). The students' EXPLORE and PLAN Composite scores served as measures of initial and later academic achievement, respectively. Multiple regression models were constructed for each PSF to test the hypotheses. Post hoc probing techniques were used if significant interaction terms were found. If no significant interaction terms were found, the effects of Psycho-social factors on achievement gains were examined using a psychosocial mediation model. The results showed that 8th grade females demonstrated greater motivation, social control, and self-regulation than 8th grade males. Also, motivation and social control each interacted significantly with sex and 8th grade achievement when predicting 10th grade achievement. Specifically, among female students, effects were positive for females with higher prior achievement and negative for females with lower prior achievement for both motivation and social control. For male students, neither motivation nor social control added significantly to the prediction of later achievement. There were no interactions between self-regulation and either sex or prior achievement. Instead, self-regulation partially mediated the effects of initial

achievement when predicting later academic achievement.But, this study was carried out to examine the analysis of Psycho-Social Factors of Classroom Environment as Predictors to Student Academic Performance of Senior Secondary Trigonometry Students in Zaria Educational Zone.

In a study which was executed among junior school students (Zedan, 2011), it found that a significant positive correlation exists between the classroom climate with its various dimensions (satisfaction and enjoyment, teacher student relations, student- student relations) and the level of achievements in mathematics, and he found a negative correlation between competitiveness dimension and tension and gender inequality and educational achievements. The findings also pointed positive correlations between the dimensions of the classroom climate: satisfaction and enjoyment, support of the teacher, clear rules and instructions,competitiveness and between achievements in mathematics, and weak but significant negative correlations, between the dimensions of the classroom climate gender inequality, tension, and difficulty and between achievements in mathematics. In a study he executed among junior school students (Zedan, 2011), it found that there exists a significant positive correlation between the class climate in the mathematics lesson and the level of achievements in mathematics.

Marc (2013) examined the influence and predictability of the psychosocial constructs of help-seeking, academic motivation, self-esteem, academic overload, perceived-stress, test-anxiety, self-efficacy and perceived social support on students' adjustment and academic performance at university. The study has four distinctive aims seeking to aid in addressing the current situation: firstly, to identify the relationship between psychosocial constructs adjustment and academic performance. Secondly, to replicate an earlier model with psychosocial constructs proposing that a partially mediated model is preferred in explaining students' adjustment and

academic performance at university-compared to a direct or totally mediated model. Thirdly, to theoretically and empirically extend and test an extended model of psychosocial constructs to explain students' adjustment and academic performance at university. Fourthly, to test for and identify possible group differences among the psychosocial constructs; as well as to establish if students' gender, age and residence status functioned as moderator variables. The study was conducted at the historically disadvantaged University of Fort Hare. The number of participants was 280 and included first and second-year undergraduate students. Path analysis was conducted to test the hypotheses of the study. Results partially supported previous findings with regard to relationships between psycho-social constructs, adjustment and academic performance; they also confirmed that a partially mediated model is preferred to explaining students' adjustments and academic performance at university; results showed that the additional constructs of test-anxiety and self-efficacy increased the explained variance of an extended model to predict students' success at university; and identified some path differences between psychosocial constructs, adjustment and academic performance.But, this study was carried out to examine the analysis of Psycho-Social Factors (satisfaction, friction, competition, difficulty and comprehensiveness) in Classroom Environment as Predictors to Student Academic Performance of Senior Secondary Trigonometry Students in Zaria Educational Zone.

Nfon (2013) in Fako District in Cameroun conducted a research titled: Effect of Rusbult's Problem Solving Strategy on Secondary School Students' Achievement in Trigonometry Classroom. The sample of the study consists of 366 form students consisting of 186 males and 180 females drawn from three colleges by a multi-stage sampling technique. The design of the study is the nonequivalent control group design. It is the quasi-experimental, non-randomized pre-test, post-test design. The Trigonometry Achievement Test (TAT) was used for

data collection. The findings of the study are: There is no statistically significant difference in the mean achievement scores of the male and female students taught trigonometry via RUPSS. Ho3: there is no statistically significant interaction effect between gender and strategy as measured by the mean achievement scores of TAT.But, this study was carried out to examine the analysis of Psycho-Social Factors of Classroom Environment as Predictors to Student Academic Performance of Senior Secondary Trigonometry Students in Zaria Educational Zone.

Sophie (2014) investigated the influence of text design (in terms of text cohesion) and individual differences, with the aim of identifying pathways to improving science education in early secondary school. One hundred and four secondary school children in Warwich South were selected (56 females, 48 males) aged 12-13 years took part in the study. To assess the influence of local cohesion (lexical and grammatical links between adjacent sentences) in science texts, the research measured students' comprehension (through multiple choice questions) of science text that was high and low in local cohesion. To explore the role of individual differences, students completed tests to measure general reading ability, general intelligence, facets of conscientiousness, science self-concept and individual, friends and family aspirations in science. A correlation research design was used with Pearson Product Moment Correlation tool was used. Students were more accurate in answering comprehension questions after reading text that was high in cohesion than low in cohesion, suggesting that high local text cohesion improved students' comprehension of science text. Reading ability predicted increased comprehension for both text designs. Individual aspirations in science accounted for unique variance for comprehension for high cohesion text of which implications for the teaching of secondary school science are discussed. But, this study was carried out to examine the analysis of Psycho-Social

Factors of Classroom Environment as Predictors to Student Academic Performance of Senior Secondary Trigonometry Students in Zaria Educational Zone.

Zedan and Jarmas (2014) conducted a study on Environment learning as a predictor of Mathematics Self-Efficacy and Mathematics Achievement. These authors used 900 students of high schools in Israel participated. The study was a descriptive and correlation research design. Classroom climate questionnaire and questionnaire of mathematical self-efficacy were used as the instruments for data collection. The data were analysed using Pearson correlation and regression analysis. The findings pointed strong positivecorrelation between the dimensions of class climate: satisfaction and enjoyment, the teacher's support, rules andinstructions, competitiveness and between mathematical self-efficacy and achievements in mathematics, and onweak negative- but significant correlations, between the indices of the classroom climate: lack of gender equality,tension and difficulty and between mathematical self-efficacy and achievements in mathematics. The findings alsopointed out that the dimensions of the class climate explain 50% of the variance in mathematical self-efficacy, andexplain 18% of the variance in achievements in mathematics. A strong positive correlation was also found, between mathematical self-efficacy and achievements in mathematics, mathematical self-efficacy explains 25% ofthe variance in achievements in mathematics. A very interesting finding in this study is that mathematical self-efficacy, which is considered as part of a cognitive theory, is explained to a very high extent, by the classclimate prevailing in the mathematics lesson and its emotional, cognitive and behavioral dimensions, a findingsupporting the approach seeing in cognition as part of emotion. The present study examined whether psycho-social factors of classroom environment as a predictor to academic performance of Trigonometry in Mathematics in Zaria Educational Zone.

Dzever (2015) examined the impact of home environment factors on the academic performance of public secondary school students in Garki Area District, Abuja, Nigeria. The stratified sampling technique was used by author to select 300 students from six public schools, while the simple random sampling technique was used to administer the questionnaire. The author utilized a descriptive survey research design for the study. Also, data on student's academic performance was obtained from student's scores in four selected school subjects. Data obtained was analyzed using descriptive and inferential statistical techniques; Pearson Product Moment Correlation and Multiple regression analysis (ANOVA). The results revealed a positive and significant relationship between permissive parenting style with academic performance ($p<0.05$). However, no relationship exists between authoritarian parenting and demanding parenting with academic performance of students ($p>0.05$). Also, the result from the study identified income, educational background and occupational level as well as permissive parenting style as the main predictive variables influencing students' academic performance.But, this study was carried out to examine the analysis of Psycho-Social Factors of Classroom Environment as Predictors to Student Academic Performance of Senior Secondary Trigonometry Students in Zaria Educational Zone.

Oginni (2015) investigated the effects of mathematics innovation and technology on students' performance in open and distance learning. The author used all the 200 level primary education students at the National Open University of Nigeria (Ekiti and Lagos state chapter). The sample of this study was made of 60 students randomly selected using stratified sampling technique. Quasi-experimental research design was adopted for the study. The study revealed that mathematics innovation, location, genderand technology influences academic performance of students in mathematics. Based onthe findings it is recommended that mathematics innovation

and technology should beembraced in Open and Distance Learning so as to enhance better performance of studentsin mathematics. Present study analyzed the psycho-social factors of classroom environment as a predictor to academic performance of Trigonometry in mathematics in Zaria Educational Zone.

Mutum (2016) analyzing the psycho-social factors of classroom environment as a predictor to academic performance in upper basic science students in Kaura, Kaduna State Nigeria while this research work was conducted in Zaria educational zone with the population of 3601 SS II students with sample size of 347 SS II student in Zaria educational zone. Mutum (2016) used correlational research design type. The population consists of 2510 upper basic science students. A sample of 340 subjects of both male and female divided into females 198 and male students 142 were selected by stratified random sampling technique. The instruments used for data collection are, Basic Science Performance Test (BSPT) and the Psycho-Social Classroom Inventory (PSCI) with reliability coefficient 0.73 and 0.88 respectively. Two hypotheses were tested in line with the research questions raised. The first hypothesis stated, there is no significant relationship between the psycho-social factors of the classroom environment as a predictor to academic performance in upper basic science. The data collected were analysed using the multiple correlation analysis at a significant level of $P \leq 0.05$ finding from the analysis of the data revealed that there was significant difference in the mean scores of the students. There, the null hypothesis was rejected. The second hypothesis stated that there is no significant relationship between psycho-social factors of classroom environment and academic performance of upper basic science students and gender. Findings from this analysis of the data revealed that there is not relationship between the psycho-social factors and academic performance and gender. This hypothesis is retained. But, this study was carried out to examine

the analysis of Psycho-Social Factors of Classroom Environment asPredictors to Student Academic Performance of Senior Secondary Trigonometry Students in Zaria Educational Zone.

2.8 Implication of Literature Reviewed for the Present Study

In the literature cited, from this study, the results obtained from the several research studies conducted in the area of competition, satisfaction, friction, difficulty and comprehensiveness. The implication is that, numerous subjects taught in a socially and psychologically conducive environment recorded higher gains in academic performance: this implies that effective Psycho-social classroom environment can be either predictor to academic performance in Trigonometry in Mathematics or not. Relate literatures about the consistent poor academic performance among mathematics subjects by the constant use of traditional methods of instructions have also been reported. It is in the light of the above that the researcher considered it necessary that students learn Mathematics under psychosocial environment which enhance academic performance.

The search for improved strategies for teaching and learning Trigonometry in Mathematics in order to stem the tide of students under achievements is a continuous process. It is on the light of the above that this research considered it necessary that students and teachers in the learning process should be involved in activities where the perceived psychosocial environmental factors are considered as predictors to academic performance in our secondary schools. The studies reviewed did not provide consistent and convincing support for predictive validity of student perception resulting in learning outcome because they were done on collective environmental factors. This study conceived against this background. Each of the five

psychosocial factors of classroom environment was used to assess students' perception of their environments as a predictor to academic performance in Trigonometry.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the method and procedure for collecting data for this study, the association between Psycho-Social factors in classroom environment and students performance in Trigonometry among Senior Secondary Schools in Zaria, Kaduna State. The chapter is presented under the following subheadings:

3.2 Research Design

3.3 Population of the Study

3.4 Sample and Sampling Procedure

3.5 Instrumentation

3.6 Validity of the Instrument

3.7 Pilot Testing

3.8 Reliability of Instruments

3.9 Data Collection Procedures.

3.10 Procedure for Data Analysis.

3.2 Research Design

A Correlational research design was adopted in this study. This research design involves measuring two or more variables and determining the degree and direction (positive or negative) of relationship that exists between them. It tells us the extent to which the two variables are associated, or the extent to which they occur together. Determination of level or degree and its direction allowed the investigator to predict; the knowledge of one variable enables one to predict the other variable. The magnitude of the relationship varies from -1.00 to $+1.00$ (i.e.

±1.00).The sample selected were administered the Trigonometry Performance Test (TPT) and Psycho-social Classroom Inventory Questionnaire.Data were collected using Trigonometry Performance Test (TPT) and the Psycho-social Classroom Inventory (PSCI). Selected variables of psychosocial factors such as competition, friction, comprehensiveness, satisfaction and difficulty were employed to determine which of them predict academic performance in Trigonometry in mathematics.

The research design is:

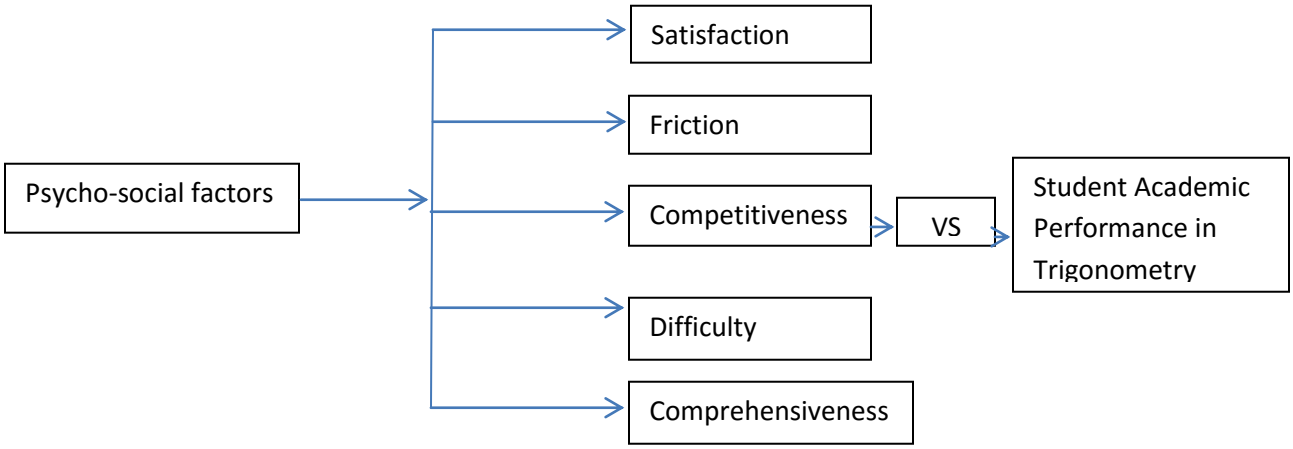


Figure 3. 1: Illustration of the Research Design

The population of the study consists of all SS II students from the Senior Secondary Schools in Zaria Educational Zone Kaduna State. The SS II students were considered suitable for the study by virtue of their experience since they had spent one year already in the school. SS I could not be used because they were only newly introduced to the subject in senior secondary school, while SS III were busy preparing for WAEC or NECO which might have effect on the study if they were involved. The population of the study has an average age of 17 years and taught the same content of the mathematics curriculum.

In Zaria Educational zone, there are seventeen secondary schools of which 13 are day secondary schools, 2 are day/boarding and 2 are Boarding schools. Coeducational schools will be

used for the study in order to accommodate the gender variable which is an important variable in this study. Record of enrolment examined showed that there were 3601 SS II students in the target population comprising 2220 boys and 1381 girls. The population of the study is presented in Table 3.1.

Table 3.1:Population of the study Area as at 2019

S/No	Sch. Type	Location	Sex		Total
	Public		*Male*	*Female*	
1	GGSS Fada	Zaria	0	250	**250**
2	GSS Gyllesu	T/Wada	204	121	**325**
3	GSS T /Jukun	T /Jukun	102	161	**263**
4	GSS K/Kuyanbana	Zaria	157	54	**211**
5	GGSS K/Gayan	Zaria	0	375	**375**
6	GSS K/Jatau	Zaria	43	11	**54**
7	GSS Kaura	Zaria	213	118	**331**
8	GSS Kugu	Zaria	61	16	**77**
9	Barewa college	Zaria	426	0	**426**
10	GSS Bogari	Wuciciri	21	3	**24**
11	GSS Dakace	Dakace	152	66	**218**
12	GSS Zaria (Senior)	Zaria	381	0	**381**
13	GGSS Zaria (WTC)	Zaria	0	303	**303**
14	SIASS K/Karau (B)	Zaria	109	110	**219**
15	GSS Kufena	Wusasa	179	0	**179**
16	GSS Magajiya (Senior)	Zaria	117	43	**160**
17	Alhuda-huda College	Zaria	481	0	**481**
	Total		**2220**	**1381**	**3601**

Source: Kaduna State Ministry of Education, Zaria Zone, 2019

3.4 Sample and Sampling Techniques

The Sample of the study was drawn from government secondary schools in Zaria educational zone of Kaduna state. Senior secondary school class two (SS II) students were used. SS II students were preferred because they had already studied some concepts of Trigonometry in their senior secondary 1 and so were better placed than the senior secondary 1 students whose have not gone far in their syllabus. The SS III students were not participate in this research because they were busy preparing for the Senior Secondary Certificate Examination (SSCE).

The variables of psychosocial factors the researcher was investigated on are: satisfaction, friction, difficulty, comprehensiveness and competition. These variables were selected in order to remediate the problems that are causing poor performance in trigonometry in classroom environment such as: difficulty in trigonometry, negative competition, lack of understanding between student to student and friction in the classroom environment. These problems have to be tackle in order to have challenges classroom environment to enhanced performance of students in trigonometry in Mathematics. Patrick, Ray & Kaplan (2007) pointed that these are factors must be properly handled by teachers to provide challenging environment for Mathematics teaching. Research findings by Anderson (2007) and Mutum (2016) had revealed that in most schools Mathematics teachers do not provide intellectually challenging environment for Mathematics students. Most often they dominate Mathematics lessons by Method full of information which is stringent, factors which may impede the performance of students of different cognitive characteristics (chidiebere, 2009; Ali, 2017). Another reason for this dominance may be that majority of the students are concrete operational and field dependent who require teachers support, peer group interaction, competition, satisfaction, comprehensiveness, and cohesion (Okebukola, 2007; Ernest, 2013).

From the population of the study, a sample size of three hundred and forty seven (347) students 223 males and 124 females were used for the study as recommended by Tuckman (1975) and Sambo (2005) who stated that a minimum sample of 30 individuals is appropriate for a study. In order to ensure that each school had an equal chance of being chosen, simple random sampling technique through balloting was used to select two senior secondary schools (SS II) from 17 schools. The schools are Government Secondary School Gellesu and Government Secondary School Dakace. A simple random sampling technique was used in selecting male and

female of SSS II intact classes in each school. The summary of the sampled schools is presented in table 3.2.

Table 3.2: Distribution of SS II students in the Sample schools by Gender

S/No	Name of School	Location	Male	Female	Total
1	School A	GSS Gellesu	121	90	211
2	School B	GSS Dakace	102	34	136
	Total		**223**	**124**	**347**

Source: Researcher

3.5 Instrumentation

This research study investigated variables such as (students' academic performance in trigonometry and Psycho-Social factors of classroom environment). The instruments that were used for collection of data for analysis are as follows:

(i) Trigonometry Performance Test (TPT).

(ii) Psycho-social Class Inventory (PSCI).

Trigonometry Performance Test (TPT)

Trigonometry Performance Test was developed by the researcher. This instrument wasconsists of 50 multiple choice questions with four options one correct option and three distracters which were based on what the students were taught and were scored to obtain the students' trigonometry Performance. The test questions for this study were selected from SS II Students' Mathematics Textbooks, past question papers for both NECO and WAEC examinations. The procedure for the construction of the Performance test is thus: 13 items of the validated instrumentcover the knowledge skills; the next 10 items cover comprehension skills, the next 9 itemscover the application skills, then 7 itemscover the analysis, 6 itemscover synthesis and 5 itemscover the evaluation.

The sub-topics in trigonometry portion of SS II Mathematics curriculum covered in this study were limited to the trigonometric ratios of Sine, Cosine and Tangent of angles, Ratios of complementary angles, Pythagoras' theorem, angles of Elevation and Depression, Trigonometric Graphs and Bearing. For effective and sound data collection, Psycho-social ClassroomInventory (questionnaire) was also adapted from Bennet (2001) by the researcher. Anderson (2004) and Sumaila, (2018) stated that using questionnaire is perhaps the most widely-used data gathering technique in research and can be used to measure issues that are critical to management and development of human resources, such as behavior, attitudes, beliefs, option, character, expectations etcetera.

Table 3.3: Table of Specification for the Trigonometry Performance Test Based on Bloom Taxonomy.

S/No	Cognitive Content	K	C	A	AN	S	E	Total
		26%	20%	18%	14%	12%	10%	100.0%
1	Sides of a Right Angled Triangle	2	1	1	1	1	1	7
2	Trigonometric Ratios	2	2	2	1	1	1	9
3	Pythagoras's Theoarem	2	2	2	1	1	1	9
4	Ratios of Complimentary angles	2	1	1	1	-	1	6
5	Angles of elevation and Depression	2	2	1	1	1	-	7
6	Trigonometric Graphs	2	1	1	1	1	1	7
7	Bearing	1	1	1	1	1	-	5
	Total	**13**	**10**	**9**	**7**	**6**	**5**	**50**

Source: Researcher (2019)

Key:
K = Knowledge
C = Comprehension
A = Application
AN = Analysis
S = Synthesis
E = Evaluation

Psycho-social Classroom Inventory

According to the Getzset and Thelen (1960), Walbey (1969) Mutum, (2016) theory of the class as a social system had proven successful in research. The theory suggested that in classrooms personalities, and role expectation interacted to form a climate in which group behavior including learning could be predicted. This is used to construct the psycho-social classroom inventory. This instrument is used to measure the social and the psychological learning in the classroom as perceived by students.

The Psycho-social Classroom Inventory (PSCI) was adapted by the researcher from Bennett, (2001) and it was used in this study. The PSCI is a five-pointLikert scales type response format Strongly Agree (SA) which coded as (5), Agree (A) coded (4), Undecided (U) coded (3), Disagree (D) coded (2), Strongly disagree (SD) coded (1)for variable such as satisfaction, competitiveness, difficulty and comprehensiveness. Since friction is a negative attitude, the coded was done in reverse case, that is Strongly Agree (SA) coded as (1), Agree (A) coded (2), Undecided (U) coded (3), Disagree (D) coded (4),Strongly disagree (SD) coded (5) in order to make responding easier for SS II students. Responses to the PSCI are provided on the same sheets as the questions, rather than on a separate response sheet, in order to reduce errors in the recording of answers (Fraser & Fisher, 1982). The PSCI is also more economical in the fact that it measures five different dimensions, yet contains only 50 items (Fraser, 1981). These are 50 items adapted by the researcher from Bennett whereby a subject is asked to identify what his/her actual class environment is. The guide on how to respond to the questions was clearly stated on the introductory aspect of the inventory. Example, I always do well in my trigonometry class.

Table 3.4: Table of Specification for the Students' Psychosocial Classroom Inventory.

S/No	Content	Cognitive Change	Affective Change	Behavioral change	Total
1	Satisfaction	-	4	6	10
2	Friction	-	2	8	10
3	Competiveness	-	2	8	10
4	Difficulty	8	2	-	10
5	Comprehensiveness	-	4	6	10
	Total	**8**	**14**	**28**	**50**

Source: Researcher (2019)

3.6 Validity of the Instruments (TPT and PSCI)

The instruments developed by the researcher were validated by two mathematics educators with the rank of senior lecturer (PhD and Professor) from mathematics education unit of the Faculty of Education, Ahmadu Bello University, Zaria.

3.7 Pilot Testing

The Trigonometry Performance Test (TPT) instrument contain 50 items and fifty (50)items for Psycho-Social Classroom Inventory (PSCI) which is to measure five different dimensions (satisfaction, competition, friction, difficulty and cohesiveness) adapted by the researcher andpilot tested on forty seven (47) SS II students randomly selected froma school in Igabi. The secondary school that was used for pilot testing was GSS Rigachikun. The pilot testing was conducted using school selected with the help of a research assistant.

3.8 Reliability of the Instruments

The reliability coefficient of a test is the consistency with which the test repeatedly measures what it is intended to measure. Indices of reliability give an indication of the extent to which a particular measurement is consistent and reproducible. Testing for Reliability is important as it refers to the consistency across the parts of a measuring instrument (Huck,

2007).Reliability coefficient of a test can be determined by several methods such as Guttmen split-half, test-retest and parallel comparison.

To test the reliability of the instrument developed by the researcher, the 50 item (TPT) and the 50 items (PSCI) was administered for a pilot study. To ascertain the reliability for the developed test (Trigonometry Performance Test) test-retest procedure was used. After the first test, the second test follows within an interval of two weeks according to (Tuckmann, 1975) and Lakpini (2006). Based on the analysis using Pearson Product-Moment Correlation Coefficient (PPMC) statistics, the reliability coefficient for the Trigonometry Performance Test (TPT) was found to be 0.889.To test the internal consistency of the PSCI instrument in this study, the Split Half method was used which employ odd-even number method. Spearman's Brown Prophecy formula was used to find correlation coefficient of the instrumentswhich was found to be 0.983.

3.9 Data Collection Procedures

The instruments were administered by the researcher. While the principals of all the two schools in the population gave permission for participation, teachers from all the two schools were agreed to be included. The students were given the TPT and PSCI. The TPT instrument contains 50 multiple choice items and each test have four response options (a-d). Subjects were to identify the correct response on the options provided. During the administration of the instruments, the researcher distributed the TPT to the study subjects. The researcherallows the subjects to read through the written instructions on how to answer the questions. The instructions were explained verbally where necessary. The subjects were allows45 minutes for the test based on pilot study conditions 45 minutes were assigned. This is based on the time suggested (Inyang, 1988 &Usman, 2000). The subjects' responses were collected and score using the marking

scheme. Each correct response was score one (1) point. Error point was marked zero. The total maximum marks were 50. These were recorded for analysis.

3.10 Procedure for Data Analysis

The Data collected for the purpose of this study were used for answering the research questions and the null hypothesis tested at $P \leq 0.05$ significant level. The statistical tools used are: Pearson product moment Correlation, t-test, independent sample t-test and Mann Whinny U test Statistical Analysis for nullhypothesis 1 to 7 at $P \leq 0.05$ significant level.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSIONS

4.1 Introduction

This chapter presented the various data analysis and the findings of the whole research. The main objective of the study was to investigate the analysis of psycho-social factors in classroom environment as predictor performance of trigonometry among senior secondary students in Zaria educational zone. The data obtained from the result of (PSCI) and (TPT) were analysed. The analysis of the results was conducted using descriptive statistics to answer the research questions (1-7). The research questions were answered using Mean, Standard Deviation and reliability values. The Multiple Correlation analysis, t-test and Mann-Whitney (U) were used to test the Null hypotheses at 0.05 level of significance using SPSS. The presentation was done under the following subheadings:

4.2 Data Presentation

4.3 Data Analysis

4.4 Summary of Finding

4.5 Discussion of Findings

4.2 Data Presentation

The study was conducted on two Senior Secondary Schools with a sample population of three hundred and forty seven (347) students. Two hundred and eleven (211) students from GSS Gellesu, which was made up of one hundred and twenty one (121) male students and ninety (90) female students, while one hundred and thirty six (136) students from GSS Dakace, which was made up of one hundred and two (102) male

students and thirty four (34) female students. Table 4.01: showed the distribution of students by schools and gender.

Table 4.1: Distribution of Students by Schools and Gender

Location	Male	Female	Total
GSS Gellesu	121	90	211
GSS Dakace	102	34	136
TOTAL	**223**	**124**	**347**

Table 4.01 showed the presentation of data of the two schools GSS Gellesu and GSS Dakace which comprises male and female students.

Research Question 1

What is the relationship between satisfaction in classroom environment and academic performance in trigonometry?

The data obtained from this research question was summarized using mean and standard deviation. The summary of analysis is presented in Table 4.02 below.

Table 4.2: Summary of Mean and Standard Deviation of Students' Academic Performance in Trigonometry in Relation to the Psycho-social factor (Satisfaction)

Variable	N	Mean	Mean Difference	SD	$r - Value$
Satisfaction	347	39.46	26.82	7.975	
Performance	347	12.64		3.494	-0.013

Table 4.2 presented the mean and standard deviations on students' academic performance in trigonometry in relation to psycho-social factor (satisfaction). The mean psycho-social factor (satisfaction) was39.46, Standard Deviation 7.975and student's academic performance was 12.64Standard Deviation 3.494. The mean difference was 26.82 in favour ofsatisfaction. The correlational value for satisfaction was -0.013 and based on magnitude and direction, according

to United State Department of Labor Employment and Training Administration(USDLEA) 2015, the relationship was weak and negative. Therefore, the psycho-social factor (satisfaction) in classroom environment does not related to student's academic performance in trigonometry.

Research Question 2

What is the relationship between Friction in classroom environment and academic performance in trigonometry?

The data obtained from this research question was summarized using mean and standard deviation. The summary of analysis is presented in Table 4.03 below.

Table 4.3: Summary of Mean and Standard Deviation of Students' Academic Performance in Trigonometry in Relation to the Psycho-social factor (Friction)

Variable	N	Mean	Mean Difference	SD	$r - Value$
Friction	347	28.08	15.44	10.267	0.028
Performance	347	12.64		3.494	

Table 4.3 presented the mean and standard deviations on students' academic performance in trigonometry in relation to psycho-social factor (friction). The mean psycho-social factor (friction) was 28.08, Standard Deviation 10.267 and student's academic performance was 12.64 Standard Deviation 3.494. The mean difference was 15.44 in favour of friction. The correlational value for friction was 0.028 and based on magnitude and direction, according to United State Department of Labor Employment and Training Administration (USDLEA) 2015, the relationship was weak and positive. Therefore, the psycho-social factor(friction) in classroom environment indicate lower relationship with student's academic performance in trigonometry.

Research Question 3

What is the relationship between competitiveness in classroom environment and academic performance in trigonometry?

The data obtained from this research question was summarized using mean and standard deviation. The summary of analysis is presented in Table 4.04 below.

Table 4.4: Summary of Mean and Standard Deviation of Students' Academic Performance in Trigonometry in Relation to the Psycho-social factor (Competitiveness)

Variable	N	Mean	Mean Difference	SD	$r - Value$
Competitiveness	347	36.81	24.17	9.238	-0.09
Performance	347	12.64		3.494	

Table 4.4 presented the mean and standard deviations on students' academic performance in trigonometry in relation to psycho-social factor (competitiveness). The mean psycho-social factor (competitiveness) was 36.81, Standard Deviation 9.238 and student's academic performance was 12.64 Standard Deviation 3.494. The mean difference was 24.17 in favour of competitiveness. The correlational value for competitiveness was-0.09 and based on magnitude and direction, according to Cohen (1988) and United State Department of Labor Employment and Training Administration (USDLEA) 2015, the relationship was weak and negative. Therefore, the psycho-social factor (competitiveness) in classroom environment indicateno relationship with student's academic performance in trigonometry.

Research Question 4

What is the relationship between difficulty in classroom environment and academic performance in trigonometry?

The data obtained from this research question was summarized using mean and standard deviation. The summary of analysis is presented in Table 4.05 below.

Table: 4.5: Summary of Mean and Standard Deviation of Students' Academic Performance in Trigonometry in Relation to the Psycho-social factor (Difficulty)

Variable	N	Mean	Mean Difference	SD	$r - Value$
Difficulty	347	32.96	20.32	10.965	-0.075
Performance	347	12.64		3.494	

Table 4.5 presented the mean and standard deviations on students' academic performance in trigonometry in relation to psycho-social factor (difficulty). The mean psycho-social factor (difficulty) was 32.96, Standard Deviation 10.965 and student's academic performance was 12.64 Standard Deviation 3.494. The mean difference was 20.32 in favour of difficulty. The correlational value for difficulty was -0.075 and based on magnitude and direction, according to United State Department of Labor Employment and Training Administration (USDLEA) 2015, the relationship was weak and negative. Therefore, the psycho-social factor (difficulty) in classroom environment indicate no relationship with student's academic performance in trigonometry.

Research Question 5

What is the relationship between comprehensiveness in classroom environment and academic performance in trigonometry?

The data obtained from this research question was summarized using mean and standard deviation. The summary of analysis is presented in Table 4.06 below.

Table 4.6: Summary of Mean and Standard Deviation of Students' Academic Performance in Trigonometry in Relation to the Psycho-social factor (Comprehensiveness)

Variable	N	Mean	Mean Difference	SD	$r - Value$
Comprehensiveness	347	35.69	23.05	11.619	
Performance	347	12.64		3.494	-0.082

Table 4.6 presented the mean and standard deviations on students' academic performance in trigonometry in relation to psycho-social factor (comprehensiveness). The mean psycho-social factor (comprehensiveness) was 35.69, Standard Deviation 11.619 and student's academic performance was 12.64 Standard Deviation 3.494. The mean difference was 23.05 in favour of comprehensiveness. The correlational value for comprehensiveness was -0.082 and based on magnitude and direction, according to United State Department of Labor Employment and Training Administration (USDLEA) 2015, the relationship was weak and negative. Therefore, the psycho-social factor (comprehensiveness) in classroom environment indicates no relationship with student's academic performance in trigonometry.

Research Question 6

What is the relationship between the comprehensiveness, satisfaction, friction, difficulty and competition in classroom environment and academic performance in Trigonometry?

The data obtained from this research question was summarized using mean and standard deviation. The summary of analysis is presented in Table 4.07 below.

Table 4.7: Summary of Mean and Standard Deviation of Students' Academic Performance in Trigonometry in Relation to the combined Psycho-social factors.

Variable	N	Mean	Mean Difference	SD	$r - Value$
Combined psychosocial factors	347	34.63	21.99	7.220	-0.047
Performance	347	12.64		3.494	

Table 4.7 presented the mean and standard deviations on students' academic performance in trigonometry in relation to combined psycho-social factors. The mean psycho-social factor was 34.63, Standard Deviation 7.220 and student's academic performance was 12.64 Standard Deviation 3.494. The mean difference was 21.99 in favour of combined psycho-social factor. The correlational value for psycho-social factor was -0.082 and based on magnitude and direction, according to United State Department of Labor Employment and Training Administration (USDLEA) 2015, the relationship was weak and negative. Therefore, the psycho-social factors in classroom environment indicate no relationship with student's academic performance in trigonometry.

Research Question 7

What is the relationship between male and female students' comprehensiveness, satisfaction, friction, difficulty and competition in classroom environment and academic performance in trigonometry?

The data obtained from this research question was summarized using mean and standard deviation. The summaries of analysis are presented in Table 4.08 and Table 4.09 below.

Table 4.8: Summary of Mean and Standard Deviation of Students' Academic Performance in Trigonometry in Relation to Male and Female.

Gender	N	Mean	Mean Difference	SD
Male	227	12.56	0.21	3.456
Female	120	12.77		3.575

Table 4.8 presented the mean and standard deviations on students' academic performance in trigonometry in male and female. The mean for male academic performance was 12.56, Standard Deviation 3.456 and the mean for female academic performance was 12.77 Standard Deviation 3.575. The mean difference between male and female academic performance in trigonometry was 0.21 in favour of female students.

Table 4.9: Summary of Mean and Standard Deviation of Students' Academic Performance in Trigonometry in Relation to Male and Female.

Gender	N	Mean	Mean Difference	SD
Male	227	35.37	2.15	6.589
Female	120	33.22		8.126

Table 4.9 presented the mean and standard deviations on students' psycho-social factors in classroom environment in male and female. The mean for male's psycho-social factors in classroom environment was 35.37, Standard Deviation 6.589 and the mean for female psycho-social factors in classroom environment was 33.22 Standard Deviation 8.126. The mean difference between male and female psycho-social factors in classroom environment was 2.15 in favour of malestudents.

4.3 Data Analysis

This section presented the results of analysis on psycho-social factors (satisfaction, friction, competitiveness, difficulty and comprehensiveness) in classroom environment and academic

performance of trigonometry among senior secondary students in Zaria educational zone. Statistical tool used for testing Hypotheses at $p \leq 0.05$ significant level was Multiple correlation and t-test.

Null Hypothesis One

There is no significant relationship between students' satisfaction in classroom environment and academic performance in trigonometry.

This null hypothesis was tested using Pearson correlation. The summary of the analysis is presented in Table 4.10

Table 4.10: Average of correlation test on satisfaction in classroom environment and academic performance of trigonometry

Variable	N	Mean	Mean Difference	SD	$r - Value$	$p - value$	Decision
Satisfaction	347	39.46	26.82	7.975	-0.013	0.810	H_0
Performance	347	12.64		3.494			Retained

Table 4.10 presented the result of Multiple correlation and t-test on satisfaction in classroom environment and academic performance in trigonometry. The $p - value$ recorded was 0.810 which was found to be greater than $p \leq 0.05$, the null hypothesis was retained. Therefore, there was no significant relationship between satisfaction and academic performance in trigonometry. Then satisfaction in classroom environment is not a predictor to academic performance in trigonometry.

Null Hypothesis Two

There is no significant relationship between students' friction in classroom environment and academic performance in trigonometry.

This null hypothesis was tested usingPearson correlation. The summary of the analysis is presented in Table 4.11

Table 4.11: Average of correlation test on friction in classroom environment and academic performance of trigonometry

Variable	N	Mean	Mean Difference	SD	$r - Value$	$p - value$	Decision
Friction	347	28.08	15.44	10.268	0.028	0.602	H_0
Performance	347	12.64		3.494			Retained

Table 4.11 presented the result of Pearson correlation and t-test on frictionin classroom environment and academic performance in trigonometry. The $p - value$ recorded was 0.602 which was found to be greater than $p \leq 0.05$, the null hypothesis was retained. Therefore, there was no significant relationship between friction and academic performance in trigonometry.

Null Hypothesis Three

There is no significant relationship between students' competitiveness in classroom environment and academic performance in trigonometry.

This null hypothesis was tested using Pearson correlation. The summary of the analysis is presented in Table 4.12

Table 4.12:Average of Correlation Test on competitiveness in classroom environment and academic performance of trigonometry

Variable	N	Mean	Mean Difference	SD	$r - Value$	$p - value$	Decision
Competitiveness	347	36.81	24.17	9.238	-0.09	0.867	H_0
Performance	347	12.64		3.494			Retained

Table 4.12 presented the result of Pearson correlation and t-test on psycho-social factor (competitiveness) in classroom environment and academic performance in trigonometry. The $p - value$ recorded was 0.867 which was found to be greater than $p \leq 0.05$, the null hypothesis

was retained. Therefore, there was no significant relationship between psycho-social factor (competitiveness) and academic performance in trigonometry.

Null Hypothesis Four

There is no significant relationship between students'difficulty in classroom environment and academic performance in trigonometry.

This null hypothesis was tested using Pearson correlation. The summary of the analysis is presented in Table 4.13

Table 4.13: Average of Correlation Test on difficulty in classroom environment and academic performance of trigonometry

Variable	N	Mean	Mean Difference	SD	$r - Value$	$p - value$	Decision
Difficulty	347	32.96	20.32	10.965	-0.075	0.162	H_0
Performance	347	12.64		3.494			Retained

Table 4.13 presented the result of correlation and t-test on psycho-social factor (difficulty) in classroom environment and academic performance in trigonometry. The $p - value$ recorded was 0.162 which was found to be greater than $p \leq 0.05$, the null hypothesis was retained. Therefore, there was no significant relationship between psycho-social factor (difficulty) and academic performance in trigonometry.

Null Hypothesis Five

There is no significant relationship between students' comprehensiveness in classroom environment and academic performance in trigonometry.

This null hypothesis was tested using correlation. The summary of the analysis is presented in Table 4.14

Table 4.14: Average of Correlation Test on comprehensiveness in classroom environment and academic performance of trigonometry

Variable	N	Mean	Mean Difference	SD	$r - Value$	$p - value$	Decision
Comprehensiveness	347	35.69	23.05	11.619	-0.082	0.127	H_0
Performance	347	12.64		3.494			Retained

Table 4.14presented the result of correlation and t-test on psycho-social factor (comprehensiveness) in classroom environment and academic performance in trigonometry. The $p - value$ recorded was 0.127 which was found to be greater than $p \leq 0.05$, the null hypothesis was retained. Therefore, there was no significant relationship between psycho-social factor (comprehensiveness) and academic performance in trigonometry.

Null Hypothesis six

There is no significant relationship between the psycho-social factors in classroom environment and academic performance in Trigonometry.

This null hypothesis was tested using correlation. The summary of the analysis is presented in Table 4.15

Table 4.15: Average of Correlation Test on Psycho-social factors in classroom environment and academic performance of trigonometry

Variable	N	Mean	Mean Difference	SD	$r - Value$	$p - value$	Decision
Psycho-social factors	347	34.63	21.99	7.220	-0.047	0.381	H_0
Performance	347	12.64		3.494			Retained

Table 4.15 presented the result of correlation and t-test on psycho-social factors in classroom environment and academic performance in trigonometry. The $p - value$ recorded was 0.127 which was found to be greater than $p \leq 0.05$, the null hypothesis was retained. Therefore, there

was no significant relationship between psycho-social factors and academic performance in trigonometry.

Null Hypothesis seven

There is no significant difference between male and female students' psycho-social factors in classroom environment and academic performance in trigonometry. The summaries of analysis are presented in Table 4.16 and Table 4.17 below.

Table 4.16: Summary of independent sample test of Students' Academic Performance in Trigonometry in Relation to Male and Female

Gender	N	Mean	SD	df	$t-value$	$p-value$	Decision
Male	227	12.56	3.456	345	-0.535	0.593	Retain H_O
Female	120	12.78	3.575				

Table 4.16 presented the result of independent sample test on performance of male and female students. The t-value recorded was -0.535 and $p-value$ 0.593 at degree of freedom 345. Since the p-value observed was greater than $\alpha = 0.05$, the null hypothesis (H_o) was retainthen there was no significant difference in the performance of male and female students in trigonometry.

Table 4.17: Summary of Mann-Whitney (U) test of Students Psycho-social factors in classroom environment in Relation to Male and Female.

Gender	N	Mean Rank	Sum of Ranks	$p-value$	Decision
Male	227	182.64	41459.50	0.027	Rejected H_O
Female	120	157.65	18918.50		

Table 4.17 presented the result of Mann-Whitney (U)-test between psycho-social factors in classroom environment of male and female students. The $p-value$ recorded was 0.027 which is less than $\alpha = 0.05$, then the null hypothesis was rejected and concluded that there was difference between male and female students' psycho-social factors in classroom environment.

4.4 Summary of the Major Findings

The data collected from this study was analyzed using different statistical tools that best fit the data collected. The research questions were summarized using mean and standard deviation. Since the data varied, hypotheses were analyzed by using appropriate statistical tool. The findings of the study are summarized as follows:

1. The Pearson Correlation test conducted revealed that there is no significant relationship between each of psycho-social factors(satisfaction, friction, competitiveness, difficulty and comprehensiveness) in classroom environment and academic performance in trigonometry.
2. No Significant relationship exists between students' (satisfaction, friction, competitiveness, difficulty and comprehensiveness) in classroom environment and academic performance in trigonometry.
3. No Significant difference exists between male and female academic performance in trigonometry.
4. Also significant difference exists between male and female psycho-social factors in classroom environment.

In summary, the findings revealed no significant relationship exist in psycho-social factors (satisfaction, friction, competitiveness, difficulty and comprehensiveness) and academic performance in trigonometry. While no difference exists between male and female academic performance in trigonometry, similarly, differences exists between male and female psycho-social factors in classroom environment.

4.5 Discussion

The null hypothesis of research question one was retained and conclude that there were no significant relationship between satisfaction and academic performance in trigonometry. The correlational values of satisfaction is found to be lower in negative direction showing that satisfaction has no effect on academic performance in trigonometry. Investigation showed that satisfaction record greater significant level of the$p - value$ (0.810) than$p \leq 0.05$showing that the factor is not predictor to performance in trigonometry. This finding agrees with the finding of Jon (2011) who stated that the literature has consistently reported that the relationship between satisfaction and productivity is neither predictive nor causal. This lack of predictive link between satisfaction and productivity led most researchers and theorists to conclude by the 1960s that morale studies were important only if measures of satisfaction were sought, but such studies were relatively meaningless for use in making inferences about productivity. He also maintain that a number of studies based on the assumption that a direct and casual link between human satisfaction and human productivity exists.

The null hypothesis of research question two (2) was retained and conclude that there were no significant relationship between friction and academic performance in trigonometry. The correlational values of friction is found to be low in positive direction showing that friction has lower effect on academic performance in trigonometry. Investigation showed that friction record greater significant level of the$p - value$ (0.602) than$p \leq 0.05$ showing that the factor is not predictor to performance in trigonometry. This finding agrees with the finding of Kanit (2015) who found that the lower the degree of friction perceived, the higher the students' levels of achievement would be. The relationship was in inverse direction.

The null hypothesis of research question three (3) was retained and conclude that there were no significant relationship between competitiveness and academic performance in trigonometry. The correlational values of competitiveness is found to be lower in negative direction showing that competitiveness has no effect on academic performance in trigonometry. Investigation showed that competitiveness record greater significant level of the$p - value$ (0.867) than$p \leq 0.05$showing that the factor is not predictor to performance in trigonometry.This finding agrees with the finding of (Kolawole, 2008) and (kanit, 2015) who found that competition fostered cautious, defensive interaction and misleading and threatening communication. Individualistic goal structures were formed to separate students, reduce interaction, and allow independent learning experience. Students in classroom where performance is emphasized are more likely to engage in cheating, avoid help-seeking, and exhibit lower levels of academic engagement. Individualistic settings, students worked by themselves without interacting with one another.

The null hypothesis of research question four (4) was retained and conclude that there were no significant relationship between difficulty and academic performance in trigonometry. The correlational values of difficulty is found to be lower in negative direction showing that difficulty has no effect on academic performance in trigonometry. Investigation showed that difficulty record greater significant level of the$p - value$ (0.162) than$p \leq 0.05$ showing that the factor is not predictor to performance in trigonometry. This finding does not agree with the finding of Studivant (2015) found a positive relationship between difficulty of work in class and performance gains for low ability girls. However, high ability students showed no significant relationship between subject difficulty and performance gains.

The null hypothesis of research question five (5) was retained and conclude that there was no significant relationship between comprehensiveness and academic performance in trigonometry.

The correlational values of comprehensiveness is found to be lower in negative direction showing that comprehensiveness has no effect on academic performance in trigonometry. Investigation showed that comprehensiveness record greater significant level of the$p - value$ (0.127) than$p \leq 0.05$ showing that the factor is not predictor to performance in trigonometry.

The null hypothesis six (6) was also retained which showthat there is no significant relationship between psycho-social factors in classroom environment and academic performance in trigonometry. The correlational value of psycho-social factors is found to be low in negative direction showing that these psycho-social factors have no effect on academic performance in trigonometry. The investigation shows that psycho-social factors record greater significant level of$p - value$ (0.0.381) than$p \leq 0.05$ showing that the psycho-social factors in classroom environment was not predictor to academic performance of students in trigonometry.

The null hypothesis sevenwas on academic performance between male and female students in trigonometry. The independent sample t-test employed in analyzing this hypothesis produces a value that made us to retain the null hypothesis, since p-value (0.593) than $\alpha = 0.05$. This indicates there is no significant difference between performance of male and female students in trigonometry. The finding of this study was supported by Okwu and Aligba (2004) who opined that there was no significant difference between the performance of boys and girls in the mathematical test. Also a study conducted by Abiem and Odok (2006), revealed that girls achieved better than boys in number and numeration, while boys outperformed the girls in all the branches such as trigonometry, geometry.This shows that, in conducive classroom environment male and female students performed the same in trigonometry.

The null hypothesis on psycho-social factors of male and female students in classroom environment was rejected since $p - value$ (0.027) less than $\alpha = 0.05$. Therefore, the result

showed that there was a significant difference between male and females' psycho-social factors in classroom environment. This is in agreement with the findings of Okebukola (2007) that investigated psycho-social factors of motivation, interest, cooperative learning and competition as a predictor to academic performance and gender. The study revealed that performance based on this psycho-social factor was not gender specific.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarized the result of the analysis of psycho-social factors in classroom environment as predictor academic performance of trigonometry among senior secondary students in Zaria educational zone. Many recommendations were drawn based on the findings of this research. The recommendations were stated in measurable and achievable form. The chapter was discussed under the following sub-headings:

5.2 Summary

5.3 Conclusion

5.4 Recommendations

5.5 Contributions to Knowledge

5.6 Limitations of the Study

5.7 Suggestions for Further Research

5.2 Summary

The study explored the analysis of psycho-social factors in classroom environment as predictors performance of trigonometry among senior secondary students in Zaria educational zone. A research design of correlational type was used. The population of the study consists of all SS II students from the public secondary schools in Zaria educational zone Kaduna state with a total number of three thousand six hundred and one (3601) students. Two (2) schools were selected using random sampling technique with three hundred and forty seven (347) students as sample. Trigonometry Performance Test (TPT) and Psycho-Social Classroom Inventory (PSCI) were the instruments employed for data collection. The two schools selected were taught trigonometry

before the instruments were administered. The result obtained was used to analyzed the hypotheses and summarize the findings. Mean and standard deviation were used to summarizedthe research questions while Pearson correlational test were used to analyzed hypotheses (1-6) and independent sample t-test and Mann-Whitney U-test was employed in analyzing the hypothesis seven (7). The result of the analysis revealed that:

1. The factors such as satisfaction, friction, competitiveness, difficulty and comprehensiveness are not predictors to academic performance in trigonometry.
2. The psycho-social factors in classroom environment were not predictors to academic performance.
3. The performance of male and female students in trigonometry is gender bias.
4. Variation exists between male and female students' psycho-social factors in classroom environment.

   In summary, the result shows that the psycho-social factors such as satisfaction, friction, competitiveness, difficulty and comprehensiveness cannot be the predictors to student academic performance. The performance of male and female students in trigonometry is gender friendly therefore, gender is a predictor to academic performance in trigonometry.

.5.3 Conclusion

Subsequent upon the findings of the present study, the following conclusions are drawn:

1. The psycho-social factors employed in this study (that is satisfaction, friction, competitiveness, difficulty and comprehensiveness) have no relationship with academic performance in trigonometry. Therefore, these psycho-social factors are not predictors to academic performance in trigonometry.
2. The academic performance of students in trigonometry is gender friendly.

3. Different opinionexists between male and female students' psycho-social factors in their classroom environment.

5.4 Recommendations

Based on the findings and conclusions from this research, the following recommendations are made:

1. A teacher should develop an environment that accepted individual differences and allowed all students to develop a feeling of belonging.
2. The professional bodies and Educational agency like Mathematical Association of Nigeria (MAN), Science Teachers Association of Nigeria (STAN), Nigerian Mathematical Society (NMS), National Mathematical Centre (NMC), National Teachers' Institute, Kaduna (NTI) and Kaduna State Ministry of Education (MoE) should organize workshops and train teachers on psycho-social factors in classroom environment for conducive classrooms for learning mathematics.
3. The curriculum planners, Federal Ministries of Education, State Ministries of Education and Local Government Education Authority should incorporate and recommend the use of Psycho-social factors in classroom environment in their schools.
4. Further researches can be carried out to compare social economic status, parental involvement, to see whether they are predictors to academic performance in trigonometry.

5.5 Contributions to Knowledge

The study has contributed to the general body of knowledge, in specific terms:

1. The instrument developed by the researcher for assessing psycho-social factors may be adopted or adapted by other researchers.

2. The lesson plan developed by researcher for teaching trigonometry may be used by other researchers or teachers.
3. The findings of the study contributed new information to the frontier of knowledge in the existing literature.
4. The findings of the study established that psycho-social factors such as satisfaction, friction, competitiveness, difficulty and comprehensiveness are not predictors to students' academic performance in trigonometry.

5.6 Limitations of the study

Every research may experience some obstacles. The ability to excel depends on the ability to surmount to those obstacles. Some of the obstacles that have hindered this research include:

1. This study conducted during the rainy season and Mathematics periods are always in the morning hours, so if it rain in the morning students usually came late to school, which sometime prevented the researcher from getting the total sample of the study.
2. The schools were closed during the conduct of the research work due to corona virus pandemic which was difficult for the researcher to complete the research work on time.

5.7 Suggestion for Further Studies

This study is delimited to only psycho-social factors such as satisfaction, friction, competitiveness, difficulty and comprehensiveness as independent variables on academic performance in trigonometry. Therefore, further studies could be carried out as follows:

1. The study dealt with only trigonometry on performance. Therefore further research can be carried out on other concepts of Mathematics such as Geometry, Statistics.
2. The study only delimited to Zaria educational zone of Kaduna state. Therefore, other studies can be carried out in other zone such as Igabi zone to replicate the study even in Kaduna state and elsewhere.
3. Similar studies should be carried out in other psycho-social factors such as motivation, interest, teacher support, innovation, experiences of teachers, selection of curriculum length of class time on task.
4. Further research is needed to determine whether there is similarity between the actual environment and that preferred by the students.
5. The study also delimited to only Senior Secondary Schools students, a replicate of it can be carried out in Junior Secondary Schools in Kaduna state.

REFERENCES

Abdullahi, U. (2018). Impact of Group-Based Mastery Learning Strategy on Attitude, Retention and Performance in Trigonometry Among Junior Secondary School Students in Katsina State.

Abiem P. O. and Odok, J. K. (2006). Gender Factor in Students' Achievement in Different Branches of Secondary School Mathematics: *Journal of Education and Technology vol.* 1, 161-168.

Adewale, A.M. (2012). The Effects of Parental Socio-Economic Status on Academic Performance of Students in Selected Schools in Edu LGA of Kwara State Nigeria.*International Journal of Academic Research in Business and Social Sciences* July 2012, Vol. 2, No. 7 ISSN:2222-6990.

Akinsola, M. K. (2002). In-service elementary teachers' mathematics anxiety and its relationship to teachers attitude towards the studying and teaching of mathematics. *Nigerian Journal of Applied Psychology, 7(1), 188-202.*

Akinsola, M. K. (2008). Relationship of some psychological variables in predicting problem solving ability of in-service mathematics teachers. The Montana mathematics enthusiast, ISSN 1551-3440, Vol. 5 no. 1, pp. 79-100.

Akkoc, H. (2008). Pre-service mathematics teachers' concept images of radian. *International Journal of Mathematical Education in Science and Technology, 39(7),* 857-878.

Ali G.K. &Wan M.B. (2017). Influence of Psychosocial Factors on Student's Academic Performance in one of Nigerian Colleges of Education, [PDF]scel.ac.ir.

Anca, C.C. (2009). Group Cohesion in the English Language Class.SYNERGY 5(2).

Anderson, R.D. (2007). Teaching the theory of evolution in social, intellectual, and pedagogical context. *Science Education,* 91(4), 664-677, [HTML]sciencedirect.com.

Anthony, O.O. (2012). Psycho-Social Factors Affecting The Teaching and Learning of Introductory Technology in Junior Secondary School in Ijebu-Ode Local Government of Ogun State, Nigeria.*Journal of Psychology volume 3, 2012.*

Antecol, Heather, OzkanEren&SerkanOzbeklik, (2012). 'The Effect of the Teach for America Program on Student Test Scores: A Distributional Analysis using Randomized Data,' Mimeo, Claremont McKenna College.

Awosiyan (2006). A survey of problems in teaching and learning of mathematics in secondary schools in Damaturu LGA of Yobe state. ABACUS.*The Journal of Mathematics Association of Nigeria (MAN), 31 (1)* 130-141, https://files.eric.gov.

Azuka, B.F. (2013). Mathematics in Technological Development: Focus on the Next Millennium-Implications for Secondary Education.ABACUS.*The Journal of the Mathematics Association of Nigeria (MAN),* 25 (1), 74-83.

Azuka, B.F. (2013). Popularization of Mathematics. A paper presented at the NMC-PTDF Workshop for mathematics Teachers. 8th -13th December 2003.

Barkatsas, A. & Malone, J. (2005) a Typology of Mathematics Teachers' Beliefs about Teaching andLearning Mathematics and Instructional Practices. *Mathematics Education Research Journal*, 17 (2), 69-90.

Bennet, J, (2001).The relationship Between Classroom Climate and Students' Achievement. Dissertation Prepared for the Degree of Doctor of Education, University of North Texas USA.

Chidiebere, D.B. (2008). The Effects of Problem-Solving Strategy and Lecture Method on Socio-Cultural Beliefs Hindering Science Learning at the Junior Secondary School in FCT, Abuja. A Thesis Submitted to the Postgraduate School in Department of Education, Faculty of Education,Ahmadu Bello University, Zaria, 2(3) 61-70.[PDF] researchgate.net.

Coleman, J.S.; Campbell, E.Q.; Hobson, C.J.; McPantland, J.; Mood, A.M.; Weinfeld, F.D. & York, R.L. (1966). Equality of Educational Opportunity. Washington, DC: US Office of Education, National Centre for Educational Statistics.

David O. F. (2012). Predicting Students 'achievement In English Language from Teachers Classroom Behaviour and Teaching Experience.*European Journal of Educational Studies* 4(2) https://www.ajoi.info>ijs>article>(pdf).

Delice, A. (2002). Recognizing, recalling and doing in the 'simplification' of trigonometric expressions. *The 26th Annual Conference of the International Group for the Psychology of Mathematics Education (PME26),* the School of Education and Professional Development at the University of East Anglia, Norwich: England, 1, 247.

Durmus, S. (2004). Matematikteogrenmegucluklerininsaptanmasiuzerinebircalisma. *KastamonuEgitimDergisi,* 12(1), 125-128.

Dzever L.T. (2015). The impact of Home Environment Factors on Academic Performance of Senior Secondary school students in Garki Area District, Abuja-Nigeria: *Bulgarian Journal of Science and Education Policy (BJSEP), Volume, Number 1,2015.*

Eliot, L. (2009). Pink brain, blue brain: How small differences grow into troublesome gaps and what we can do about it. New York: Houghton Mifflin Harcourt, [pdf] chennaiescortsservce.com.

Ernest A. (2013). The effects of Psychosocial Learning Environment on Students' Attitudes Towards Mathematics. A thesis summited to the University of Putra Malaysia.

Fisher, D.L. & Fraser, B.J. (1982). A Comparison of actual and Preferred Classroom Environment as perceived by Science Teachers and Students. *Journal of Research in Science Teaching,* 20, 55-61.

Fraser, B.J. (2007). Classroom Learning Environments.In S.K. Abel & N.G. Lederman (Eds.), Handbook of Research on Science Education. London: Routledge.

Fraser, B.J. (2012). Classroom Learning Environments.In S.K. Abel & N.G. Lederman (Eds.), Handbook of Research on Science Education. London: Routledge.

Fredricks, J.A., &Eccles, J. (2002). Children's competence and value beliefs from childhood through adolescence: Growth trajectories in two male-sex-typed domains. Developmental Psychology, 38, 519-533,[PDF] researchgate.net.

Getzels, J. &Thelen, H. (1960).The Classroom as a Unique Social System.*National Society for the Study of Education Yearbook,* 59: 53-81.

Higgins, A. Z. (2011). Psycho-social Effects on Academic Performance. Unpublished Master's Thesis.Faculty of the Graduate School, Eastern Kentucky University, Lexington, Kentucky.

Huck, S. W. (2007).Reading Statistics and Research, United State of America, Allyn& Bacon.

Igwebuike, T.B. (2005) . Psych-social Environment of junior secondary school Integrated science Classroom. A Pilot Study.Paper Read at the 42nd Annual Conference of STAN in Environment, [pdf] wiley.com.

Igwebuike, T.B. (2013). Science Educatees Perception of Science Classroom Environment. *Journal of the Science Teachers Association of Nigeria.*

Iloba O. J. (2009). Relationship Between Students' Perception of Classroom Psycho-social Environment and Achievement in Geography.A Thesis Summited to the University of Nigeria, Nsukka.

Inyang, N.E. (1988). The Construction, Validation, Standardization of Integrated Science Achievement Test for Junior Secondary School.Unpublished Ph.D Thesis, Ahmadu Bello University, Zaria.

Inyang, N.E. &Jeqcot, O.J. (1991). Development and Validation, Standardization of Integrated Science Among Secondary School Students. *International Review of Education,* 36 (3), 310-319.

Jacobs, J.E., Lanza, S., Osgood, D. W., Eccles, J.S., &Wigfield, A. (2002). Changes in children's self-competence and values: Gender and domain differences across grades onethrough twelve. Child Development, 73, 509-527.

Jon M.P. (2011). Relationships Among school climate domains and school satisfaction *West Virginia University Psychology in the Schools, 48(2), plos one, Journals.plos.org.*

Joyce, D.E. (1997). Applications of trigonometry. Retrieved on Friday, May 07, 2018, 17:49:34 fromhttp://www.clarku.edu/djoyce/trig.

Johnson, R.M. (2000). Gender Difference in Mathematics Performance: *Walbergs Educational Productivity Model and the NELS:* 88.

Kajuru, Y. K &Popoola, F. R (2010). Pedagogical Strategies for Improving the Teaching and Learning of Mathematics at the Colleges of Agriculture in Nigeria.*Journal of studies in science and mathematics education Vol 1(1).*Ahmadu Bello University, Zaria.

Kanit S. (2015). Development of the Classroom Climate Measurement Model.Procediaand socialBehavior science. 5th ICEEPSY International Conference on Education & Educational Psychology (171) 1353-1359.

Kelly A. R. (2010). Student Participation in the College Classroom: An Extended Multidisciplinary Literature Review.59 (2), 185213.

Kitty D. (2011). Psychosocial Factors Predicting Academic Performance of Students at a Historically Disadvantaged University. A Thesis Summited to the University of South Africa.

Kolawole E. B. (2008). Effects of Competitive and Cooperative Learning Strategies on Academic Performance of Nigerian Students in Mathematics.*Educational Research and Review* 3 (1), 033-037.

Kolawole, E.B. (2007). Gender issues and Academic Performance of Senior Secondary School Students in Mathematics Computation Tasks in Ekiti State, Nigeria.*Pakistan Journal of Social Sciences, 4: 701-704.*

Kumar, R. (2005). Research Methodology: *A step by step Guide for Beginners, Sage Publications, 2nd edition.*

Lakpini, M.A. (2006). Effects of Conceptual Change Instructional Strategy on the Achievement Retention and Attitude of Secondary School Students with Varied Abilities.Unpublished Ph.D Dissertation, Department of Education, Ahmadu Bello University, Zaria.

Lewin, K. (1935). A Dynamic Theory of Personality, Selected papers. New York. McGraw-Hill.

Maliki, A. E., Anthony N. N. & Julie E. I. (2009). Analysis of Students' Performance in Junior Secondary School Mathematics Examination in Bayelsa State of Nigeria Stud Home CommSci, 3(2): 131-134.

Marc, M. S. (2013). Psycho-Social Factors Predicting the Adjustment and Academic Performance of University students.

Maslow, A.A. (1954). *Maturation and Personality.*New York:harper.

Milad, K. &Sayid, D. G. (2011). The role of parental involvement affect in children's academic performance. *Procedia-Social and Behavioural Sciences,* 15 (2011), 1204-1208.

Mohammed, A. N (2006). Factors that Influence Secondary School Students' Performance in Mathematics in Banadir Region, Somalia.

Mutum, Y. A. (2016). Analysis of Psycho-Social Factors of Classroom Environment as a Predictor to Performance of Upper Basic Science Students in Kaura, Kaduna, [HTML] nature.com.

Mullis, I.V.S., et al. (2000). *TIMMS 1999 internationl mathematics report.*Boston: The International Study Center.

National Council of Teachers of Mathematics (2012). Research Presentation, 140- Current Research on Trigonometry Teaching and Learning.

Nfon, F. N. (2013). Effect of Rusbult's Problem Solving Strategy on Secondary School Students' Achievement in Trigonometry Classroom.*Journal of Mathematics Education © Education for All* June 2013, (61) 38-55.

Obeka, S.S. (2009). Epodewacad and Power Simulation Games of Geographical and Environmental Education. Zaria: Ahmadu Bello University Press Ltd.

Obioma&Salau (2007). The Predictive Validity of Public Examinations: A Case study of Nigeria. A Paper Presented at the 33rd Annual Conference of International Association for Educational Assessment (IAEA) held in Baku, Azerbaijan, 16-21 September, 2007.

OECD. (2004). Learning for tomorrow's world: First results from PISA 2003. Paris, France: OECD Publications.

Oginnin, N. I. (2015). Effects of Mathematics Innovation and technology on students' performance in Open and Distance Learning. National Open University of Nigeria.

Okebukola, P.A. (2007). The State Science Education in Nigeria.*Bulletin of the Science Teacher Asssciation of Nigeria.*

Okebukola, P.A. (2007). Science, Technology and Mathematics Education for Sustainable

Development.Keynote Address. Golden Jubilee Anniversary Conference of Science Teachers Association of Nigera, Sokoto, August, 23.

Okoh, A. S. (2011). Comparison Between Perceptions of Classroom Environment by Biology Students in Public and Private Secondary Schools PGDE Project, University of Port Harcourt, Nigeria.

Okonkwo, C. (2010). RelationshipBetween Secondary School Students' Perceptions of Classroom Learning Environment and their Achievement in Chemistry.PGDE Project, University of Port Harcourt, Nigeria.

Okwu E. I. and Aligba S. O (2004). The Effect of Gender and Location on Mathematics Achievement of Secondary School Students', Benue State University. *Journal of Education.* Nov. 2004 Vol. 5 123-126.

Orhun, N. (2002). Solution of verbal problems using concept of least common multiplier (LCM) and greatest common divisor (GCD) in Primary School Mathematics and Misconceptions. retrieved 6th September 2018 from http:// math.unipa.it/ grim/SiOrhun.PDF.

Patrick, H., Ryan, A.M., & Kaplan, A. (2007). Early Adolescents' Perceptions of the Classroom Social Environment, motivational beliefs, and engagement. Journal of Educational Psychology, 99, 83-98.

Peter, O.A. (2010). THE Effeect of Intervention on Chemistry Students' Achievement and Perception of Psychosocial Environment.PGDE Project, University of Port Harcourt, Nigeria.

Peter, O.A. (2014). Effect of Gender on Students Academic Achievement in Secondary School Social Studies. Journal of Education and Practice www.iiste.org ISSN 2222-1735 (Paper) ISSN 2222-288X (Online) 5, (21).

Ray, A.M. & Patrick, H. (20070. Identifying Adaptive Classroom Analysis of Measurement of Dimension of the Classroom Social Environment. Paper Prepared for the Position Outcomes Conference University of Illinois Urbana-Campaign.

Robinson, D. I. (2009). Teacher Quality as a Factor of Student Achievement: How Does the Type of Teacher Certification Correlate with Student Mathematics Achievement? Phi DELTA Kappa International Summit on Quality Educator Recruitment and Retention, [HTML] sciencedirect.com.

Sambo, A.A. (2008). *Research Methods in Education.* Ibadan: Stirling-Horden Publishers (Nig. Ltd).

Sarac, Ayse&FatmaAslan-Tutak (2013). Investigating Teachers' Trigonometry Teaching

Efficacy.Available onlineat htttp://www.cerme8.metu.edu.tr/wgpapers/WG8/WG8_Sarac.pdf.

Schunk, D. (2008). Motivation in Education: Theory, Research and Applications (3rded). Upper Saddle River, NJ: Pearson.

Sophie S. H (2014). Local text cohesion, reading ability and individual science aspirations: key factors influencing comprehension in science classes. *British Educational Research Journal 41 (1).*

Studivant, K.M. (2015). A Detailed Analysis of Coaching in Teacher-Child Interaction Training (TCIT).Dessertation Paper 36.

Sumaila, M. U. (2018). Assessment of Teaching Styles and Teachers' Characteristics as Determinants of Performance in Trigonometry Among Secondary School Students in Kano Municipal, Nigeria. A Thesis Summited to the Faculty of Education Ahmadu Bello Universiy, Zaria, ATBU Journal of Science, Technology 2018-atbuftejoste.com.

Tella, A. (2008). Teacher Variables as Predictors of Academic Achievement of Primary School Pupils Mathematics.*International Electronic Journal of Elementary Education, Vol. 1, Issue 1, (pdf) un-muenchen.de October 2008. ISSN: 1307-9298.*

Tella, A. Jr&Tella, A. (2003). Self-efficacy and locus of control as predictors of academic achievement among secondary schools students in Osun State Unity Schools. *Oyo Journal of Educational Psychology.*1(1), 32-41.

Tuckman, B.W. (1975). Measuring Educational Outcomes Fundamentals of Testing.Atlanta, Chicago, New York, San Francisco: Harcourt Brace Jovanovic Inc.

Tuna, A. (2013). A conceptual analysis of the knowledge of prospective mathematics teachers about degree and radian. *World Journal of Education, 3(4),* 1-9.

Usman, I.A. (2007). The Effects of Selected Methods of Teaching on the Academic Achievement of Slow Learners in Integrated Science at the Junior Secondary School Level.*Journal of Science and Mathematics Education,* 3(1), 70-77. University of Cape Coast, Ghana.

United State Department of Labor Employment and Training Administration.(1999 & 2015). Understanding Test Quality Concepts of Reliability and Validity.

WAEC (2012). Chief examiners report. General certificate of education/school certificate O' level papers. *WAEC.* Lagos.

WAEC (2013). Chief examiners report. General certificate of education/school certificate O' level papers. *WAEC.* Lagos.

WAEC (2014). Chief examiners report. General certificate of education/school certificate O' level papers. *WAEC.* Lagos.

WAEC (2015). Chief examiners report. General certificate of education/school certificate O' level papers. *WAEC.* Lagos.

WAEC (2016). Chief examiners report. General certificate of education/school certificate O' level papers. *WAEC.* Lagos.

WAEC (2017). Chief examiners report. General certificate of education/school certificate O' level papers. *WAEC.* Lagos.

WAEC (2018). Chief examiners report. General certificate of education/school certificate O' level papers. *WAEC.* Lagos.

Walberg, H.J. (1969a). predicting Class Learning: An Approach to the Class as a Social System. *American Educational Research Journal, 4, 529-542.*

Walberg, H.J. (1969b). Social Environment as a Mediator of Classroom Learning.*Journal of Educational Psychology*, 60 (6), 443-448.

Watt, H. M. G. (2004). Development of adolescents' self-perceptions, values, and task perceptions according to gender and domain in 7th through 11th grade Australian students. Child Development, 75 1556-1574.

www.kenpro.org.

Yi-Lung K. (2011). The impact of Psychosocial Factors on Achievement Gains between eighth and tenth grade. University of Iowa Research Online.

Zedan R. &Jarmas B, (2014). Environment learning as a predictor of Mathematics Self-Efficacy and Mathematics Achievement.*American International Journal of social science. Vol. 3, No.6, November 2014.*

Zedan, R. (2010). New dimensions in the classroom climate.Learning Environments Research, 13, 1, 75-88.

Zhang, L. and Manon, J. (2000).*Gender and Achievement.. Understanding Gender Differences and Similarities in Mathematics Assessment.*

APPENDIX A

Trigonometry Performance Test (TPT)

INSTRUCTIONS:

Answer all questions by ticking correct answer of your choice in the question paper.

Class: SS II

Time: 1 hour

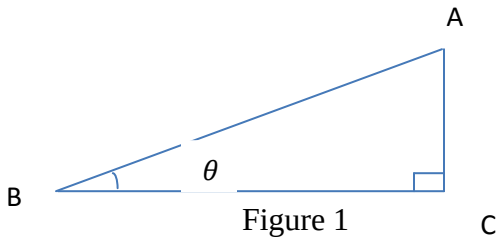


Figure 1

1. From figure 1, with respect to the angle θ, identify and name the side $|AC|$.

   A) Adjacent B) Hypotenuse C) Opposite D) Terminal

2. Identify and name the side $|BC|$

   A) Opposite B) Adjacent C) Hypotenuse D) Shortage side

3. The side $|AB|$ of the above triangle is called

   A) Adjacent B) Hypotenuse C) Opposite D) Equidistant

4. What is the value of $cos\ 90^O$?

   A) -1 B) $\frac{-1}{2}$ C) 0 D) 1

5. The exact value of $tan\ 60^O$ is

   A) $\sqrt{3}$ B) 1 C) $\frac{\sqrt{3}}{2}$ D) $\frac{1}{2}$

6. The exact value of $sin\ 60^O$

   A) $3\sqrt{3}$ B) $\frac{\sqrt{3}}{2}$ C) $2\sqrt{2}$ D) $\frac{1}{2}$

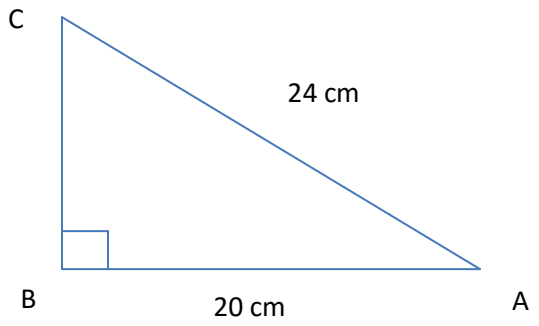


Figure 2

7. What do you use to find $|BC|$ from figure (2)

   A) sine ratio B) cosine ratio C) tangent ratio D) Pythagoras's theorem

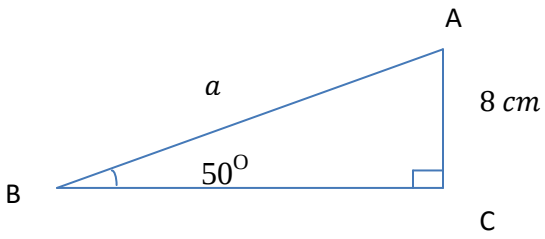


Figure 3

8. What do we use to find $|BC|$ from figure (3)?

   A) Sine ratio B) cosine ratio C) tangent ratio D) Pythagoras's theorem

9. To find the equivalent of 135^O in the first quadrant, we use,

   A) $360^O - \theta$ B) $270^O + \theta$ C) $180^O - \theta$ D) $180^O + \theta$.

10. Which of the following expressions always equals to 1?

    A) $cos^2x + sin^2x$ B) $\cos x - \sin x$ C) $cos^2x - sin^2x$ D) $\cos x + \sin x$

11. If $sinx = cos\ 50^O$, then x is equal to:

    A) 40^O B) 54^O C) 50^O D) 90^O

12. If $\cos(x + 40)^O = 0.822$, what is the value of x?

A) 85^O B) 75^O C) 65^O D) 30^O

13. If x is an angle and $0^o < x < 90^o$ what value of x is true for $sin\ x\ =\ cos\ x$?

(A) 0^O (B) 30^O (C) 45^O (D) 60^O

14. If $sin\ x\ = \frac{3}{5,}$ for $0^o < x < 90^o$, calculate $\frac{1+cosx}{1-cosx}$

(A) 9 (B) 7 (C) $\frac{7}{10}$ (D) $\frac{19}{25}$

15. Given that $\sin 60^O = \frac{\sqrt{3}}{2}$and $\cos 60^O = \frac{1}{2}$, evaluate $\frac{1-\sin\ 60^O}{1+\cos\ 60^O}$.

(A) $\frac{2+\sqrt{3}}{3}$ (B) $\frac{1-\sqrt{3}}{3}$ C $\frac{1+\sqrt{3}}{3}$ D $\frac{2-\sqrt{3}}{3}$.

16. If $sin\ \theta = -\frac{3}{5}$ and $\cos\theta = -\frac{4}{5}$, then θ lies in

A quadrant I B quadrant II C quadrant III D quadrant IV

17 If $sin\ \theta = \frac{\sqrt{3}}{2}$ and $90^O < \theta < 180^O$, what is $cos\theta$?

A $\frac{1}{3}$ B $\frac{2}{3}$ C $-\frac{1}{2}$ D $\frac{\sqrt{3}}{2}$

18. If $tan30^O = \frac{1}{\sqrt{3}}$, what is $\sin 30^O + \cos 30^O$.

A $\sqrt{3}$ B $\frac{1+\sqrt{3}}{2}$ C $\frac{1+\sqrt{3}}{4}$ D $\frac{2}{\sqrt{3}}$.

19. If $\sin x = \cos 70^O$, $for\ 0^O < x < 90^O$, find x.

A 110^O B 70^O C 30^O D 20^O

20. What is the equivalent of 210^O in the first quadrant?

A 30^O B 45^O C 60^O D 150^O

21. Angle of elevation is equal to angle of depression. Why are the two angles equal

A Corresponding angles B Vertically opposite angles

C Alternate angles D interior angle.

22 If $sin(x-40)^O = 0.5$, what is the value of x?

A 85^O B 70^O C 65^O D 55^O

23. The cosine of an angle in the first quadrant equals 0.50.What sine of angle has the same value?

A 90^O B 60^O C 45^O D 30^O

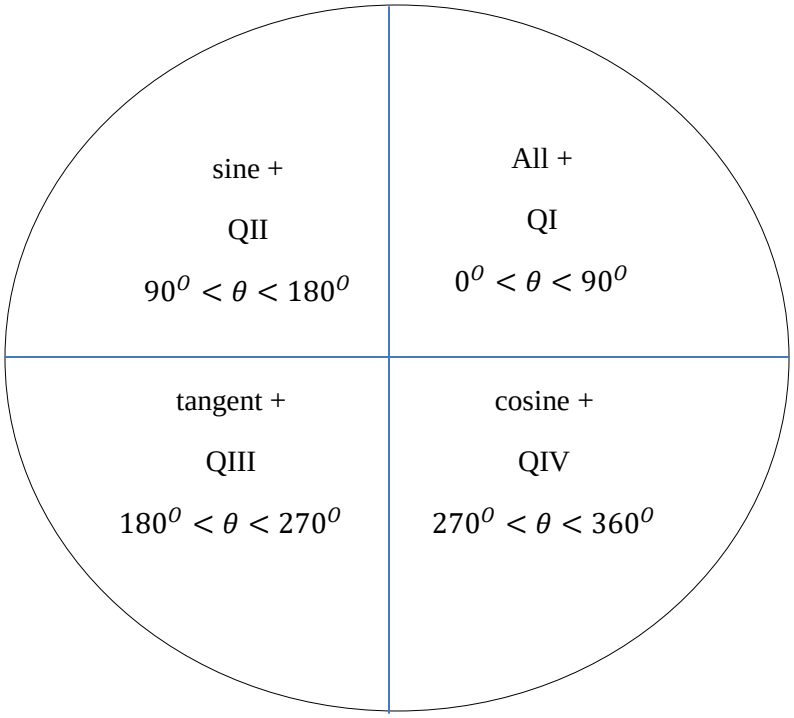


Figure (4)

24. From figure 4, in which quadrant do sine and tangent have opposite sign?

A I B II C III D IV

24. If $\tan x$ and $\cos x$ are both negative, which quadrant does x lie in?

A I B II C III D IV

25. If $sin\ x = \frac{5}{17}$, find $\tan x$, for x being in the first quadrant.

A $\frac{8}{5}$ B $\frac{3}{4}$ C $\frac{5}{8}$ D $\frac{8}{17}$

26. In what quadrants will $sin\ \theta$ be positive and $cos\ \theta$ be negative?

A I B II C III D IV.

27. How many periods the graph of $y = sin\ x$ has, for $0^O \leq x \leq 360^O$?

A 0 B 1 C 2 D 3

28. How many times does the graph of $y = cos\ x$, for $0^O \leq x \leq 360^O$ cross the x-axis?

A 0 B 1 C 2 D 3

29. A ladder 9m long leans against a vertical wall, making an angle of 64^O with the horizontal ground. Calculate correct to one decimal place, how far the foot of the ladder is from the wall.

A 4.0cm B 5.8cm C 7.1cm D 8.1cm

30. When an aeroplane is 800m above the ground, its angle of elevation from a point P on the ground is 30^O. How far is the plane from P by line of sight?

A 400m B 800m C 1500m D 1600m

31. From the top of a building 10m high, the angle of depression of a stone lying on the horizontal ground is 69^O. Calculate correct to 1 decimal place, the distance of the stone from the foot of the building.

A 3.6m B 3.8m C 6.0m D 9.3m

32. Express $S20^O W$ in terms of three digit bearing (000^O)

A 020^O B 110^O C 180^O D 200^O

33. Point X and Y respectively $20km$ North and $9km$ East of a point Q. What is the bearing of Y from X? Correct to the nearest degree.

A 24^O B 114^O C 156^O D 204^O

34. The angle of elevation of a point T on a tower from a point U on the horizontal ground is 30^O. If $TU = 54m$, how high is T above the horizontal ground?

A $108m$ B $72m$ C $46.3m$ D 27m

35. The angle of elevation of the top of a building is 30^O from a point $90m$ away on the level ground. Find the height of the building.

A $45m$ B $30\sqrt{3}m$ C $45\sqrt{3}m$ D $90\sqrt{3}m$

36. The bearing of P from Q is 060^O and the bearing of R from Q is 120^O. If R is equidistant from Q, what is the bearing of P from R?

A 090^O B 180^O C 300^O D 330^O

37. The angle of elevation of X from Y is 30^O. If $XY = 40m$, how high is X above the level of Y?

A 10m B 20m C $20\sqrt{3}m$ D 40m

38. Given that $\tan x = 1$,where $0^O \leq x \leq 90^O$, evaluate $\frac{1-sin^2x}{\cos x}$.

A $2\sqrt{2}$ B $\sqrt{2}$ C $\frac{\sqrt{2}}{2}$ D $\frac{1}{2}$

39. If $sin3y = cos2y$ and $0^O \leq y \leq 90^O$, find the value of y.

A 18^O B 36^O C 54^O D 90^O

40. From a point P, R is 5km due west and 12km due south. Find the distance between P and R.

A. 5km B. 12km C. 13km D. 17km

41. From a point R, 300m north of P, man, walks eastwards to a place Q which is 600m from P. Find the bearing of P from Q, correct to the nearest degree.

A. 026^O B. 045^O C. 210^O D. 240^O

42. The lengths of the adjacent sides of a right-angled triangle are $xcm, (x-1)cm$.If the length of the hypotenuse is $\sqrt{13}cm$, find the value of x.

A. $2cm$ B. $3cm$ C. $4cm$ D. $5cm$.

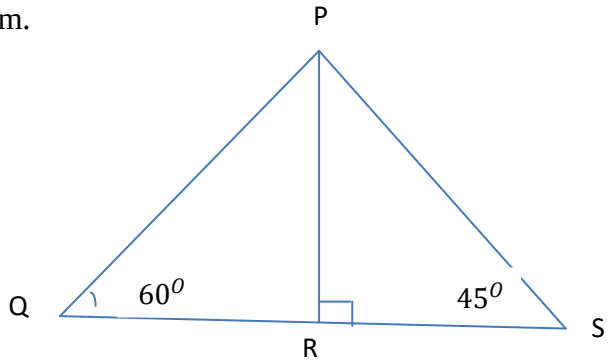
43. In the diagram below, $|QR| = 5cm, PQR = 60^O$ and $PSR = 45^O$. Find $|PS|$, leaving your answer in surd form.

A. $4\sqrt{5}cm$

B. $3\sqrt{7}cm$

C. $4\sqrt{6}cm$

D. $5\sqrt{6}cm$



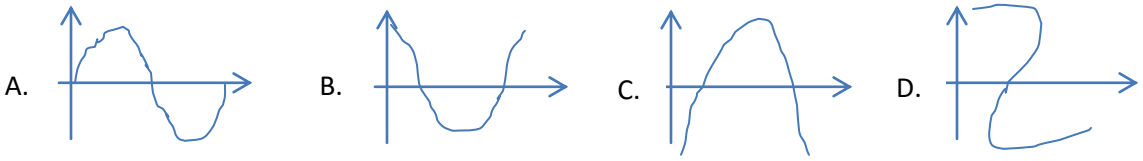
44. Points P and Q are respectively $24m$ north and $7m$ east of point R. Calculate $|PQ|$ in metres.

A. $20m$ B. $24m$ C. $25m$ D. $31m$.

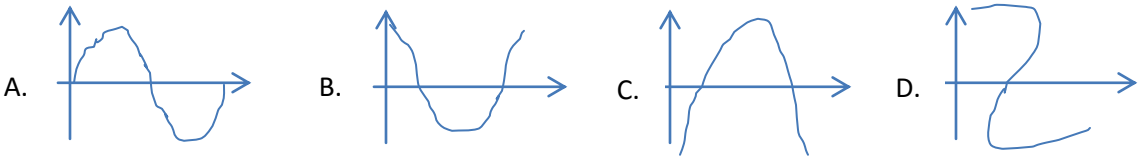
45. From the top of a cliff, the angle of depression of a boat on the sea is 60^0, if the top of the cliff is $25m$ above the sea level, calculate the horizontal distance from the bottom of the cliff to the boat.

A. $50\sqrt{3}m$ B. $25\sqrt{3}m$ C. $\frac{25\sqrt{3}}{3}m$ D. $\frac{25}{3}m$

46. Which of the followings is the sketch of the graph of $y = sin\ x$?



47. Which of the following is the sketch of the graph of $Cos\ x$?



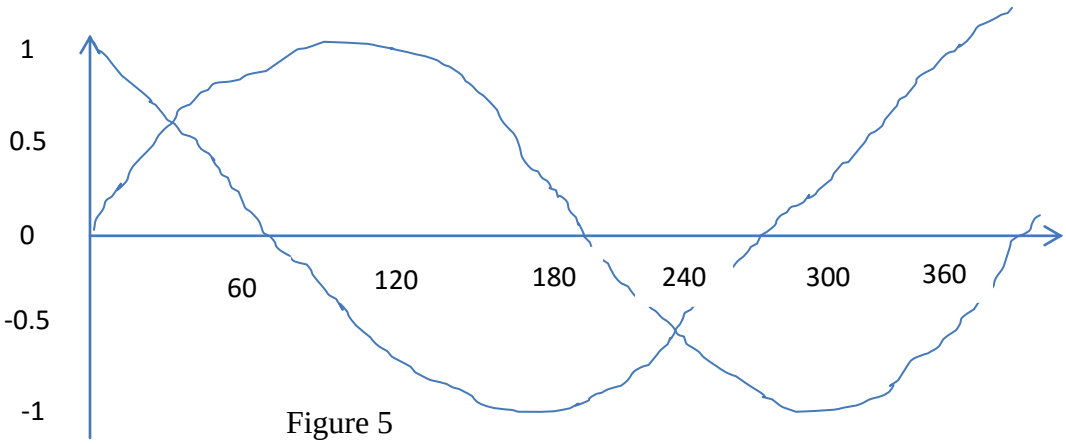


Figure 5

48. Using the above figure 5, if $0 \leq x \leq 60$, what is the value of x for which $sin\ x = cos\ x$?

A 0 B 30 C. 45 D. 60

49. What is the maximum value of $sin\ x$ in the figure 5 above?

A. 1 B. 2 C. -1 D. 0.5

50. The minimum value of $cos\ x$ in figure 5 above is:

A. 1 B. 2 C. -1 D. -0.5

APPENDIX B

PSYCHO-SOCIAL CLASSROOM INVENTORY

Dear Respondent

This is not a test. The questions are to find what your class is actually like each sentence is meant to describe what your actual classroom is like. Tickthe appropriate box: Strongly Agree (SA) or Agree (A) or Undecided (U) or Disagree (D) or Strongly Disagree (SD).

Gender: Male [ ] Female [ ]

	Remember you are describing your actual classroom	SA	A	U	D	SD
Satisfaction	1. I enjoy the school work in my class.					
	2. I am happy in my class.					
	3. I like my class.					
	4. My teacher is friendly.					
	5. My class is fun.					
	6. I always do well in my trigonometry class.					
	7. I am good at trigonometry class.					
	8. My class is conducive.					
	9. I like everyone in my class.					
	10. Trigonometry is fun.					
Friction	1. My classmates always fight with one another.					
	2. Some of my classmates are mean.					
	3. Many students in my class like to quarrel always.					
	4. Certain students always want to have their own way.					
	5. My classmates fight a lot.					
	6. My classmates do not help each other.					
	7. My classmates do not tolerate each other.					
	8. I don't assist any one in my class.					
	9. I am not a friend to all my classmates.					
	10. My teacher is not friendly.					
Competitiveness	1. My classmates often race to see who can finish first.					
	2. Most of my classmates want their work to be better than their friend's work.					
	3. Some of us feel bad when they don't do as well as the others.					
	4. Some students in my class always try to do their work better than the other.					
	5. Few students in my class want to be better than others.					

	6. Many of my classmates are shy to answer questions in the class.					
	7. Many of my classmates copy other students work to compete with others.					
	8. Most of classmates copy from piece of papers during examinations to compete with others.					
	9. Some of classmates feel happy when they do well as the others.					
	10. My classmates hide their knowledge in order to compete with each others.					
Difficulty	1. I find Trigonometry as a topic in mathematics very difficult to understand.					
	2. I cannot do my Trigonometry homework without external help.					
	3. My classmates always help me in my Trigonometry class work.					
	4. Mathematics textbook (Trigonometry) are difficult to read and understand without external help.					
	5. I find it difficult to solve simple problems in Trigonometry.					
	6. Word problems in trigonometry are very difficult to understand.					
	7. I always failed trigonometry exams.					
	8. Some theorems or formulae in trigonometry are difficult to remember.					
	9. I get distracted easily during trigonometry class.					
	10. I feel bad when cannot solve trigonometry problems.					
Comprehensiveness	1. I am a friend to everybody in my class.					
	2. I am not a friend to all my classmates.					`
	3. I tolerate all my classmates.					
	4. I assist all my classmates when they are in difficulties.					
	5. I am a member of my class social club.					
	6. I assist my classmate when learning trigonometry.					
	7. I give my classmate positive encouragement when their performance is unsatisfactory in mathematics.					
	8. I am always encourages my classmate to read their trigonometry book.					
	9. I assist some of my friend when they cannot solve problems in trigonometry.					
	10. I always solve trigonometry problems together with some of my classmate.					

APPENDIX C

LECTURE METHOD LESSON PLAN

(WEEK ONE)

Class: SS II

Subject: Mathematics

Topic: Sine rule

Average age: 16 years

Sex: Co-educational (Mixed)

Time: 1hr 30min

Teaching materials: cardboard paper with sine formula written on it, chalk or maker and black or white board.

Behavioral objective: at the end of the lesson the students will be able to:

i. State the conditions of using sin rule

ii. Solve the problems that require the use of sin rule.

Previous knowledge: the students have an idea of types of triangle and Pythagoras theorem

Introduction: teacher introduces the lesson by asking the student the types of triangles they know and how to solve right angle triangle using Pythagoras theorem.

Presentation: teacher presents the lesson using the following steps;

Step I: teacher introduces the sin formula $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$ and conditions for using the formula: (a) if two angles or all three angles and one side are known, (b) if two sides and the angle opposite one of them are known.

Step II: teacher solves some examples, on how to find unknown angle in a given triangle and on how to find unknown side of a given triangle. e.g. (1) in triangle ABC, A=34°, a=4m, b=6m. Find B. (2) in triangle ABC, B=68°, C=43°, c=7cm find b.

Conclusion: teacher concludes the lesson by revising the key points of the lesson to the students.

Evaluation: teacherevaluates the lesson by asking students to list the conditions of using sine formula and exercise will be given to the students, to solve after the class.

LECTURE METHOD LESSON PLAN

(WEEK TWO)

Class: SS II

Subject: Mathematics

Topic: Cosine rule

Average age: 16 years

Sex: Co-educational (Mixed)

Time: 1hr 30min

Teaching materials: cardboard paper with cosine formula written on it, including all its formations, chalk or maker and black or white board

Behavioral objective: at the end of the lesson the students will be able to:

(i) State the conditions of using cosine formula.

(ii) Solve problems using cosine formula.

Previous knowledge: the students have an idea of using Pythagoras theorem, using sine formula and making subject of the formula.

Introduction: teacher introduces the lesson by asking students to list the conditions of using Pythagoras theorem sine formula.

Presentation: teacher presents the lesson using the following steps;

Step I: teacher introducesto the students,the cosine formula $cosA = \frac{b^2+c^2-a^2}{2bc}$ and the conditions of using cosine formula; if two sides of a triangle and angle between them are known, and if three sides of a triangle are known.

Step II: teachersolves problems using cosine formula with the students, on how to find unknown angle of a given triangle, on how to find unknown side of a given triangle. E.g.

Conclusion: teacher concludes the lesson by revising the key points of the lesson.

Evaluation: teacher evaluates the lesson by asking the students to state the conditions of using cosine formula and give some exercise that involve finding unknown angles and sides of a triangle using cosine formula**.**

LECTURE MRTHOD LESSON PLAN

(WEEK THREE)

Class: SS II

Subject: Mathematics

Topic: Solution of triangle

Average age: 16 years

Sex: Co-educational (Mixed)

Time: 1hr 30min

Teaching materials:text books, chalk or maker and black or white board

Behavioral objective: at the end of the lesson the students will be able to solve triangles using sine formula and cosine formula.

Previous knowledge: the students have idea on the conditions of using sine and cosine formula and how to use them.

Introduction: teacher introduces the lesson by asking the students questions such as;

(i) State the conditions of using sine formula and cosine formula.

(ii) Write cosine formula and sine formula.

Presentation: teacher presents the lesson using the following steps;

Step I: teacher explains what are needed in solving triangles

Step II: teacher solves two (2) examples on solution of triangles.

(i) Find angle ABC in a triangle if |AB|=32cm,|BC|=24cm and |CA|=42cm.

(ii) The length of the side QR of a triangle PQR is 12.4cm, <PQR=67° and <QPR=540. Find the length of the sides PR and PQ.

Conclusion: teacher concludes the lesson by summarizing the whole lesson to the students.

Evaluation: teacher evaluates the lesson by asking students to solve one question in the class while the teacher is going round in the class. And give some exercises to solve after the class

LECTURE METHOD LESSON PLAN

(WEEK FOUR)

Class: SS II

Subject: Mathematics

Topic: Angle of elevation

Average age: 16 years

Sex: Co-educational (Mixed)

Time: 1hr 30min

Teaching materials: pictures illustrating angles of elevation, text books chalk or maker and black or white board

Behavioral objective: at the end of the lesson the students will be able to solve problems involving angle of elevation.

Previous knowledge: the students have idea of trigonometry ratio.

Introduction: teacher introduces the lesson by asking students questions on their previous knowledge such as; what is the ratio of sine, cosine and tangent.

Presentation: teacher presents the lesson using the following steps;

Step I: teacher solves problems together with the students, which involve finding; the distance between object and observer

Step II: teacher solves problems, which involve finding; the height of the object and the angle of elevation.

(a) A boy observes that the angle of elevationof the top of a tower is 32°. He then walks 8m toward the tower and then discovers that the angle of elevation is 43°. Find the height of the tower

Conclusion: teacher concludes the lesson by revising the key points of the whole lesson.

Evaluation: teacher evaluates the lesson given question to the students to answer in the class and some exercises to solve after the class.

LECTURE METHOD LESSON PLAN

(WEEK FIVE)

Class: SS II

Subject: Mathematics

Topic: Angle of depression

Average age: 16 years

Sex: Co-educational (Mixed)

Time: 1hr 30min

Teaching materials: pictures illustrating angles of depression, text books chalk or maker and black or white board

Behavioral objective: at the end of the lesson the students will be able to solve problems involving angle of depression.

Previous knowledge: the students have idea of trigonometry ratio.

Introduction: teacher introduces the lesson by asking students questions on their previous knowledge such as; what is the ratio of sine, cosine and tangent.

Presentation: teacher presents the lesson using the following steps;

Step I: teacher solves problems together with the students, which involve finding the distance between object and observer.

(a) From a horizontal distance of 10.5km, a pilot observes that the angle of depression of the top and the base of the tower are 36° and 41° respectively; calculate the distance between the base of the tower and the pilot.

Step II: teacher solves problems, which involve finding the height of the object and the angle of depression.

Conclusion: teacher concludes the lesson by revising the key points of the whole lesson.

Evaluation: teacher evaluates the lesson given question to the students to answer in the class and some exercises to solve after the class.

LECTURE METHOD LESSON PLAN

(WEEK SIX)

Class: SS II

Subject: Mathematics

Topic: Bearing and distance

Average age: 16 years

Sex: Co-educational (Mixed)

Time: 1hr 30min

Teaching materials: cardboard paper with cardinal point drown on it, text books, chalk ormaker and black or white board**.**

Behavioral objective: at the end of the lesson the students will be able to solve problems involving bearing and distance.

Previous knowledge: the students have idea of using sin formula and cosine formula

Introduction: teacher introduces the lesson by asking students questions on their previous knowledge

Presentation: teacher presents the lesson using the following steps;

Step I: teacher explains the meaning bearing and how to approach any problem involving bearing and distance.

Step II: teacher solves two examples. The examples will be on how to find the distance and how to find a bearing from particular point to another.

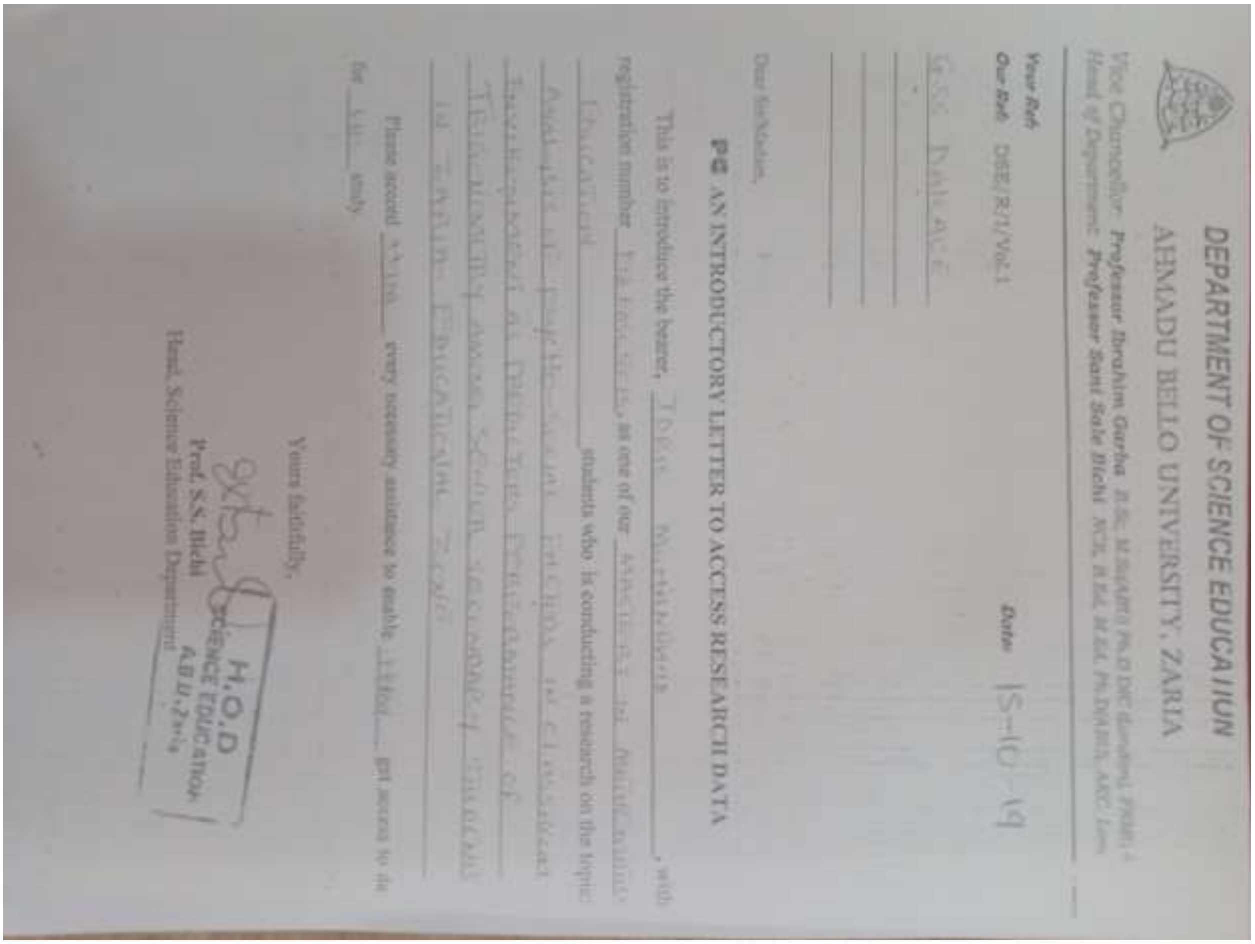
A surveyor leaves her base camp and drives 42km on a bearing 032^0 she then drives 28km on a bearing 154^0. How far she is from her base and what is her bearing from it?

Conclusion: teacher concludes the lesson by summarizing the key points of the lesson to the students.

Evaluation: teacher evaluates the lesson by given the students, class work and some exercises to solve after the class

APPENDIX D

LETTER OF INTRODUCTION TO ACCESS RESEARCH DATA



DEPARTMENT OF SCIENCE EDUCATION

AHMADU BELLO UNIVERSITY, ZARIA

Vice Chancellor: **Professor Ibrahim Garba** B.Sc, M.Sc(ABU) Ph.D DIC (London), FNMGS
Head of Department: **Professor Sani Sale Bichi** NCE, B.Ed, M.Ed, Ph.D(ABU), AKC, Lon.

Your Ref:
Our Ref: DSE/R/1/Vol.1 *Date:* 15-10-19

G.S.S. DAKACE

Dear Sir/Madam,

PG AN INTRODUCTORY LETTER TO ACCESS RESEARCH DATA

This is to introduce the bearer, Idris Muhammad, with registration number [illegible], as one of our Masters in Mathematics Education students who is conducting a research on the topic: Analysis of Psycho-social Factors in Classroom Environment as Predictors Performance of Trigonometry among Senior Secondary Students in Zaria Educational Zone

Please accord him every necessary assistance to enable him get access to data for his study.

Yours faithfully,

Prof. S.S. Bichi
Head, Science Education Department

H.O.D
SCIENCE EDUCATION
A.B.U., Zaria

DEPARTMENT OF SCIENCE EDUCATION

AHMADU BELLO UNIVERSITY, ZARIA

Vice Chancellor: **Professor Ibrahim Garba** *B.Sc, M.Sc(ABU) Ph.D DIC (London), FNMG*
Head of Department: **Professor Sani Sale Bichi** *NCE, B.Ed, M.Ed, Ph.D(ABU), AKC. Lond*

Your Ref:

Our Ref: DSE/R/I/Vol.1 ***Date:*** 15-10-19

GSS GELLESU
TUDUN-WADA
ZARIA

Dear Sir/Madam,

PG AN INTRODUCTORY LETTER TO ACCESS RESEARCH DATA

This is to introduce the bearer, IDRIS MUHAMMAD, with registration number PG/ED/SC/2015, as one of our MASTERS IN MATHEMATICS EDUCATION students who is conducting a research on the topic: ANALYSIS OF PSYCHOSOCIAL FACTORS IN CLASSROOM ENVIRONMENT AS PREDICTORS PERFORMANCE OF TRIGONOMETRY AMONG SENIOR SECONDARY STUDENTS IN ZARIA EDUCATIONAL ZONE

Please accord HIM every necessary assistance to enable HIM get access to da for HIS study.

Yours faithfully,

H.O.D
SCIENCE EDUCATION
A.B.U. Zaria

Prof. S.S. Bichi
Head, Science Education Department

APPENDIX E

DATA OUTPUT

```
CORRELATIONS
  /VARIABLES=test tcompetitiveness
  /PRINT=TWOTAIL NOSIG
  /STATISTICS DESCRIPTIVES

  /MISSING=PAIRWISE.
```

Correlations

Notes

Output Created		09-Jan-2020 14:12:31
Comments		
Input	Data	C:\Users\LENOVO USER\Documents\analysis for thesis.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	347
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax		CORRELATIONS /VARIABLES=test tcompetitiveness /PRINT=TWOTAIL NOSIG /STATISTICS DESCRIPTIVES /MISSING=PAIRWISE.
Resources	Processor Time	00:00:00.047
	Elapsed Time	00:00:00.059

[DataSet1] C:\Users\LENOVO USER\Documents\analysis for thesis.sav

Descriptive Statistics

	Mean	Std. Deviation	N
total performance	12.64	3.494	347
total competitiveness	36.81	9.238	347

Correlations

		total performance	total competitiveness
total performance	Pearson Correlation	1	-.009
	Sig. (2-tailed)		.867
	N	347	347
total competitiveness	Pearson Correlation	-.009	1
	Sig. (2-tailed)	.867	
	N	347	347

Cont. Data Output

```
CORRELATIONS
  /VARIABLES=test tdifficulty
  /PRINT=TWOTAIL NOSIG
  /STATISTICS DESCRIPTIVES

  /MISSING=PAIRWISE.
```

Correlations

Notes

Output Created		09-Jan-2020 14:14:58
Comments		
Input	Data	C:\Users\LENOVO USER\Documents\analysis for thesis.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	347
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax		CORRELATIONS /VARIABLES=test tdifficulty /PRINT=TWOTAIL NOSIG /STATISTICS DESCRIPTIVES /MISSING=PAIRWISE.
Resources	Processor Time	00:00:00.062
	Elapsed Time	00:00:00.055

[DataSet1] C:\Users\LENOVO USER\Documents\analysis for thesis.sav

Descriptive Statistics

	Mean	Std. Deviation	N
total performance	12.64	3.494	347
total difficulty	32.96	10.965	347

Correlations

		total performance	total difficulty
total performance	Pearson Correlation	1	-.075
	Sig. (2-tailed)		.162
	N	347	347
total difficulty	Pearson Correlation	-.075	1
	Sig. (2-tailed)	.162	
	N	347	347

Cont. Data Output

```
CORRELATIONS
  /VARIABLES=test tfriction
  /PRINT=TWOTAIL NOSIG
  /STATISTICS DESCRIPTIVES

  /MISSING=PAIRWISE.
```

Correlations

Notes

Output Created		09-Jan-2020 14:10:31
Comments		
Input	Data	C:\Users\LENOVO USER\Documents\analysis for thesis.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	347
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax		CORRELATIONS /VARIABLES=test tfriction /PRINT=TWOTAIL NOSIG /STATISTICS DESCRIPTIVES /MISSING=PAIRWISE.
Resources	Processor Time	00:00:00.063
	Elapsed Time	00:00:00.060

[DataSet1] C:\Users\LENOVO USER\Documents\analysis for thesis.sav

Descriptive Statistics

	Mean	Std. Deviation	N
total performance	12.64	3.494	347
total friction	28.08	10.267	347

Correlations

		total performance	total friction
total performance	Pearson Correlation	1	.028
	Sig. (2-tailed)		.602
	N	347	347
total friction	Pearson Correlation	.028	1
	Sig. (2-tailed)	.602	
	N	347	347

Cont. Data Output

```
CORRELATIONS
  /VARIABLES=test tcomprehensiveness
  /PRINT=TWOTAIL NOSIG
  /STATISTICS DESCRIPTIVES

  /MISSING=PAIRWISE.
```

Correlations

Notes

Output Created		12-Jan-2020 17:00:06
Comments		
Input	Data	C:\Users\LENOVO USER\Documents\analysis for thesis.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	347
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax		CORRELATIONS /VARIABLES=test tcomprehensiveness /PRINT=TWOTAIL NOSIG /STATISTICS DESCRIPTIVES /MISSING=PAIRWISE.
Resources	Processor Time	00:00:00.047
	Elapsed Time	00:00:00.065

[DataSet1] C:\Users\LENOVO USER\Documents\analysis for thesis.sav

Descriptive Statistics

	Mean	Std. Deviation	N
total performance	12.64	3.494	347
total comprehensiveness	35.69	11.619	347

Correlations

		total performance	total comprehensiveness
total performance	Pearson Correlation	1	-.082
	Sig. (2-tailed)		.127
	N	347	347
total comprehensiveness	Pearson Correlation	-.082	1
	Sig. (2-tailed)	.127	
	N	347	347

Cont. Data Output

```
CORRELATIONS
  /VARIABLES=test tsatisfaction
  /PRINT=TWOTAIL NOSIG
  /STATISTICS DESCRIPTIVES

  /MISSING=PAIRWISE.
```

Correlations

Notes

Output Created		09-Jan-2020 14:04:01
Comments		
Input	Data	C:\Users\LENOVO USER\Documents\analysis for thesis.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	347
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax		CORRELATIONS /VARIABLES=test tsatisfaction /PRINT=TWOTAIL NOSIG /STATISTICS DESCRIPTIVES /MISSING=PAIRWISE.
Resources	Processor Time	00:00:00.063
	Elapsed Time	00:00:00.026

[DataSet1] C:\Users\LENOVO USER\Documents\analysis for thesis.sav

Descriptive Statistics

	Mean	Std. Deviation	N
total performance	12.64	3.494	347
total satisfaction	39.46	7.975	347

Correlations

		total performance	total satisfaction
total performance	Pearson Correlation	1	-.013
	Sig. (2-tailed)		.810
	N	347	347
total satisfaction	Pearson Correlation	-.013	1
	Sig. (2-tailed)	.810	
	N	347	347

Cont. Data Output

```
CORRELATIONS
  /VARIABLES=test tpsychosocialf
  /PRINT=TWOTAIL NOSIG
  /STATISTICS DESCRIPTIVES

  /MISSING=PAIRWISE.
```

Correlations

Notes

Output Created		12-Jan-2020 17:15:58
Comments		
Input	Data	C:\Users\LENOVO USER\Documents\analysis for thesis.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	347
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax		CORRELATIONS /VARIABLES=test tpsychosocialf /PRINT=TWOTAIL NOSIG /STATISTICS DESCRIPTIVES /MISSING=PAIRWISE.
Resources	Processor Time	00:00:00.047
	Elapsed Time	00:00:00.177

[DataSet1] C:\Users\LENOVO USER\Documents\analysis for thesis.sav

Descriptive Statistics

	Mean	Std. Deviation	N
total performance	12.64	3.494	347
total psychosocial factors	34.60	7.178	347

Correlations

		total performance	total psychosocial factors
total performance	Pearson Correlation	1	-.047
	Sig. (2-tailed)		.385
	N	347	347
total psychosocial factors	Pearson Correlation	-.047	1
	Sig. (2-tailed)	.385	
	N	347	347