IMPACT OF STUDENTS' ATTITUDES, TEACHERS' QUALIFICATIONS AND MATHEMATICS WAEC/NECO RESULTS ON TERTIARYSTUDENTS' PERFORMANCE IN KATSINA STATE, NIGERIA

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Declaration

I, Dalha Nasiru M.ED/EDUC/7691/2009-10hereby declare that this research work is entirely the result of my independent investigation. It has not been presented in any previous application for a master in Mathematics Education (M. Ed Mathematics). All sources of information are duly acknowledged by means of reference.

……. …….

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Certification

This thesis entitled “Impact of Students’ Attitudes, Teachers’ Qualifications and Mathematics WAEC/NECO Results on Tertiary Students performances in Katsina State, Nigeria” by Dalha Nasiru has been read and approved as having met the requirements governing the award of masters degree in Mathematics Education (M.Ed Mathematics) from Department of Science Education Ahmadu Bello University Zaria

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Dedication

I dedicated this research work to my sick father, the entire members of my family, friends and well-wishers who contributed towards the successful completion of this research work. May Almighty Allah restore back the normal health of my father and compensate him with what he promised to give pious Muslims when subjected to trials (Ameen).

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Abstract

This study examined the impact of students' attitudes, teachers' qualifications and Mathematics WAEC/NECO results on tertiary students' performance in Katsina state, Nigeria. A simple random sampling technique was used in selecting five out of six tertiary institutions. The researcher used a stratified random sample of 322 students, scores of the students from their responses towards Mathematics and their Linear Algebra results from their various teachers who have different qualifications in answering six research questions and testing six research hypotheses. Pearson Product Moment Correlation (PPMC) revealed significant relationship between students' positive attitudes and their performances. Also, the PPMC revealed no significant relationship between students' negative attitudes and their performances. The Analysis of variance (ANOVA) revealed significant performance difference among students taught by teachers with different qualifications. Scheffe's test further revealed where the significant difference exists and the level of the difference. The Regression Analysis revealed significant predictive relationship between students' WAEC Mathematics results and their performances. It also revealed no significant predictive relationship between students' NECO Mathematics results and their performances. The independent t-test revealed no significant difference between male and female students' performance. Based on these findings, recommendations were given.

Abbreviations

The major terms used in this research are operationally explained below to avert any possible misinterpretation or misconceptions.

I. ANOVA: Analysis of Variance

II. IJMB: Interim Joint Matriculation Board

III. JAMB: Joint Admission and Matriculation Board

IV. JSCE: Junior Secondary School Examination

V. MAN: Mathematics Association of Nigeria

VI. NECO: National Examination Council

VII. NERDC: National Educational Research and Development Council

VIII. PPMC: Pearson Product Moment Correlation

IX. SSCE: Senior Secondary School Examination

X. STAN: Science Teachers Association of Nigeria

XI. MAQ: Mathematics Attitudinal Questionnaire

XII. UTME: Unified Tertiary Institutions Matriculation Examination

XIII. WAEC: West African Examination Council

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CHAPTER ONE

THE PROBLEM

1.1 Background to the Study

In the contemporary Nigeria, considerable attention is being paid to education as a key to sustainable development, peace and stability. Such recognition makes education an indispensable means for effective participation not only in the socio-economic development of Nigeria but also in the on-going rapid globalization (Ikoh, 2007; Agba, Ushie & Agba, 2007). The crucial importance of education as the key to genuine development and the enhancement of people's capability and talents have led to the struggle for the control of education by the federal government (Omolewa, 2001). Considering the importance of education Olubadewo (2006) believes that, the faith of the people of developing countries including Nigeria, in education is as strong as their faith in their religion. Tersoo (2005) refers to education as "The key that ignites the engine of development of any society" To Iheonu in Yakubu (2006), education generally refers to any action, which aims at deliberate initiation of a child or an individual, formally or informally into his/her culture. Therefore, it follows that the realization of national development lies on the effective implementation of the country's educational policies and performance of both teachers and students at all levels of the system.

Attitude is a hypothetical construct that represents an individual's likes or dislikes. According to Rosemund (2006), attitude implies a favourable or unfavourable evaluative reaction towards something, events, programmes, etc exhibited in an individual's beliefs, feelings, emotions or intended behaviours. Attitude affects people in everything they do and in fact reflects what they are, hence a determining factor of students' behaviour (Aiken, 2000).Attitude towards an event

is practically as important as the event itself, when it comes to facing it constructively. One's attitude towards subjects when faced constructively can lead to better assimilation, understanding, interest, self-confidence and optimum production with positive outlook to a career in such a field (Melgosa, 2002). Attitudes are relatively less stable than personality traits and can be changed both across time and across situations in virtue of individual's interaction with the environment (Robinson, Simpson, Huefner& Hunt, 1991).

Evans (1965) opined that, it is generally accepted that attitudes are learnt and the wide spread interest in the process bears witness to its importance in the modern world. Since attitudes are learnt, they are moldable i.e they change with experience of the stimulus object and with social rules or institutions (Binder & Niederle, 2007). Ormerod and Duckworth (1975) suggested that, the attitudes of students are likely to play a significant part in any satisfactory explanation of variable levels of performance shown by students in their school science and Mathematics. Similarly, Bajah (1998) explained that the position and negative attitudes of students themselves have been suggested as a contributory factor to misconceptions.

Attitudes towards science and Mathematics, and science teaching are issues with long standing attention and interest in science education research (George, 2006). What students know about science lessons is not the only important thing but their feelings about the lessons are also important (Ebenezer & Zoller, 1993). If students are ensured to acquire successful experiences and positive feelings at the beginning of their science and Mathematics education, they will be more successful in their scientific experiences in the future. Thus, they will acquire positive attitudes intended for science and Mathematics, be interested in science and Mathematics, and be glad to learn science and Mathematics during their life cycles. However, if they have negative

experiences in science Mathematics lessons, they will avoid science and develop negative attitudes towards science and Mathematics in the rest of their lives (Simpson & Oliver, 1990).

Teacher quality is the most important school related factor influencing students' achievement (Rice, 2003). The National Policy on Education as cited in Ibukun (2009) states that, no education system could rise above the quality of teachers in the system. Ibrahim (2000) believed that teacher quality could go a long way to bring about pupils' high academic achievement. The Baguada seminar reports on Quality and Quantity in Nigerian Education (NERC, 1980) as cited in ESA (2005) also shared the consensus that teachers are the main determinants of quality in education. If they are apathetic, uncommitted, uninspired, unmotivated, lazy, immoral, and anti-social, the whole nation is doomed. If they are ignorant in their disciplines and thus impart wrong information, they are not only useless but also dangerous. Therefore, the kind of knowledge imparted by qualified teachers to students may determine what the next generation will be like.

Scholars have argued the necessity of skilled teachers for effective learning. Ngada as cited in Fajonyomi (2007) emphasized that, the success or failure of any educational programme rests majorly on the adequate availability of qualified, competent and dedicated teachers. The teacher serves as the most important science curriculum implementer in the classroom (Aweh, 2004). Teachers all over the world are recognized as critical factors in the delivery of quality education at whatever level (Ike & Iheberenu, 2008). The recognition of the key role of teachers in any curriculum implementation has prompted several interactive studies in Nigeria (Awotua-Efebo, 2002; Effiong & Enukona, 2004; Kalu, 2004; Edu, 2006). These studies have all acknowledged a need for improvement in the level of abilities in teachers for them to be able to effectively teach in schools.

The availability of qualified teachers in schools is low (Ngada, 2008). The reasons may not be farfetched from the fact that teaching is seen as a dumping ground for any unemployed school leavers, irrespective of their area of specialization. This group of able-bodied young men and women thus, handle the job as a bye-pass venture to their desired ends. Consequently, their inputs into the job would be very low since it lacks the dedication demanded by the job. The few ones that seem to show little dedication lack the technical expertise. The resultant effect on the students' performance is catastrophic. The major evil done by this is half backed and shallow knowledge students who often perform poorly in their examinations. This eventually culminates to a decline in the educational standard. Therefore, quality of teachers for better service delivery needs to be assessed on a regular basis.

Schools and public examining bodies conduct examinations and use the results as a helpful guide/key to promote teaching subjects, maintain academic standards, assess the effective materials, classify and award certificates, diagnose and remedy learners' abilities and make students learn regularly and consistently as such, examination is necessary. Abe (2006) defines an examination as a standard situation designed to elicit sample of an individual's behavior. Examination is therefore an integral part of the teaching-learning process. It could be internally or externally conducted. Internal examinations (School-based examinations) are usually developed and administered by schools using teacher- made tests. On the other hand, external examinations (public examinations) are developed and administered by public examining bodies. Public examining bodies in Nigeria include the West African Examination Council (WAEC), The National Examination Council (NECO), The National Business and Technical Examination Board (NABTEB), The Joint Admission and Matriculation Board (JAMB), and the National Teachers' Institute (NTI).

The West African Examination Council (WAEC) was established in 1952 following the acceptance of the Jeffery report by the then colonial government(s) in the Gold cost (now Ghana), Nigeria, Sierra-Leon and the Gambia; who passed appropriate ordinances in their legislative assemblies in 1951. The ordinances charged the council with the responsibility of determining the examinations required in the public interest in West Africa and empowered it to conduct such examinations and award appropriate certificates. The WAEC became in charge of many local and overseas examinations. With time, signs of its being overburdened were evident. Such overburdening leads many problems such as delay in the publication of results, inappropriate sitting arrangements especially for the private candidates and examination malpractice. In 1977, there was public outcry over the credibility of public examinations conducted by WAEC. This led the Federal Government of Nigeria to set up the Justice Sogbetun Judicial Tribunal of Inquiry into the affairs of WAEC. Among the tribunal findings were that WAEC had excessive load, having taken up the conduct of nearly all the public examinations in the country and this had in turn affected drastically the effective conduct of West African Senior School Certificate Examination (Nkwocha, 2002).

The National Examination Council (NECO) came into being in the year 1999. Its mandate at its inception was to complement WAEC, the conduct of School-based Senior School Certificate Examination (SSCE) from 2000. While some Nigerians saw the establishment of NECO as an opportunity for choice of examining body to patronize, others doubted its capacity to conduct reliable examination that could command widespread national and international respect and acceptability. The NECO conducted its first SSCE in the year 2000. Confusions and mix-ups were evident when the result was out, the result was simply fantastic for every candidate and there were allegations of leakages of question papers before the examination and that candidates

obtained credit passes in the subjects they never sat for. To this end, Uchebuaka (2001) commented that NECO is not a true examining body, but is only out to sabotage the educational effort being made in the country. Commenting on the same issue Leigh (2001) said it would take NECO more than ten years to acquire the necessary expertise to successfully handle a crucial examination like the SSCE.

Examining bodies are tasked with maintaining a common standard in the development and administration of public examinations. According to Nworgu (1992), examining bodies were set up to promote education, coordinate education programme and control and monitor the quality of education in educational institutions, the essence of which is the organization of public examinations to provide uniform standards to all testees irrespective of the type or method of instruction they have received. Students admitted by WAEC and NECO version of SSCE are assumed to possess similar academic strength needed for undergraduate activities. In the past, some calls have been made for the scrapping of NECO for the fear that the SSCE it issues is not as valid as that of WAEC (Ejinkeonye, 2004; Falaye & Afolabi 2005).

Senior School Certificate Examination (SSCE) serves as an end of course evaluation for all secondary school graduates. The purpose of this examination is to ascertain to what extent students in a particular course have achieved the course or educational objectives (Offor, 2001). SSCE is one of the requisite qualifications for entry into Nigerian tertiary institutions. A candidate must possess the minimum requirement with respect to SSCE (usually five credits in not more than two sittings) before he/she is given admission into any Nigerian University (NUC in Adekunle, 2003). Students obtain an SSCE by passing examinations administered by either WAEC or NECO (Dibu-Ojerinde & Falaye, 2005). According to Adeyegbe (2004), the tests administered by various public examining bodies are often better developed than the ones

prepared by the teachers in the school settings, universities inclusive. However, public examining bodies responsible for the award of certificates and placement of students in the tertiary institutions of learning have been facing many criticisms due to the poor performance or poor quality of our graduates. Fagbamiye (2004) believes that, many Nigerians are justifiably apprehensive that in spite of the fact that so much money is being expended on providing social welfare services particularly education, we are comparatively worse off in 2003 than we were in 1976.

The National Policy on Education (F.M.E, 2004) stipulated some broad aims of secondary school education, which include:

1. Preparation for useful living within the society

2. Equipping students to live effectively in our modern age of science and technology

3. Inspiring its students with a desire for achievement and self-improvement both at school and in later life

4. Preparation for tertiary education

In reality, these aims are very often defeated as most secondary school graduates fail to adapt adequately to society and fail to succeed in post-secondary school education, despite their possession of excellent certificates. For some time now, there have been increasingly vocal and widespread criticisms of the examination system in Nigeria. The public likewise disparages the falling standard of education as evidenced by the lack of skills and personal integrity of many school leavers (Udor & Ubahakwe, 1979; Ololube, 2008b). In addition to the misgivings and criticisms expressed in respect of WAEC and NECO is the current concern over the general poor

performance of students in tertiary institutions of learning. Experience has shown that successful candidates with the minimum requirement for admission find great difficulty in coping with academic work in their courses of choice. One begins to wonder what has become of the process, bringing to the question of the quality of the entrance qualification, the SSCE.

Katsina state is one of the 36 states in Nigeria. It is located in the North-West Geo-political zone of the country. Kano, Jigawa, Zamfara, Kaduna States, and the Niger Republic bounded it. It has six science and technology tertiary institutions of learning. They are, Umaru Musa Yar'adua State University, Katsina University Katsina, Federal College of Education Katsina, Hassan Usman Katsina Polytechnic, Isa Kaita College of Education Dutsinma, and the newly created Federal University Dutsinma. This study examined the impact of students' attitudes, teachers' qualifications, and Mathematics WAEC/NECO results on tertiary students' performance in Katsina state as the case study.

1.2 Statement of the Problem

Effective teaching and learning of Mathematics in tertiary institutions depend to a large extent on students' positive attitudes towards Mathematics, teachers' own knowledge of the content and ability to adequately deliver the instructions to the students, and students' entrance qualifications. However a lot of variables may hinder effective learning, such variable may be lack of interest, lack of qualified teachers, and lack of good mathematical background among others. Development of positive attitudes towards science and Mathematics, which has always been a constituent of science education, is increasingly a subject of concern (Trumper, 2006). Students' beliefs and attitudes have the potential to either facilitate or inhabit learning. Attitudes can distort the perception of information and affect the degree of their retention. According to Ifayefunmi

(1984), poor attitude is an important factor causing failure in subjects like Mathematics and other sciences and hence students' development of fear and hatred for teaching-learning process. Hence, the nature of the attitude of students towards learning Mathematics needs to be studied on a regular basis.

Many research findings have attributed the poor performance of students to the poor knowledge, which was brought about by the inadequacy of specialist teachers in schools (Ademujimi, 2002; Akinduro, 2003; Bankole, 2002; Ogundare, 2005). Producing qualitative teachers is a problem that ranked very high amongst the problems associated with educational system (Pelumo, 2007). The educational analysis carried out in Nigeria by National Economic Empowerment and Development Strategy (NEEDS, 2005) indicated that more than 49% of the teachers in Nigeria are unqualified. It is therefore of paramount importance to examine the impact of teachers' qualifications on students' achievement on a regular basis.

Studies by Gbore (2006), and Obioma (2008) have shown that public examinations like WASSCE, UME and SSCE though possess content validity but have very low predictive validity of achievement in the universities for first year CGPA and fourth year final CGPA. Poor academic achievement among students limits their potential abilities to compete effectively in an ever increasingly competitive global village. Academic failure is not only frustrating to the students and the parents, its effects are equally grave on the society in terms of dearth of work force in all spheres of the economy and polity (Aremu, 2000). Hence, the issue of whether or not a relationship exists between students' attitudes, teachers' qualifications, Mathematics WAEC/NECO results and students' learning outcomes in Mathematics constituted the problem of this study.

1.3 Objectives of the Study

The study aimed at finding the impact of students' attitudes, teachers' qualifications and Mathematics WAEC/NECO results on tertiary students' performance in Katsina state. To achieve these, the study focused on the following objectives.

1. Find out the impact of students' positive attitudes on their performance in Linear Algebra
2. Find out the impact of students' negative attitudes on their performance in Linear Algebra
3. Identify the impact of teachers' qualifications on students' performance in Linear Algebra
4. Find out whether WAEC Mathematics results can predict students' performance in tertiary institutions
5. Find out whether NECO Mathematics results can predict students' performance in tertiary institutions
6. Find out the impact of gender on students' performance in Linear Algebra

1.4 Research Questions

To facilitate the investigation of the problem of this study based on the objectives stated above, this study aimed at answering the following research questions:

1. What is the impact of students' positive attitudes on their performance in Linear Algebra?
2. What is the impact of students' negative attitudes on their performance in Linear Algebra?
3. What is the impact of teachers' qualifications on students' performance in Linear Algebra?
4. Is there any significant relationship between students' performance in WAEC Mathematics and their performance in tertiary institutions?

5. Is there any significant relationship between students' performance in NECO Mathematics results and their performance in tertiary institutions?

6.Does gender affect students' performance in Linear Algebra?

1.5 Research Hypothesis

To facilitate the investigation of this study, six research hypotheses were formulated as follows

HO_1: There is no significant relationship between students' positive attitudes and their performance in Linear Algebra

HO_2: There is no significant relationship between students' negative attitudes and their performance in Linear Algebra

HO_3: There is no significant performance difference among students' taught by teachers with different qualifications

HO_4: There is no significant relationship between students' performance in WAEC Mathematics and their performance in tertiary institutions

HO_5: There is no significant relationship between students' performance in NECO Mathematics and their performance in tertiary institutions

HO_6: There is no significant difference between the mean score of male and those of female in Linear Algebra

1.6 Significance of the Study

Poor students' achievement in Mathematics is a matter of great concern to Nigeria as a developing nation. The proper teaching and handling of science and Mathematics in schools will result in the training of the minds of students in the understanding of the world around them and in the acquisition of appropriate skills, capacities, competencies necessary for them to live and contribute to the development of their society. The study hopes among other things to, strategically identify the impact of students' attitudes, teachers' qualifications, and Mathematics WAEC/NECO results in relation to poor performance of students in Mathematics with specific emphasis on Katsina state with a view to recommend possible solutions to the factors identified.

The findings of this study can play an important role in preparing information for science (Mathematics) curriculum planners in identifying demands and needs of students to develop science(Mathematics) curricula and Mathematics textbooks. It could also be used to guide science(Mathematics) educational planners about the need for qualified teachers to facilitate effective teaching and learning in Mathematics.

Exploring predictive validity of WAEC/NECO Mathematics results on students' performance in tertiary institutions will help to reaffirm the criteria being used for admission into science-based programmes. It will also contribute to the efforts being made in the country to revive the educational sector from its falling standard, which has become a general concern at present. If the two examinations under review are found to have high predictive validity, it will help to restore back the confidence the public has lost in them, otherwise it will be an opportunity for them to use corrective measures to improve on the conduct of their examination and certification of their results.

The study will provide a framework for organizing workshops and seminars for teachers, students, public examining bodies and the public at large. It will also serve as a source of motivation for research in the same area and other areas.

1.7 Scope/Delimitation of the Study

The two public examining bodies WAEC and NECO that are responsible for the conduct of SSCE in Nigeria conduct other examinations such as Junior Secondary Certificate Examination (JSCE), National Common Entrance Examination (NCEE), and Gifted Examination into Federal Academy Suleja. This study covered only the Senior Secondary Certificate Examination SSCE (Mathematics) conducted by the two examining bodies. The study also delimited its scope to only students of Umaru Musa Yar'adua University Katsina, Federal University Dutsinma, Hassan Usman Katsina Polytechnic, Federal College of Education Katsina and Isa Kaita College of Education Dutsinma.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

The review of literature is presented under three headings viz, theoretical framework, empirical reviews and implications of literature reviewed to the present study. Below are details of each of the sub sections.

a. Theoretical Framework

- Concept of Attitude
- Theories of Attitude Change and Formation
- Attitude and Learning
- Quality Education and the Roles of Teachers
- Concept of Test
- Characteristics of Good Test
- Concept of Predictive Validity
- Concept of Academic Achievement
- Concept of Educational Assessment
- Educational Assessment in Nigeria

2.2 Theoretical Framework

This study reviewed some theories that explained learning and the methods for achieving favourable learning outcomes with a view to selecting the ones that appropriately apply to the study.

2.2.1Concept of Attitude

Attitude as a concept is concerned with an individual's way of thinking, acting, and behaving. It is a multi-faceted construct that is why there is no consensus among researchers on the meaning of attitude. One definition that is commonly used to describe attitudes includes the three components of cognitive, affective, and behavioural (Kruglansky, 2007). These three components are defined by Reid (2006) as: knowledge about the object, or the beliefs and ideas component (affective); and a tendency towards action, or the objective component (behavioural).

Zelly, Marianne, and Elaine (2005) postulate that attitudes are generally positive or negative views about a person, place, thing or event which are often referred to as the attitude object. Salta and Tzoughraki (2004) defined attitude as the tendency to think, feel or act positively or negatively towards objects in our environment. Attitude in the words of Ubom (2001) refers to an individual's perception and reaction to a task, which is expected to be carried out or executed in a group, institution, school setting or an organization. Attitude is the way an individual feels or thinks about a thing (Horbey, 2001). Based on one's attitude or feeling towards something, one is predisposed to behave in a particular way. Thus, attitude is a function of antecedent stimulus conditions and, in turn, as a determinant of observable behaviour that follows. Attitude reflects perceptions maintained by individuals. These perceptions structure individual's behaviour and represent a key interior for change.

During the growth period of every child, his/her home, neighbourhood, culture and the mass media confronting him/her continually inculcate into him/her certain values, beliefs, and opinions. Some of these values he/she accepts, and some he/she rejects. He/she may also acquire certain values completely alien to his/her culture. These acquired values in his/her social context shape his/her attitudes to various things, issues, and objects. Once these feelings, thoughts and cherished opinions are firmly rooted in his/her personality, he/she remains predisposed to act in ways corresponding to his/her attitudes. When children start school, their attitude towards learning is derived primarily from their home environment. However, success or failure in the class room impacts on these initial attitudes and is shaped by early school experiences which in turn, impact on subsequent classroom situations (Lumsden, 1994) Apart from home, which wields an important influence on attitude change or formation, other important builders are schools, religious institutions, peer groups and so on. Attitudes are often built up slowly and are arrived at, not through the result of careful thinking and deliberation but are rather motivated by emotions, which have some reasons behind them.

Research suggests that there are different components of Attitude. These are the cognitive component, the behavioural component, and the affective component (Maio & Haddock, 2010). The cognitive component of attitude is what the individual thinks or believes about the attitude object. An example is that a person might think that a snake is a dangerous reptile. The affective (evaluative) component of attitude is the feelings or emotions of the individual associated with the attitude object. For example, the sight of a snake may evoke the feeling of fear in the individual. The behavioural (operational) component of attitude is the tendency to respond in a certain way to the attitude object. An example is a person choosing to run away or scream upon seeing a snake. Hence, the cognitive, affective and behavioural components of attitude are

interrelated and connected. When the three components are positively interconnected, the individual has a positive attitude towards the concerned object, person or situation. The reverse is also the case if the three components are negatively interconnected.

Attitudes held by individuals may be simple or complex, implicit or explicit, stable or unstable, temporary or permanent, and superficial or fundamental. Attitudes are best expressed when individuals make statement about their feelings or opinions about certain objects, issues or things. Judgments based on insufficient facts are likely to yield wrong results and thereby, develop biased attitudes. Attitude is said to be positive or high when an individual's response to task or programme is favourable and when he/she shows commitment to his/her duties. It is said to be negative or low when an individual expresses a nonchalant response, with regard to what is expected of him/her in the given situation. Majority of the attitudes of a child are formed or acquired from members of his/her family as the child grows. Interactions with people at school and neighbours also feed him/her with new and additional information that guides his/her attitude to objects and persons.

2.2.2 Theories of Attitude Change and Formation

Research has shown that formation of attitude is experimental. People form attitudes through their experiences in life. Social psychology explains how attitudes are formed using three major learning theories which are classical conditioning; operant conditioning, and observational learning. Propounded by Ivan Pavlov, classical conditioning is a procedure for modifying behaviour in which repeated pairing of conditioned stimulus with an unconditioned stimulus leads to the development of a conditioned response (Ntim, 2010, Lineros & Hinojosa, 2012) classical conditioning entails neutral stimuli that naturally elicit a response. Children for

instance, become fans of football clubs of their fathers. They grow up believing that those particular football clubs are the best and develop the same passion for the club. Hence, we form attitudes according to how we are conditioned or how our experiences condition us.

B.F Skinner's operant conditioning theory is a form of learning in which a response is made in anticipation of a stimulus. In operant conditioning, c increases the likelihood that behaviour will be repeated (Ntim, 2010). Behaviours that are followed by positive consequences are reinforced and are more likely to be repeated than are behaviours and attitudes that are followed by negative consequences (Moris & Maisto, 2001). Operant conditioning requires the use of reinforcement. A case in a point is if a child's mother smiles at her any time she picks something up for her, the child begins to realize that it is good to be helpful and she is likely to repeat the behaviour. Conversely, if a mother screams at a child for picking up a puff of a piece of cigarette, the child will grow up having unfavourable attitude towards smoking and probably those who smoke. This is due to the negative consequences of her action.

Finally, people also learn attitude through observation of people around them, especially if they are people they admire, respect or hold in high esteem. Children therefore invariably observe the attitude of parents and teachers and learn a lot from them. Observational learning theory propounded by Albert Bandura posits that behaviours are acquired by watching another or the model that performs the behaviour (Yara, 2009).

The formation of attitude is the belief that attitudes are acquired or learnt. Just like any other habit, it is not inherited. As people acquire information and facts, they also acquire feelings and values associated with these facts. Once the attitudes are formed, the individuals are no longer passive. He/she begins to process new information in terms of what he/she has learnt. He/she

tends to reject inconsistent information and accept more readily information consistent with his/her attitude. Thus, well-established attitudes tend to be extremely resistant to change.

2.2.3 Attitude and Learning

Performance appears generally to be the fundamental goal behind every life struggle, but the positive platform has consequential effects of improving the worth of the students and can only be achieved through acquisition of positive learning attitudes (Festus, 2007). An individual acquires attitudes that match his/her personal relativity that is his/her status in relation to other people. Some attitudes are also derived from personal experience. Effects of attitudes on learning influence personality, interpersonal relationship, behaviour and school learning. Learning clearly has an affective component and, according to Kind, Jones, and Barnby (2007), developing a positive attitude is important for students' achievement.

Attitude reveals a balance from interaction with several variables of the environment. Thus, the attitude of a child to school and to learning activities reveals a balance between the child, the school and any other environmental factor, like home. If a child has a positive attitude towards school, he/she will be interested in what goes on in the school. He/she will attend school promptly, pay serious attention to his/her study and carry out all learning activities. Some factors that influence students' attitudes towards learning include peer group influence, personal adjustment, poverty level, parental influence, sex and teachers' attitudes (Mike, 2005).

Negative attitude towards school usually signifies that the child's interest and energies are aimed elsewhere. The conditions that influence attitude to school negatively include physical conditions that result in pains, fear and anxiety that are caused by threats from teachers or peer group, frustrations that are caused when students attempts are not appreciated and goals directed

activities are blocked, humiliations and embarrassment resulting from repetitive lessons and teachers monotonous method of teaching and excluding student's participations. These conditions can make student desire an escape from school activities. Negative attitude to school are manifested when a child exhibits attitudes of lateness, truancy, bullying, rudeness, self-assertion noise making, laziness and so on.

Some authorities regard attitudes towards Mathematics as just a like or dislike for Mathematics, while others extended the meaning to embrace beliefs, ability, and usefulness of Mathematics. For Zan and Martino (2007), attitude towards Mathematics is just a positive or negative emotional disposition towards Mathematics. Attitudes towards Mathematics has cognitive, affective, and behavioural components, and like any other kind of attitude, it can be formed through any of the three process described earlier. A student can develop positive attitude towards Mathematics because he/she learns to associate positive experiences or events with it. Also, positive reinforcement creates room for the formation of positive attitude for Mathematics.

2.2.4 Quality Education and the Roles of Teachers

Quality education can be looked at as the extent to which education accomplishes the various roles ascribed to it in the National Policy on Education, such as usefulness of education for employment, relevance to the developmental needs of the recipient individuals and the society in which the individuals live and operate as citizens and achievement of students. Quality education should elicit favourable feedback from stakeholders. The outputs of quality education should be intellectually sound, socially adaptable, technologically skilled, vocationally competent and morally sound. To achieve quality education, we need quality teachers to deliver quality teaching and learning.

Educational planners, policy makers and administrators all over the world have realized that many meaningful improvements in the quality of education that students receive are highly dependent on the quality of teachers (Anderson, 1991). This situation is especially true in the developing countries where teachers are usually the only adults who transact educational inputs to the students. Teachers are a vital pre-requisite for students' attainment of educational goals as well as bedrock of all learning that takes place in schools. Aghenta (2000) described teachers as the key factor in formal education while Adeyemi (2004) regarded teachers as the hub of education.

Ehindero (2004) opined that teaching is one of the most influential professions in the society while Oyekan (2000) asserted that teaching is a noble profession that calls for the highest degree of responsibility. Adodo (2007) argued that, one key overriding factor for the success of students' academic achievements is the teacher. Darling-Hammond (2000) corroborated the above assertions by saying that schools can make a difference, and a substantial portion of that difference is attributed to teachers. Considering the importance of teachers as determinants of success of students, Owolabi (2007) recommended that government should find all possible means to retain veteran and experienced teachers who are willing to serve so that they can contribute their wealth of experience to improving educational standards.

Quality teachers are often seen as good teachers and are considered those who exhibit desirable traits and uphold the standards and norms of the profession. Quality teachers are also considered those who bring about positives change in students' learning. These teachers are called effective (Berliner, 2005) or successful (Fenstermacher and Richardson, 2005). Good teachers are always optimistic about what their pupils can achieve, whatever their background or circumstance (Kappan, 2006). Good quality teachers are more important than any other factor in teaching-

learning process (Darling-Hammond, 2007; Linda, 2007). This view is further supported by Nkwodimah's (2003) submission that, the teachers' quality will inevitably be seen in the citizens tomorrow.

Okebukola as cited in Ngada (2008) while remarking on teachers' quality observed that over 80% of the respondents in a survey research were of the view that teachers are carriers of weakness. These weaknesses include among others, inadequate exposure to teaching practice, poor classroom management and control, shallow subject matter and lack of professionalism. The qualities of teachers such as teaching methods, years of teaching experience, quality of training received, and amount of training qualification is the most important determinants of educational standard at all levels (Audu, 2001; Badmus, 2001; Maduabum, 2001; Abbas, 2006). Seweje and Jegede (2005) opined that, the ability of a teacher to teach is not derived only from one's academic background but it is based upon outstanding pedagogical skills. For teachers to present information effectively to their students, they must find a balance between their subject knowledge and the methods they use (Brewer, 2003). The professional qualities of a teacher have to do with the following mastery of the subject matter, sense of organization, ability to motivate students, ability to clarify ideas, and good imagination (Ajayi, 2009).

2.2.5Concept of Test

Test is a very crucial aspect of teaching. It has been the most sensitive dominant and important instrument used by effective teachers and examining bodies such as JAMB, NTI, NECO and WAEC for measuring performance in various teaching subjects for the purpose of placement, prediction, or certification. Tests assess the extent of curriculum content coverage, and the reliability of instructional methods on the part of the teacher. Test such as these are supposed to

be of moderate standard. In other words, such tests are supposed to be discriminating, reliable, valid, and of moderate difficulty level.

However, Cronbach (1970) states that there is no fully satisfactory definition for the word test. He, however, went ahead to define a test as a systematic procedure for observing a person's behaviour and describing it with the aid of a numerical scale or a category system. According to Belts (2001), a test is an instrument or system procedure for measuring a sample of behaviour. In the field of education, different types of test are administered to improve educational practices. Some of the notable tests in education include:

Achievement test: An achievement test is a test of developed skills, knowledge or proficiency based on something learned or taught. It is designed to determine student's knowledge in a particular subject area. In other words, it is designed to determine if the student has met the course objectives.

Achievement test may be criterion-referenced test or norm-referenced test. A criterion-referenced test describes an individual's achievement in terms of stated instructional objectives while norm-referenced test describes how well a student performs in relation to some group called the "norm-group." Achievement test can also be classified into two according to their construction procedure. These are the teacher made and standardized achievement tests. Mehrens and Lehmann (1975) give the characteristics of a teacher made test as follows:

1. There is usually no uniform directions specified for administration and scoring

2. The classroom teacher alone determines the test content

3. Construction may be hurried and haphazard

4. Often, there is no table of specification, no items tryouts and the quality of the test may be very poor

5. They are best suited for measuring particular objectives set by the teacher and for intra class comparisons

Teacher achievement test and aptitude test scores have been used to predict academic and occupational success of students on a countless area (Adewunmi, 1993).

Aptitude test: An aptitude test is designed to appraise the candidates' innate abilities and potential after receiving appropriate education or job training. It is also called employee selection test.

Diagnostic test: A diagnostic test is individually administered test designed to identify some specific case of difficulty in acquiring a skill in the learning processes. It is useful in suggesting specific remedial actions that might help to improve mastery of that skill.

Personality test: A personality test is designed to appraise the individual's typical or habitual way of acting. It usually involves a standardized series of questions or tasks, used to describe or evaluate a subject's personality characteristics. It measures non-intellective aspects of an individual's psychological make-up.

Placement test: A placement test is designed to determine students' accomplishment levels for the purposes of situating them in appropriate courses.

Standardized test: A standardized test is a test that is administered and scored under uniform (standardized) conditions. Standardized tests are usually commercially prepared for nationwide use to provide accurate and meaningful information on student's level of performance relative to

others at their age or grade levels. Achievement and aptitude tests defined above are the two major kinds of standardized test. Gronlund (1981) summarizes the characteristics of a carefully constructed standardized achievement test as follows:

1. The test items are developed by educational and test specialists.

2. They are of high technical quality.

3. They are selected based on difficulty, discriminating power, and relationship to a clearly defined and rigid set of specifications.

4. Directions for administration and scoring are so precisely stated that the procedures become standard for different users of the test.

5. Norms (frames of reference for the interpretation of test scores) based on representative group of individuals, are provided as aids in interpreting the test scores. These norms are based on various age and grade groups on a national, regional or state level.

6. Equivalent and comparable forms are provided for a standardized achievement test as well as information concerning the degree to which the forms are comparable.

7. A test manual and other accessory materials are provided as guides for administering and scoring a standardized achievement test, for evaluating its technical qualities, and for interpreting and using the results.

The word "standardized" in a test title means only that all students answer the same questions and a large number of questions under uniform directions and uniform time limits, and there is a uniform and standard reference group to the performance of which a student's performance can be compared (Thorndike & Hagen, 1969). The word "standardized" does not mean that the test

provides standards of achievement that students should or could reach at a particular grade level. This means conscious efforts must be put in place to ensure that a standardized test is valid. A standardized test is valuable particularly in two kinds of situation. A situation in which comparison need to be made for instance, comparison of an individuals' achievement level in different subject matter areas or comparison of groups or classes taught by different methods.

A situation in which there are large number of people about whom decision need to be made, but for whom the decision maker has no common or comparable data. For instance, a secondary school that admits students from various Primary schools will be faced with the problem of assigning students to classroom groups and the teachers are faced with the problem of determining the achievement status of individual student in order to plan effective learning activities. All the students enrolling into the school will have marks of some kind from their previous teachers but such marks are difficult to interpret. This is because different criteria may have been used by different teachers in awarding marks to their students. A standardized test can provide such data.

The first major step towards standardization of psychological testing came in 1905 when a committee of the American psychological association defined procedures that could be followed in all laboratories. The first important steps towards the scientific use of measurement in education were taken by Horace Mann (Stanley & Hopkins, 1972). Mann analyzed the weakness of the oral exams then in vogue and of the superiority of written exams. He used concepts that have become the cornerstone of today's theories and which are now known as validity, reliability, and usability. The senior secondary certificate examination conducted by NECO and WAEC are standardized achievement tests that measure student's attainment of instructional objectives in specific subject areas.

2.2.6Characteristics of a Good Test

For a measuring instrument to be considered appropriate for any particular use, it must possess some qualities. The process of establishing how appropriate a test is requires testers to examine some psychometric properties of such a test (Sambo et al, 2004). Psychometric properties are the technical properties of a test used for measuring mental, abilities and processes. The following characteristics of a good test have the consent of a number of authors.

Comparability: A test possesses comparability when scores resulting from it can be interpreted in terms of a common base that has a natural or accepted meaning. The comparability quality of a test is in form of comparability between: standards in examinations, different subjects, sexes and so on. Its importance is especially in a system of examination where certificates play a great role in determining an individual's success.

Comprehensiveness: A good test should cover the whole syllabus. In other words, it should include items from different areas of materials assigned for the test as well as covering all the anticipated objectives. Due importance should be given to all the relevant learning materials.

Discriminating power: Discriminating power of the test is its power to discriminate the upper (high achievers) and the lower (low achievers) groups who took the test. The test should contain different difficulty level of questions. This is possible if the marks in the test are well spread out. Standardized achievement tests are designed to draw distinctions between levels of attainment, describing the levels in terms of marks, grades or simply pass/fail (Hudson, 1973). He added that given the need for and the existence of grading schemes in public examinations, it is obviously the responsibility of test experts to make these distinctions as accurately as possible. A test result

that clearly separates the high achievers from the low achievers is said to have high discrimination ability.

Economy: Cost of test is relatively unimportant in selecting a test. If two tests are equally good in all the characteristics of a good test then we should go for that which cost less. However, quality should not be undermined because of cost.

Interpretative ease: The success or failure of a testing programme is determined by the use of test results. If they are interpreted correctly and applied effectively, they will contribute to decisions that are more educational. If the test results are misinterpreted, misapplied, or not applied at all, they will be of little value (Gronlund, 1981).

Objectivity: Objectivity means that if the test is marked by different people, the score will be the same. Marking process should not be affected by the marking person's personality. In other words, the test should be free from personal biases in interpreting its scope as well as in scoring the responses. Objectivity of a test can be increased using more objective type test items and the answers are scored according to model answers provided.

Objective baseness: The test should be based on pre-determined objectives. The tester should have definite idea about the objective behind each item.

Practicability: Gronlund (1981) states that in selecting tests and other evaluation instruments, practical consideration cannot be neglected. He highlighted administrative ease as an important quality to seek in a test, especially if the test is to be administered by teachers or testers with limited training. For this purpose, the directions should be simple and clear and the subsets should be few. He added that administering a test with complicated instructions and a number of subsets is tasking even to an experienced examiner. For an examiner with little experiences, such

a situation is likely to result in errors in giving directions, timing, and other aspects of administration that are likely to affect the results.

Reliability: Reliability refers to the test's consistency. If the same test were administered a second time under equivalent conditions, the same result should occur (Gage &Berliner, 1998). Reliability in the words of Adeoye (2002) is consistency and accuracy of a test. A test is considered reliable if it is taken again by the same subjects under the same circumstances and the score average is almost constant, taking into consideration that the time between the test and the retest is of reasonable length. Ukwuije and Orluwene (2009) found some of the factors that affect reliability include teacher's bias and power motivation, which cause the teacher to be careless, unfair, vicious, and indulgent. Unfortunately, it is impossible to calculate reliability exactly, but there are several different ways to estimate it. Below are some of the ways of estimating reliability.

Test-retest method: To determine the reliability of empirical measurements using test-retest, the same test is administered to the same group after a reasonable period. The scores are tabulated and correlation is calculated. The higher the correlation the more the reliability

Split-halves method: This method requires the total scores be divided into halves say even and odd and the correlation between the two sets of scores determined. This correlation only estimates the reliability of each half of the test. It is more practical in that it does not require two administrations of the same or an alternative form test.

Internal consistency method: This method requires the splitting of items neither into halves nor into the multiples administration of instruments. The method is used to judge the consistency of

results across items on the same test. Essentially, one is comparing test items that measure the same construct to determine test internal consistency.

Parallel forms method: This method is determined by comparing two different tests that were created using the same content. This is accomplished by creating a large pool of test items that measure the same quality and then randomly dividing the items into two separate tests. The two tests should then be administered to the same subject at the same time.

Scorability: This means that each item in the test has its own mark related to the distribution of mark set.

Simplicity: This means that the test should be written in a clear, correct, and simple language. It is important to keep the method of testing as simple as possible while still testing the skill intended to test (avoid ambiguous questions and instructions).

Validity: Validity refers to the degree to which evidence and theory support the interpretations of test scores entailed by proposed uses of tests. Validity reflects whether the test measures what it was supposed to measure (Ornstein &Lasley, 2000).A test is valid if its results are appropriate and useful for making decision about an aspect of students' achievement (Gronlund & Linn, 1990). Technically, validity refers to the appropriateness of the interpretation of the results and not to the test itself, though colloquially we speak about a test being valid. Validity is not determined by single statistic, but by a body of research that demonstrates the relationship between the test and the behaviour it is intended to measure. The three types of validity namely content, construct, and criterion related validity are discussed below:

Content Validity: A test is said to have content validity if the items in the test constitute a representative sample of the total course content to be tested. In the words of Abiri (2006)

content validity defines the extent to which contents of a test correspond to those of the subject matter. This is ascertained by comparing the contents with the behavioural objectives of the subject matter in question. Anastasi (1976) sees content validity as the systematic examination of the test content to determine whether it covers representative samples of the behaviour domain to be measured.

While discussing content validity, it is worth considering the term "face validity." Anastasi (1976) states that face validity are not validity in the technical sense. It does not refer to what the test actually measures, but to what it appears superficially to measure. Face validity emphasized that the papers on which test items are to be written should look professionally produced, be easy to read, no smudges or typing errors, have clear instructions and an example for each section.

Criterion-related Validity: A test is said to have criterion-related validity when the test has demonstrated its effectiveness in predicting criterion or indicators of a construct. This approach is concerned with detecting the presence or absence of one or more criteria considered to represent trait or construct of interest. One of the easiest ways to test for criterion-related validity is to administer the instrument to a group that is known to exhibit the trait to be measured. There are two different types of criterion-related validity namely concurrent and predictive validity.

Concurrent validity occurs when the criterion measures are obtained at the same time as the test scores. This indicates the extent to which the test scores accurately estimate an individual's current state concerning the criterion. Predictive validity occurs when the criterion measures are obtained later after the test. In other words, it is the degree of accuracy of how a test predicts the level of performance in an activity, which it intends to foretell.

Construct Validity: A test is said to have construct validity if it demonstrates an association between the sets scores and the prediction of a theoretical trait. It involves explaining the test scores psychologically.

2.2.7Concept of Predictive Validity

A test is said to have predictive validity if an individual's score in the test can be used to predict his/her future performance (Nwana in Ajuonuma, 2004).Predictive validity is therefore basically concerned with how well a test can predict future behaviour.The notion predictive validity was derived from the words 'prediction' and "validation". Cronbach (1970) observes that "validation" consist of checking the test scores against some other observations that serve as the criterion.

The word predictive validity is defined as the degree to which the predictions made by a test are confirmed by the later behaviour of the subject. The concept is used to describe the capacity of measuring instrument to forecast future performance in a related task. Therefore, predictive validity addresses the issues of the ability of a test to predict who will do well at a certain activities, and whether or not similar result will be achieved in the future. This type of validity is difficult to determine because of the dynamics of intellectual growths.

Two things are involved in predictive validity namely the predictor and the criterion. For instance, in the field of education common entrance examination is administered to candidates wishing to enroll into secondary schools, the test scores are used in predicting the success of those to be admitted. At the junior secondary schools, students are exposed to many subjects as a matter of compulsion. However, at the end of the first three years of education, a test is administered to predict those that will do well in the science disciplines and those that are

suitable for art and social science courses. At the end of the second three years of secondary education, there is another test (SSCE), this time to predict those that can cope with education in the tertiary institutions of learning.

Outside the field of education, tests are also administered for the purpose of prediction. Corporate organizations normally administer aptitude tests to applicants as part of employment procedure. The success of an applicant in the aptitude test is an indication that he/she will succeed as an employee of the organization. The decision to introduce aptitude test as an employment procedure was because of the failure of the grades in the certification of applicants to reflect on their job performance.

Summarily, the information provided by predictive validity is most relevant to tests used in the selection and classification of students for admission into tertiary institutions and professional schools as well as assigning individuals to different occupations. However, studies have shown that there are other means of predicting performance other than test. Stain &Bloom in Babangida (2004) point out that in many cases, students from whom test results indicated high probability of achievement never the less failed. They therefore felt that more importance should be allocated to such factors as motivation, interest and the likes. Cronbach (1970) argued that a school select students based on probable academic performance, rejects students with fair academic promise that are outstanding along other lines. He further stated that measures of interest in a particular course of study predict more than measures of performance on admission.

2.2.8 Concept of Academic Achievement

The term “academic achievement” has been described as the scholastic standing of a student at a given moment. This scholastic standing could be explained as the grades obtained in a course or

group of courses taken (Daniels &Schouten, 1970; Owoyemi, 2000). According to Adu, Ojelabi and Adeyanju (2009) Academic performance can simply be viewed as an outcome of all academic tasks or rigours of a person which could be poorly or successfully stated. Academic performance is generally referred to as the display of knowledge attained or skills developed in the school subject (Busari, 2000).

Teaching – learning process involves achieving specific objectives at its completion. Teachers through an instrument called test or examination determine the extent to which the set down objectives have been attained. Students' performance in the examination is an indication of the success or otherwise of the teaching – learning process. The factors that determine the academic performance of students is classified into two broad categories namely, biological and environmental factors. Biological factor describes how intelligence affect academic performance while environmental factors describes how things like parents' Socio–economic and educational status, crowdedness and the likes affect academic performance. In connection with the environmental factor, Olubadewo (2005) noted that the provision and maintenance of school facilities can have serious effects on academic achievement.

Thus, in the educational domain, it is expected that the academic performance of a student should (be a pointer to) predict his/her performance in a tertiary level. It is on this assumption that scores obtained by a candidate in an examination like SSCE are used by tertiary institutions in admission process.

2.2.9 Concept of Educational Assessment

One of the functions of a school is the certification of the individual learner under its embrace (Idowu & Esere, 2009). To effectively carryout this role, assessment of one kind or the other is a

prerequisite. Educational assessment is a process of documenting , usually in measurable terms, knowledge, skills, attitudes, beliefs, practices or generally what behavior a learner does or does not have, acquire or develop before, during , and at the end of instruction, or a course of study (Ukwuije, 2007). According to Anikweze (2005) assessment is the process of investigating the status or standard of learners' attainment, with respect to expected outcomes that must have been specified as objectives. Assessment is a means whereby the teacher obtains information about knowledge gains, behavioural changes and other aspect of the development of learners (Oguneye, 2002). In the words of Belts (2001) assessment is the process of organizing test data into interpretable forms on a number of factors.

Assessment involves the deliberate effort of the teacher to measure the effect of the instructional process as well as the overall aspects of school experience both within and outside the classroom. It also covers the cognitive as well as the affective and psychomotor aspects of learning. Assessment is a broad term that includes testing. A test is a special form of assessment. Tests are assessments made under contrived circumstances especially so that they may be administered, in other words, all tests are assessments, but not all assessments are tests. The fact that educational assessment serves different purposes made Macintosh and Hale in Yakasai (1998) to summarize the views of different authors on the purpose of assessment in education as follows:

Diagnostic Assessment: Diagnostic assessment is designed to determine the difficulties encountered by students in the course of their programmes so that appropriate action can be taken by the course instructor to effectively overcome the problem. In other words, diagnostic assessment seeks to find out underlying causes of students learning difficulties for remediation.

Evaluative Assessment: Evaluative assessment is concerned with the overall success of all the students. The curriculum as a whole is being evaluated to determine its success or otherwise.

Graded Assessment: Graded assessment involves the use of grade to specify the success of student for instance A_1, B_2, B_3, and so on at the ordinary level; distinction, credit, merit and so on in colleges of education and polytechnics; and first class, second class upper, second class lower and so on in the universities.

Guiding Assessment: Guiding assessment is designed to allow teachers as well as counselors use test results to assist students in selecting appropriate disciplines and career choices.

Predictive Assessment: Predictive assessment is designed to forecast the future success of students.

Selective Assessment: Selective assessment is designed to measure whether students possess the knowledge and skills that will enable them succeed in being placed at a certain educational level.

Selective assessment is the function of public examinations such as the SSCE conducted by WAEC and NECO. This study is concerned with assessment for the purpose of grading and prediction. Usually, public examining bodies like WAEC and NECO administer their examinations on students at the end of secondary school curriculum. The candidates are then awarded grades according to their performance in each subject area. These grading are then taken into consideration by tertiary institutions of learning during admission process.

2.2.10Educational Assessment in Nigeria

There is no doubt that educational institutions in any country are the industries in which future leaders, politicians, teachers, workers and so on are produced. Educational institutions are agents

of purifying the minds of the students to become useful members of our society. To realize this quality education should be provided to all Nigerian citizens. The quality of education is important to Nigeria as the products are expected to service the economy (Afemikhe, 2007). In addition, quality is necessary to be gauged as quality graduates can be a source of capital inflow. Unfortunately, Ajayi and Fekundayo (2006) remark that the Nigerian government over the years has not been meeting the United Nations Educational Scientific and Cultural Organization (UNESCO) recommendation of 26% of the total budget allocation to education sector.

Good quality measurements are a necessity for better decision making. In line with this, Oladokun (2006) identify educational assessment to be an integral and inseparable part of sound education system. Assessment data form the basis upon which crucial educational decisions about teaching, learning, educational programmes and learning environment are made. To arrive at useful and objective decisions about these crucial organs of the education system, quality assessment is very important. Quality assessment should display elements of validity, credibility and civility among others (Afemikhe, 2005).

The two broad divisions of educational assessment are internal (School-based) assessment that is carried out by teachers and external (Public) assessment carried-out by public examining bodies. The choice of either internal or external assessment of teaching – learning process largely depends on the decision that needed to be taken about students, teaching or the entire programmes. Public examinations conducted by WAEC and NECO focus mainly on selection and certification. Experience has shown that in Nigeria, public examinations now involve a large number of examinees when compared with the early years of formal education. This increment created the need for large halls, more examination personnel, more materials and extra vigilant supervision/invigilation.

The way and manner examinations are conducted in Nigeria today, not only rubbish the examination process but also made gibberish of the entire education system. Schools have failed in their responsibility of producing citizens that are worthy both in character and learning, they now serve merely as gateways to meaningless certification in the educational system. It makes it impossible to use the result of tests and examinations to determine the level of skills and competence of candidates.

For any examination to be credible, it must possess key elements, which are validity and reliability. These key elements can only be present if the examination is free and fair, devoid of partiality, cheating and all sorts of malpractice (Liman, 2006). All examinations are guided by a code of ethics, translated into rules and regulations. Therefore, any unethical action that could lead to flouting of these rules and regulations constitute examination malpractice. Worldwide, examination malpractice is seen as an academic crime committed before, during and after an examination by means contrary to what is required for the realization of the purpose for conducting the examination.

The above-identified forms of examination malpractice are common with NECO and WAEC SSCE. Students normally buy question papers ahead of the examination and pay supervisors of such examination huge sum of money to allow them operate freely during the examination. Students writing SSCE out of desperation to acquire the necessary requirements for admission into tertiary institutions of learning, indulge in all forms of examination malpractice. A situation has been created in which learning is no longer emphasized but preparation for examination. The quality of learning is no more cherished but the level of passes in public examination. There is therefore a loss of confidence in products from schools.

Unfortunately, however, WAEC and NECO seem not to be doing much to put an end to examination malpractice. The JAMB had to come up with question papers in types (A,B,C etc) whereby each question paper have a different arrangement of items. It has recently banned the use of handset in and around examination centers, in an attempt to curb examination malpractice.

A war of words started between WAEC and NECO soon after the establishment of NECO. Abdullahi (2003) states that, WAEC started by questioning the legality of NECO's existence as an examining body, as it maintained that there was no law establishing NECO. It also argued that NECO had neither syllabus of its own nor any constituted body regulating its affairs. It contented that NECO had lowered the set standard in the first May/June examination it conducted in the year 2000. WAEC observed that 70% of the candidates who sat for the examination passed with flying colours (Abdullahi, 2003).

Because of the above criticisms and many more, the uncertainty surrounding the NECO results, made many tertiary institutions of learning initially rejected the results (Abdullahi, 2003). In 2008, Cross Rivers State (Southern Nigeria) announced that it would no longer recognize certificates awarded by NECO for entry into the States' University and Colleges (Leadership 31 Jan 2008). According to the state commissioner for education, WAEC remains superior to NECO and many students who passed the NECO examination could not defend their results.

NECO on its part denied allegations against it by WAEC and refuted the argument that it had no syllabus. According to NECO, both WAEC and NECO extracted their syllabi from the national curriculum prepared by the Federal Ministry of Education. Concerning the May/June results, NECO made it clear that it made use of continuous assessment, which WAEC never contemplated. NECO went ahead and said that the WAEC assertion may not necessarily be

detrimental to the credibility of its certificate as in section 1 of the National Policy on Education (Revised, 2004) which deals with the philosophy and goals of education in Nigeria, paragraph 9(g) states that educational assessment and evaluation shall be liberalized by their being based in whole or in part on continuous assessment of the progress of the individual. Absence of continuous assessment in the final SSCE results provides only a partial assessment of candidates.

In a study conducted by Onyekachijet (2008), he reported that WAEC, NECO, JAMB and NABTEB cancelled over 50,000 results in 2007 for malpractice. According to Nwana (1982) WAEC was criticized for problems of increasing number of irregularities, forgery and long delays in releasing results of examinations and these have done a great deal to undermine the confidence people had in the council. Daniel (2005) found that people tend to attach significantly different values, attitudes, preferences and interpretations to WAEC and NECO especially with respect to the perceived quality of their question papers and the worth of their results or certificates.

If both WAEC and NECO are able to maintain high standards in the development and administration of SSCE, then performance in the examinations should be good indicators of students' standings with respect to any of the tested subject areas. How often, however, is this case? It is possible for instance, to identify candidates who scored an F9 in the WAEC SSCE and an A1 in the NECO SSCE in the same subject and in the same year, thus leaving observers to wonder if both SSCE are in fact parallel.

Going by the discussion above, one can rightly asserts that there are many problems surrounding Nigerian educational assessment in general and public examinations in particular. Therefore,

there is the need to find out whether the purpose of the SSCE is being realized especially that of the suitability of a candidate to pursue a specific course in the tertiary institutions of learning.

2.3 Review of Empirical Studies

Review of relevant literature depicts varying opinions and findings on impact of students' attitudes, teachers' qualifications, school based and public examinations on students' academic achievements.

Hemmings and Kay (2010) conducted a study to explore the prior achievement, effort and Mathematics attitudes as predictors of current achievement with a sample of Australian secondary school students. They found significant association between Mathematics attitude and achievement among year 10 students. The authors suggested that the attitude towards Mathematics can be a good predictor of Mathematics achievement. In researching students' towards Mathematics in Estonian and Finland schools, Piht and Eisenchmidt (2008) conducted a study that involves two groups of students. They found that students' attitude towards Mathematics depend on teaching methods and students' active participation in the learning process. Mensah, Okyere, and Kuranchi (2013), fashioned a study on Ghanaian students' attitude towards Mathematics performance to extend the discussion to the influence of teacher attitude on student attitude. The study unveiled a significant relationship between teacher attitude and student attitude towards Mathematics. Farooq, and Shah (2008), in a study of secondary school students in Pakistan found that there was no significant difference in confidence of male and female students towards Mathematics at secondary school level. They rather found that students' success in Mathematics depended on attitude towards the subject.

Schenkel (2007), also demonstrated a strong and significant relationship between Mathematics attitude and Mathematics achievement. This was established in the study of elementary school pupils. Adebule, and Aborisade (2004), carried out a study on Nigerian senior secondary school students. The study showed that the attitude of students towards Mathematics did not depend upon sex. Adodo and Gbore (2012) reported that attitudes and interest of students are good predictors of their academic performance in science and Mathematics. The researchers made this conclusion in their study on junior secondary school in Nigeria. Asghar, Afsaneh and Mahmoudi (2010) also supported the view of predictability of science and Mathematics achievement from the knowledge of attitude. This finding was established when the researchers worked on Iranian students. Dehghani and Rezaei (2012) investigated the relationship between middle secondary school' attitudes and their academic performance in science and Mathematics. The findings revealed that there is a strong relationship between students' attitudes and performance in science and Mathematics.

Ahmad, Ali and Azman (2010) conducted a research to examine students' attitudes towards learning science and Mathematics in three low performing secondary schools. The researchers used Malaysian students from the three low performing schools. The researchers concluded that, the students had negative attitudes towards science and Mathematics. Adebowale, Adediwura and Bada (2009) examined the effect of gender on computer attitude of students in Lagos state, Nigeria. The researchers tested their hypotheses and concluded that gender does not have influence on students' attitudes towards computer.

Maagan (2007), conducted a research on teaching staff survey in elementary schools in Israel. The research found a positive relationship between students' Mathematics achievement and teacher qualification. Thomas (2014) designed a study using Nigerian secondary students. The

results showed that a significant difference existed in the performance of students taught by professional teachers and non-professional teachers. Abuseji (2007) constructed and tested a model for providing a causal explanation of secondary school achievement in Chemistry and teachers' qualifications. The researcher concluded that teachers' qualifications had direct causal effect on students' achievement in Chemistry. Okoye, Momoh, Aigbomian and Okecha (2008) examined teachers' quality and instructional strategy on students' achievements in secondary school science and Mathematics. The findings revealed that the variables of teacher quality and instructional strategy had positives significant relationship with achievement in science and Mathematics.

Similarly, Adeyemi and Adu (2012) carried out a study on Primary school teachers in Ekiti state. The purpose of the study was to examine the effect of teachers' qualifications on students' achievements. The results showed that teachers' qualifications had significant relationship with the students' achievement. Monday, Jurrien and Peter (2010) assessed the teaching effectiveness of Mathematics teachers in Nigeria. The findings revealed that teacher quality is directly proportional to students' academic achievements. Owolabi and Adedayo (2012) conducted a survey research on Nigerian Physics teachers with the purpose of finding out the impact of their qualification on students' achievement in Physics. The results showed that both academic and professional qualifications of Physics teachers had a powerful positive influence on students' achievement in Physics.

Edu, Edu, and Kalu (2012) examined teachers' perception of difficult concepts in Primary science and Mathematics in Ikom educational zone of Cross River state, Nigeria. The findings of the study revealed that teachers' qualifications and gender have no significant effect on their perception of difficult concepts in basic science and Mathematics. Umar (2011) designed a study

in Kaduna state Nigeria with a view to finding out the effect of teachers' qualifications and students' gender on students' performance in Further Mathematics. The researcher concluded that teachers' qualifications have effect on students' performance. He also pointed out that gender of students does not have effect on students' performance.

Obinna (2010) conducted a study in Kano state secondary schools. The purpose of the study was to find out whether students' results in qualifier examination predict their subsequent performance in senior secondary certificate examination. The analysis showed that qualifier examination is a good predictor of students' performance in senior secondary certificate examination. It also showed that the relationship does not very across gender. Moses (2008) carried out a study in tertiary institutions of learning in Kano state. The research investigated the relationship between WAEC and NECO senior secondary certificate examination results and students' final CGPA in tertiary institutions of learning. The research findings revealed that senior secondary certificate examination is not a good predictor of students' achievements in tertiary institutions of learning. To be specific the findings revealed that NECO senior secondary certificate examination result predicts students' achievements better than WAEC senior secondary certificate examination result.

Haruna (2008) conducted a study on secondary school in Kano metropolis. The purpose of the study was to investigate the relationship between student's performance in junior secondary certificate examination Mathematics and their subsequent performance in senior secondary certificate examination Mathematics. The findings of the study showed that there is a significant relationship between students' performance in junior secondary certificate examination and their subsequent performance in senior secondary certificate examination. Obioma and Salau (2007) carried out a study using candidates from Nigerian Universities that satisfied certain

predetermined criteria. The findings of the study revealed that there was low but positive relationship between each of predictor variables under study. Emmanuel, Solomon and Omananyi (2010), carried out a study in Benue state university with a view to seeking alternative to multiple selection examinations. The findings of the study revealed that prelim and UME Mathematics did not significantly predict SSCE Mathematics. While prelim Physics and UME Physics significantly predicted SSCE Physics.

Kolawole, Oginni and Fayomi (2010), conducted a study in the South-west Nigeria. The purpose of the study was to examine ordinary level results as predictors of students' academic performance in Chemistry. The findings of the study revealed that ordinary level Chemistry results of the students related poorly with their respective universities results. The finding of the study also revealed that there is little or no influence of the mode of entry on the academic performance at all levels and the two examining bodies were equivalent. Achor, Kurumeh and Orokpo (2010) carried out a study in some secondary schools in Nigeria. In the study, the researchers used the results of students' alternative to practical knowledge of Chemistry and their tests of theoretical knowledge of Chemistry to predict students' performance in Chemistry mock SSCE. The findings of the study showed that male and female students' performance in a test of theoretical knowledge in Chemistry did not significantly predict their performance in mock SSCE Chemistry theory examination. The overall relationship between students' alternative to test of practical knowledge of Chemistry, mock SSCE practical and mock SSCE theory for male as well as female students were not significant.

Femi and Stephen (2011) conducted a study. The study investigated the relationship between School-based continuous assessment scores and senior secondary certificate examination grades as well as the relationship between the senior secondary certificate examination grades in

Mathematics and English. The findings of the study revealed that the relationship between continuous assessment scores and senior secondary certificate examination grades were mostly inverse or very weak for all the three years examined. Considering, the divergent findings of the reviewed researches on the impact of students' attitudes, teachers' qualifications and predictive validity of teacher made and public examinations on students' performance. This study intended to examine the above independent variables to determine whether they have any relationship with students' achievement in tertiary institutions with Katsina state as a case study.

2.4 Implication of the Literature Reviewed on the Study

The literature reviewed so far revealed the impact of students' attitudes, teachers' qualifications, school based and public examinations on students' academic performance. One of the implications is the potentiality of the students' attitudes and interest to either facilitate effective learning or inhibit it. It also revealed that attitudes and interest of students are likely to play a significant part in any satisfactory explanation of variable levels of performance shown by students in their Mathematics subjects and hence are good predictors of their academic performance in Mathematics.

Another implication is the significant role of teachers in making a positive impact on students' academic performance in Mathematics. It also revealed those teachers' qualities such as pedagogy, qualification, competency, and years of experience as factors that influence students' performance positively. Moreover, many researchers constructed and tested models for providing a causal explanation of students' academic achievement in Mathematics and the variables under study and concluded that they had direct causal effect on students' performance

in Mathematics. The review further revealed the predictability of both public and school based examinations on students' performance.

Most of the literature reviewed is on Primary and secondary schools students' academic performance. This study focused on students in tertiary institutions with a view to finding out the impact of students' attitudes, teachers' qualifications, and Mathematics WAEC/NECO results on students' learning outcomes in tertiary institutions. This is necessary in order to fill the gap, which related studies reviewed have not filled.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The study was designed to examine the impact of students' attitudes, teachers' qualifications, and Mathematics WAEC/NECO results on students' performance in tertiary institutions in Katsina state. This chapter presented the methodology of the study. It described the research design, population of the study, sample and sampling procedures, source and methods of data collection. It also described the statistical technique used to analyze the data collected for the study.

3.2 Research Design

This study adapted the Ex-post facto design of the descriptive research. Ex-post facto research design was adapted because the researcher was only interested in examining the impact of students' attitudes, teachers' qualifications, and Mathematics WAEC/NECO results on students' performance in tertiary institutions without changing any of the variables. In this research, efforts were directed toward establishing whether there is a relationship between students' attitudes, teachers' qualifications, and Mathematics WAEC/NECO results and students' performance in tertiary institutions.

3.3 Population of the Study

The population for this study consisted of all the students from tertiary institutions in Katsina state in the session 2012/2013. There were six tertiary institutions in the state as at the time of conducting this study. The target population of the study consisted of all the 200 level students of

Umaru Musa Yar'adua University, Hassan Usman Katsina Polytechnic, Federal University Dutsinma, Federal College of Education Katsina and Isa Kaita College of Education Dutsinma who were offering Linear Algebra course in the session 2012/2013.

Umaru Musa Yar'adua University had two hundred and thirty five (235) 200 level students offering Linear Algebra course in the session 2012/2013. Hassan Usman Katsina polytechnic had five hundred and fifty three (553) 200 level students offering Linear Algebra course in the session 2012/2013. Federal University Dutsinma had one hundred and forty three (143) 200 level students offering Linear Algebra course in the session 2012/2013. Federal College of Education Katsina had six hundred and fourteen (614) 200 level students offering Linear Algebra course in the session 2012/2013, and Isa Kaita College of Education Dutsin-ma had four hundred and sixty nine (469) 200 level students offering Linear Algebra course in the session 2012/2013. Therefore, the target population for the study was two thousand and fourteen (2014) 200 level students. Table 1 below shows the total number of 200 level students in 2012/2013 session according to their institutions.

Table 1: Population of the Study

Name of Institution	Male	Female	Total
Umaru Musa Yar'adua University	179	56	235
Hassan Usman Katsina Polytechnic	421	132	553
Federal College of Education Katsina	470	144	614
Federal University Dutsinma	106	37	143
Isa Kaita College of Education Dutsin-ma	356	113	469
Total	**1532**	**482**	**2014**

Source: Academic Record Offices of Each Institution (2012/2013)

3.4 Sample and Sampling Procedure

Five tertiary institutions out of six were randomly selected as the sample size of the study namely; Umaru Musa Yar'adua University, Hassan Usman Katsina Polytechnic, Federal University Dutsinma, Isa Kaita College of Education Dutsinma and Federal College of Education Katsina. The remaining one institution was used for pilot study. In the five selected institutions, three hundred and twenty two subjects (322) were selected using both proportional stratified random sampling technique and Krejcie and Morgan (1970) Table for determining sample size from population (see appendix A). Furthermore, the five institutions under study were classified into Schools/Faculties depending on the institution. The Schools/Faculties were in turn classified into departments and each department was further classified into Males and Females. Then the required numbers of subjects were selected randomly. See Table 2 below.

Table2: Sample Size

Name of Institution	Male	Female	Total
Umaru Musa Yar'adua University	29	09	28
Hassan Usman Katsina Polytechnic	67	21	88
Federal College of Education Katsina	75	23	98
Federal University Dutsinma	17	06	23
Isa Kaita College of Education Dutsin-ma	57	18	75
Total	**245**	**77**	**322**

3.5 Instrumentation

The instrument for data collection is the Mathematics Attitudinal Questionnaire (MAQ), adapted from Tapia and Marsh (2004) Attitude Towards Mathematics Inventory (ATMI).The questionnaire consisted of sections A and B. Section A consisted of students' biographic data while section B consisted of 40items about attitude related factors designed to measure students' attitudes towards Mathematics. Out of the 40 items, 12 are negatively worded. Each item of the questionnaire is to be responded using a five point Likert Scale with the following responses: Strongly Agree(SA), Agree (A), Disagree (D), Neutral (N), and Strongly Disagree (SD). The responses were scored as(SA) = 5, (A) = 4, (N) = 3,(D) = 2, and(SD) = 1. 12 items were reverse scored. Students were required to objectively express their opinions using the five point Likert Scale. In addition students' scores in Linear Algebra were collected from their various teachers who have different qualifications so also, students' WAEC/NECO Mathematics results and their end of first year CGPA were collected from their various record offices (See Appendix C).

3.6 Validation of the Instrument

The instrument (questionnaire) used for collecting the data for the study was a standardized questionnaire already validated by its original authors (Tapia & Marsh, 2004). Despite the validation by the original authors (Tapia & Marsh, 2004), the researcher still consulted the supervisors of the research who are experts in Measurement and Evaluation for their consent about using the instrument (questionnaire). The supervisors Okayed the eligibility of the instrument before the researcher went ahead and used it as a valid instrument for the study.

3.7 Reliability of the Instrument

The reliability of the instrument (questionnaire) was already determined by its original authors (Tapia & Marsh, 2004) using 545 high school students (Male and Female, grades 9-12). The authors used test retest and Cronbach's alpha coefficient to test the internal consistency of the instrument (questionnaire). A coefficient of 0.97 indicated a high degree of internal consistency of the instrument (questionnaire). Also, the instrument (questionnaire)was tested for reliability using split half method by the researcher. Reliability co-efficient of $r = 0.63$ was obtained. This is lower than the original, and could likely be attributed to the fewer number of students the researcher used compare to the number of students used by the original authors (Tapia & Marsh, 2004)

3.8 Procedure for Data Collection

The process of data collection started with adapting of the instrument (questionnaire). Then the researcher collected an introductory letter titled "Students' Field Research" from the Department of Science Education, Ahmadu Bello University Zaria. The researcher personally visited all the sampled institutions. In each institution visited, the researcher followed all the due processes for

the collection of data in that institution. During the process of administration of the instrument, the researcher with the help of some staff in each department distributed the questionnaire to the study sample. The researcher explained the instructions to the subjects verbally and allowed them to read the written instructions. The researcher also gave them room for asking questions for further clarification. The questionnaires were administered and collected on the spot to ensure 100% retrieve.

3.9 Procedure for Data Analysis

To analyze the data collected into meaningful and interpretable form, all the null hypotheses itemized in chapter one were tested at $\alpha = 0.05$ using appropriate statistical tools.

1. Null hypothesis one was tested at $\alpha = 0.05$ using Pearson Product Moment Correlation (PPMC). This was because the researcher needed to establish relationship (if any) between students' positive attitudes and their performance in Linear Algebra

2. Null hypothesis two was tested at $\alpha = 0.05$ using Pearson Product Moment Correlation (PPMC). This was because the researcher needed to establish relationship (if any) between students' negative attitudes and their performance in Linear Algebra

3. Null hypothesis three was tested at $\alpha = 0.05$ using one way Analysis of Variance (ANOVA). This was because the researcher needed to compare students' performance in Linear Algebra under teachers with different qualifications

4. Null hypothesis four was tested at $\alpha = 0.05$ using Linear Regression Analysis. This was because the researcher needed to establish predictive relationship (if any) between students' WAEC Mathematics results and their end of first year CGPA

5. Null hypothesis five was tested at $\alpha = 0.05$ using Linear Regression Analysis. This was because the researcher needed to establish predictive relationship (if any) between students' NECO Mathematics results and their end of first year CGPA

6. Null hypothesis six was tested at $\alpha = 0.05$ using independent t-test statistic. This was because the researcher needed to compare two sample means i.e male and female performance in Linear Algebra.

3.10 Pilot Study

The instrument was pilot tested using students of Katsina University. In this pilot test, 30students were randomly selected from 200 level for 2012/2013 session. The selected students were administered questionnaires and instructions on how to supply the required information were explained to them. After filling the questionnaires, the questionnaires were shuffled and the scores in their responses and their scores in Linear Algebra were divided into two halves i.e even and odd. Then the two scores were correlated to estimate the reliability of the instrument. The correlation index of 0.63 was found. The pilot test was done to determine the appropriateness and to establish the reliability of the instrument used.

CHAPTER FOUR

DATA PRESENATATION, ANALYSIS AND DISCUSSION

4.1 Introduction

The study was designed to examine the impact of students' attitudes, teachers' qualifications, and Mathematics WAEC/NECO results on students' performance in tertiary institutions in Katsina state. This chapter presented the analyses of the data collected and discussions on the results. The chapter was divided into two main sections. The first section presented the descriptive statistics of the data. The second section presented the inferential statistics of the data. Null hypotheses formulated in chapter one were tested using appropriate statistical tools and conclusions were made.

4.2 Descriptive Statistics

This section presented the descriptive Statistics of the data collected. Mean, standard deviation, and Percentage were used to analyze the data.

4.2.1 Students' Attitude towards Mathematics

Table 3 presented the descriptive statistic on percentages of students' responses with respect to their attitudes towards Mathematics.

Table 3: Distribution of Students' Attitudes towards Mathematics

S/N	Attitudes towards Mathematics	P.A(N)	%	N.A(N)	%
1.	Mathematics is a very worthwhile and necessary subject	172	53.4	150	46.6
2.	I want to develop Mathematical skills	170	52.8	152	47.2
3.	I get a great deal of satisfaction out of solving Mathematics problems	156	49.1	164	50.9
4.	Mathematics helps develop the mind and teaches a person to think	187	58.1	135	41.9
5.	Mathematics is important in everyday life	271	84.2	51	15.8
6.	Mathematics is one of the most important subjects for people to study	291	90.4	31	9.6
7.	High school Mathematics courses would be very helpful no matter what I decide to study	197	61.2	125	38.8
8.	I can think of many ways that I use Mathematics outside of school	293	91.0	29	9.0
9.	Mathematics is one of my dreaded subjects	268	83.2	54	15.8
10.	My mind goes blank and I am unable to think clearly when studying mathematics	260	80.7	62	19.3
11.	Studying Mathematics makes me feel nervous	289	89.8	33	10.2
12.	Mathematics makes me feel uncomfortable	251	78.0	71	22.0
13.	I am always under a terrible strain in a Mathematics class	183	56.8	139	43.2
14.	When I hear the word Mathematics, I have a feeling of dislike	189	58.7	133	41.3
15.	It makes me nervous to even think about having to do a Mathematics problems	206	64.0	116	36.0
16.	Mathematics does not scare me at all	210	65.2	112	34.8
17.	I have a lot of self - confidence when it comes to Mathematics	303	94.1	19	5.9
18.	I am able to solve Mathematics problems without too much difficulty	260	80.7	62	19.3
19.	I expect to do fairly well in any Mathematics class I take	235	73.0	87	27.0
20.	I am always confused in my Mathematics class	274	85.1	48	14.9
21.	I feel sense of insecurity when attempting Mathematics	293	91.0	29	9.0
22.	I lean Mathematics easily	303	94.1	19	5.9
23.	I am confident that I could learn advanced Mathematics	210	65.2	112	34.8
24.	I have usually enjoyed studying Mathematics in school	189	58.7	133	41.3
25.	Mathematics is dull and boring	235	73.0	87	27.0
26.	I like to solve new problems in Mathematics	260	80.7	62	19.3
27.	I would prefer to do an assignment in Mathematics than to write an essay	206	64.0	116	36.0
28.	I would like to avoid using Mathematics in college	197	61.2	125	38.8
29.	I really like Mathematics	156	49.1	164	50.9
30.	I am happier in a Mathematics class than in any other class	274	85.1	48	14.9
31.	Mathematics is a very interesting subject	183	78.0	139	43.2
32.	I am willing to take more than the required amount of Mathematics	251	90.4	71	22.0
33.	I plan to take as much mathematics as I can during my education	291	80.7	31	9.6
34.	The challenge of Mathematics appeals to me	260	89.8	62	19.3
35.	I think studying advanced Mathematics is useful	289	53.4	33	46.6
36.	I think studying Mathematics helps me with problem solving in other areas	172	58.1	150	41.9
37.	I am comfortable expressing my own ideas on how to look for solutions to a Difficult problems in Mathematics	187	84.2	135	15.8
38.	I am comfortable answering questions in Mathematics class	271	83.2	51	16.8
39.	A strong Mathematics background could help me in my professional life	268	52.8	54	47.2
40.	I believe I am good at solving Mathematics problems	170	72.5	152	47.2
	Total Average		**72.5**		**27.5**

Table 3 showed statements about attitude towards Mathematics and the percentage responses

Table 3 showed students' attitude towards Mathematics and percentage responses. It showed that 72.5% of the respondents have positive attitude towards Mathematics while 27.5% of the respondents have negative attitudes towards Mathematics. This clearly showed that the positive average percentage response (72.5) is greater than the negative average percentage response (27.5)

4.2.2 Influence of Teachers' Qualifications on Students' Performance

Table 4 showed teachers' level of academic qualifications and the influence they have on students' academic performance.

Table 4: Students' scores with respect to their Teachers' qualifications

Qualifications	**Number of Students taught (N)**	**Mean performance of students**	**Standard deviation**	**Level influence**
B.Sc.	59	58.2288	10.8116	2nd
B.Sc.(Ed)	60	46.1667	16.5874	5th
M.Sc.	100	50.8000	15.4171	4th
M.Ed	46	52.7609	17.4234	3rd
Ph.D.	57	65.3772	14.0510	1st
Total	**322**			

According to table 4, the influence of academic qualification of teachers on students' performance when rated showed that PhD holders had students' mean score of 65.3772. This was the highest score on students' performance. B.Sc (Ed) holders had students' mean score of 58.2288. This was the 2nd highest score, followed by M.Ed holders who had students' mean

score of 52.7609. M.Sc holders had the 4th highest students mean score of 50.8000, followed by B.Sc holders who had the least students' mean score 0f 46.1667. This clearly showed that PhD and B.Sc (Ed) qualifications have more influence on students' performance.

4.2.3 Relationship between Students' Performance in WAEC Mathematics and their performance in tertiary institutions

Table5 presented students' performance in WAEC Mathematics and their performance in tertiary institutions

Table 5: Students' WAEC Mathematics composite scores and their end of first year CGPA

Variable	N	Mean	Standard Deviation
Students' scores in WAEC Mathematics	273	2.4963	1.0200
Students' end of first year CGPA	273	2.8443	0.9694

Table 5 showed the means and the standard deviations of students' scores in WAEC Mathematics and their scores in tertiary institutions. It showed that the mean and the standard deviation of students' scores in WAEC Mathematics are 2.4963 and 1.0200 respectively. It also showed that the mean and the standard deviation of students' scores in tertiary institutions are 2.8443 and 0.9694 respectively. It clearly showed that the two mean scores are different.

4.2.4 Relationship between Students' Performance in NECO Mathematics and their performance in tertiary institutions

Table 6 presented students' performance in NECO Mathematics and their performance in tertiary institutions

Table 6: Students' NECO Mathematics composite scores and their end of first year CGPA

Variable	N	Mean	Standard Deviation
Students' scores in NECO Mathematics	148	2.2635	0.7681
Students' end of first year CGPA	148	2.9324	0.8010

Table 6 showed the mean performance and the standard deviations of students in NECO Mathematics and tertiary institutions. It showed that the mean and standard deviation of students' scores in NECO Mathematics are 2.2635 and 0.7681 respectively. It also showed that the mean and standard deviation of students' scores in tertiary institutions are 2.9324 and 0.8010 respectively. It clearly showed that the two mean scores are different.

4.4.5 Relationship between Male and Female Students' Performance in Linear Algebra

Table 7 presented the mean scores of students in Linear Algebra by gender

Table 7: Distribution of Students' scores by gender

Variable	N	Mean	Standard Deviation
Male	245	50.1327	14.5741
Female	77	48.9156	13.2281
Total	**322**		

Table 7 showed the mean score and the standard deviations of students' scores in tertiary institutions by gender. It showed that the mean score and the standard deviation of male students are 50.1327 and 14.5741 respectively. It also showed that the mean score and standard deviation of female students are 48.9156 and 13.2281 respectively. It clearly showed that the mean score of male and female students is almost the same.

4.3 Hypotheses Testing

The following are the research hypotheses formulated in chapter one and their inferential statistics

4.3.1 Null hypothesis 1: There is no significant relationship between students' positive attitudes and their academic performance in Linear Algebra

To test this hypothesis, the students' scores on attitude towards Mathematics and their performance in Linear Algebra were correlated using Pearson Product Moment Correlation. The summary of the computations was shown in Table 8

Table 8: Relationship between Students' positive attitudes and their performance

Variable	N	Mean	S.D	Cor. Index	Crit.r	DF	P Value
Positive attitudes towards Mathematics	233	62.9979	7.5926	0.900**	0.1946	231	0.000
Students' Performances In Linear Algebra	233	58.2339	14.3916				

**** Correlation is significant at the 0.01 level (2 – tailed).**

The results of the Pearson Product Moment Correlation (PPMC) statistic in Table 8 revealed significant relationship between students' positive attitude towards Mathematics and their performance in Linear Algebra. This was because the calculated correlation index r-value of 0.900 is greater than 0.1946 the critical r. In addition, the calculated p value of 0.000 is less than the 0.05 level of significance. Therefore, the null hypothesis, which states that there is no significant relationship between students' positive attitude towards Mathematics and their academic performance in Linear Algebra, was therefore rejected. Hence, there exists a significant relationship between students' positive attitude towards Mathematics and their academic performance in Linear Algebra.

4.3.2 Null hypothesis 2: There is no significant relationship between students' negative attitude towards Mathematics and their academic performance in Linear Algebra

To test this hypothesis, the students' scores on attitude towards Mathematics and their performance in Linear Algebra were correlated using Pearson Product Moment Correlation. The summary of the computations was shown in Table 9

Table9: Relationship between Students' negative attitudes and their performance

Variable	N	Mean	S.D	Cor. Index	Crit.r	DF	P Value
Negative attitudes towards Mathematics	89	44.2753	1.4905	- 0.201	0.2050	87	0.600
Students' Performances In Linear Algebra	89	43.5674	15.9151				

The results of the Pearson Product Moment Correlation (PPMC) statistic in Table 9 revealed no significant relationship between students' negative attitudes towards Mathematics and their performance in Linear Algebra. This was because the calculated correlation index r-value of 0.201 is less than critical r 0.2050. In addition, the calculated p value of 0.060 is greater than the 0.05 level of significance. Therefore, the null hypothesis, which states that there is no significant relationship between students' negative attitudes towards Mathematics and their academic performance in Linear Algebra, was therefore accepted. Hence, there exist no significant relationship between students' negative attitude towards Mathematics and their academic performance in Linear Algebra.

4.3.3 Null hypothesis 3: There is no significant performance difference among students taught by teachers with different qualifications

To test this hypothesis, students' scores in Linear Algebra were collected from their various teachers who have different qualifications. One way Analysis of Variance (ANOVA) was used to compare their performance. The summary of the computations was shown in Table 10(a)

Table 10(a): Students' Performance differences influenced by their teachers' qualifications

Variation	**Sum of square**	**DF**	**Mean Square**	**F Ratio**	**F critical**	**P Value**
Between Groups (V_B)	13201.418	4	3300.355	14.681	2.37	0.000
Within Groups (V_W)	71261.004	317	224.798			
	84462.422	**321**				

The one way Analysis of variance (ANOVA) in Table 10(a) revealed that significant performance difference exists between students taught by teachers with different qualifications. This was because the calculated F ratio value of 14.681 is greater than the 2.37 F critical value. In addition, the calculated p value of 0.000 is less than the 0.05 level of significance. Therefore, the null hypothesis that states there is no significant performance difference among students taught by teachers with different qualifications was therefore rejected. Hence, teachers' qualifications do influence students' academic performance in Linear Algebra. To further establish whether there are differences between groups of teachers' qualification, Scheffe's test was performed and presented in Table 10(b).

Table 10(b): Scheffe's test showing the difference between students' performance according to teachers' qualifications.

Teachers' qualifications (I)	Teachers' Qualifications (J)	Students' Mean Difference (I-J)	Standard error	P value
B.Sc.	B.Sc. (Ed)	12.0621*	2.7490	0.000
	M.Sc.	7.4288*	2.4613	0.003
	M.Ed.	5.4679	2.9491	0.065
	Ph.D.	-7.1484*	2.7846	0.011
B.Sc. (Ed)	B.Sc.	-12.0621*	2.7490	0.000
	M.Sc.	-4.6333	2.4484	0.059
	M.Ed.	-6.5942*	2.9383	0.026
	Ph.D.	-19.2105*	2.7732	0.000
M.Sc.	B.Sc.	-7.4288*	2.4613	0.000
	B.Sc. (Ed)	4.6333	2.4484	0.059
	M.Ed.	-1.9609	2.6711	0.463
	Ph.D.	-14.5772*	2.4883	0.000
M.Ed.	B.Sc.	-5.4679	2.9491	0.065
	B.Sc. (Ed)	6.5942*	2.9383	0.026
	M.Sc.	1.9609	2.6711	0.463
	Ph.D.	-12.6163	2.9717	0.000
Ph.D	B.Sc.	7.1484*	2.7846	0.011
	B.Sc. (Ed)	19.2105*	2.7732	0.000
	M.Sc.	14.5772*	2.4883	0.000
	M.Ed.	12.6163*	2.9717	0.000

***The mean difference is significant at the 0.05 level.**

The Scheffe's test in Table 10(b) further revealed where the significant difference exists, and the level of the difference. For instance, the table revealed that significant difference exists between students taught by PhD holders and those taught by either B.Sc, M.Sc or M.Ed holders as the students taught by PhD holders had the highest performance. Therefore, the null hypothesis, which states that there is no significant performance difference among students taught by teachers with different qualifications, was therefore rejected. Hence, teachers' academic qualifications relate with students' learning outcomes in Linear Algebra.

4.3.4 Null hypothesis 4: There is no significant relationship between students' performance in WAEC Mathematics and their performance in tertiary institutions

To test this hypothesis, students' WAEC Mathematics composite scores and their end of first year CGPA were analyzed using Linear Regression Analysis. The summary of the computations was shown in Table 11

Table11: Relationship between Students' WAEC Mathematics and their end of first year CGPA

Variable	**N**	**Coefficient**	**S.E**	**$t_{cal.}$**	**t_{crit}**	**DF**	**P-value**
Constant		2.794	0.207	13.520			0.000
	273				1.96	146	
NECO		0.374	0.086	0.432			0.060

The result of the Linear Regression Analysis Statistic in Table 11 revealed significant predictive relationship between students' WAEC Mathematics performance and their performance in tertiary institutions. This is because the calculated t-value of the independent variable (WAEC)

4.190 is greater than the 1.96 critical t. also the calculated P value of 0.000 is less than the 0.05 level of significance. Therefore, the null hypothesis, which states that there is no significant relationship between students' performance in WAEC Mathematics and their performance in tertiary institutions, is therefore rejected. Hence, WAEC Mathematics is a good predictor of students' performance in tertiary institutions.

4.3.5 Null hypothesis 5: There is no significant relationship between students' performance in NECO Mathematics and their performance in tertiary institutions

To test this hypothesis, students' Mathematics WAEC results and their end of first year CGPA were analyzed using Linear Regression Analysis. The summary of the computations was shown in Table 12

Table 12: Relationship between Students' NECO Mathematics and their end of first year CGPA

Sex	**N**	**Mean score**	**Standard deviation**	**Standard error**	**$t_{cal.}$**	**t_{crit}**	**DF**	**P-value**
Male	245	50.1327	14.5741	0.9311				
					0.653	1.96	320	0.514
Female	77	48.9156	13.2281	1.5075				

The result of the Linear Regression Analysis Statistic in Table 12 revealed that no significant predictive relationship exist between students' NECO Mathematics scores and their end of first year CGPA. This is because the calculated t-value of the independent variable (NECO) 0.432 is less than1.96 critical t. In addition, the calculated P value of 0.060 is greater than the 0.05 level

of significance. Therefore, the null hypothesis, which states that there is no significant relationship between students' performance in NECO Mathematics and their performance in tertiary institutions, is therefore accepted. Hence, NECO Mathematics result is not a good predictor of students' performance in tertiary institutions.

4.3.6 Null hypothesis 6: There is no significant difference between the average performance of male and those of female in Linear Algebra

To test this hypothesis, students' scores in Linear Algebra according to their gender were analyzed using Independent t-test Statistic. The summary of the computations was shown in Table13

Table13: Students' performance differences by gender

Sex	**N**	**Mean score**	**Standard deviation**	**Standard error**	**$t_{cal.}$**	**t_{crit}**	**DF**	**P-value**
Male	245	50.1327	14.5741	0.9311				
					0.653	1.96	320	0.514
Female	77	48.9156	13.2281	1.5075				

The result of the Independent t-test Statistic in Table13 revealed that there is no significant difference in performance between male and female in Linear Algebra. This was because the calculated t value of 0.653 is less than the t critical value of 1.96. In addition, the calculated P value of 0.514 is greater than the 0.05 level of significance. Therefore, the null hypothesis which states that there is no significant difference between the average performance of male and those

of female in Linear Algebra was therefore accepted. Hence, gender has no effect on students' performance in Linear Algebra.

4.4 Summary of the Major Findings

Following the analyses of the data collected and subsequent testing of the hypotheses formulated, the study revealed that:

1. Significant relationship exists between students' positive attitude towards Mathematics and their performance in Linear Algebra

2. No significant relationship exist between students' negative attitude towards Mathematics and their performance in Linear Algebra

3. Significant performance difference in Linear Algebra exists among students taught by teachers with different qualifications

4. Significant relationship exists between students' performance in WAEC Mathematics and their performance in tertiary institutions

5. No significant relationship exist between students' performance in NECO Mathematics and their performance in tertiary institutions

6. No Significant performance difference in Linear Algebra exist between male and female students

4.5 Discussion

The study examined the impact of students' attitudes, teachers' qualifications and Mathematics WAEC/NECO results on tertiary students' performance in Katsina state. For this purpose, the research formulated six research questions and six research hypotheses in order to establish possible relationships (if any) between the identified factors and students' academic achievement.

The first finding of this study showed that a significant relationship exist between students' positive attitudes and their academic performance in Linear Algebra. The significant relationship found between students' positive attitudes and their academic performance in Linear Algebra could likely be because Linear Algebra is a friendly course. So the students are likely to manifest positive attitudes and interest in it. This result is in agreement with Adodo and Gbore (2012), Schenkel (2007), and Farooq and Shah (2008) among others who agreed that attitudes of students are good predictors of their academic performance in Mathematics. The result also corroborated the report of Melgosa (2002) who asserted that one's attitudes towards subjects when faced constructively can lead to better assimilation, understanding, interest, self-confidence and optimum production with positive outlook to a career in such a field.

The second finding of this study showed that no significant relationship exist between students' negative attitudes and their academic performance in Linear Algebra. The insignificant relationship found between students' negative attitudes and their academic performance in Linear Algebra could likely be because some students do not take their studies seriously when they are beginners. This finding disagreed with the finding of Ahmad, Ali and Azman (2010) who concluded that Malaysian students in three low performing secondary schools had negative attitude towards science.

The third finding of this study showed that teachers' qualifications have influence on students' performance. This result confirmed the previous finding of Thomas (2014), Adeyemi and Adu (2012), Abuseji (2007), Maagan (2007), and Umar (2011) among others who established that teacher qualifications have influence on students' academic performance. The finding is in disagreement with the finding of Edu, Edu, and Kalu (2012).

The fourth finding of this study showed that WAEC Mathematics is related to students' achievement. The significant relationship found between WAEC Mathematics results and students' academic performance in tertiary institutions is likely due to the general perception that WAEC is superior to NECO. For this reason, students tend to take WAEC more seriously than NECO as observed by Daniel (2005) who found that people tend to attach significantly different values, attitudes, preferences and interpretations to WAEC and NECO especially with respect to the perceived quality of their question papers and the worth of their results or certificates. This result concurred the previous finding of Obioma and Salau (2007) who reported that public examinations like WAEC predicts students' performance in the universities.

The fifth finding of this study showed that NECO Mathematics is not related to students' achievement. This result could likely be due to the general perception that NECO is inferior to WAEC. For this reason, students tend to take NECO less seriously than WAEC as observed by Daniel (2005) who found that people tend to attach significantly different values, attitudes, preferences and interpretations to WAEC and NECO especially with respect to the perceived quality of their question papers and the worth of their results or certificates. In many situations, you find out that the number of students who have WAEC results are more than those that have NECO results. This result confirmed the previous finding of Gbore (2006) and Obioma (2008) who reported that public examination like NECO could not predict students' academic achievements in the Universities.

The sixth finding of this study showed that gender has no effect on students' achievement. This result is in agreement with the finding of Umar (2011) who reported that there is no significant difference between male and female with respect to their performance in Further Mathematics. This finding also re-affirmed the report of Sinnes (2006) who asserted that females in principle would produce exactly the same scientific knowledge as males if sufficient rigour were undertaken in scientific inquiry.

CHAPTER FIVE

SUMMARY CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The study was designed to examine the impact of students' attitudes, teachers' qualifications, and Mathematics WAEC/NECO results on students' performance in tertiary institutions in Katsina state. This chapter presented the summary of the entire work, conclusion, educational implications, limitation, recommendations and suggestions for further research.

5.2 Summary

This study was designed to find out the impact of students' attitudes, teachers' qualifications and, Mathematics WAEC/NECO results on tertiary students' academic performance in Katsina state. This descriptive study was carried out in five tertiary institutions using 322 subjects. The five institutions were randomly selected from six tertiary institutions and the subjects were selected using proportional stratified random sampling technique. The subjects comprised of 245 male and 77 female students grouped according to the qualifications of their teachers. Six research questions and six research hypotheses guided the study. The independent variables used consist of students' attitudes, teachers' qualifications, and WAEC/NECO Mathematics results. The dependent variable was students' scores in Linear Algebra. Mathematics Attitudinal Questionnaire (MAQ) was used to retrieve data from students. The instrument was a questionnaire adapted from Tapia and Marsh (2004). The scores of students were collected from their various teachers who have different qualifications. The data collected were subjected to analyses using appropriate statistical tools, which include Mean, Standard Deviation, Percentage, Pearson Product Moment Correlation (PPMC), Linear Regression Analysis, Independent t-test,

Analysis of Variance (ANOVA), Scheffe's test suitable for answering the research questions and testing the null hypotheses. The following are the findings of the research.

5.3 Conclusion

Recent studies in conjunction with the findings of this study revealed some noteworthy results. Three independent variables namely Students' attitudes, teachers' educational qualifications and WAEC Mathematics result related significantly with students' learning outcomes in tertiary institutions. The independent variable of NECO Mathematics did not significantly relate with students' learning outcomes. The results of this study, despite relatively small in scope, suggest a number of implications for policy intervention to promote positive attitudes, improve the quality of teachers. In this study, it was observed that

1. Students' positive attitudes towards Mathematics related significantly with their learning outcomes

2. Students' negative attitudes towards Mathematics did not relate significantly with their learning outcomes

3. Teachers' educational qualifications related significantly with students' learning outcomes

4. WAEC Mathematics results related significantly with students' performance

5. NECO Mathematics results did not relate significantly with students' performance

6. Gender did not relate significantly with students' performance

5.4 Recommendations

The study wishes to make the following recommendations based on the findings of the study

1.Students' positive attitudes correlated highly with their academic Performance. This tends to show that students with positive attitudes towards Mathematics will perform significantly better than those with negative attitudes. This calls for the attention of counseling units of tertiary

institutions to provide counseling services for students with a view to promoting positive attitudes among students

2. Significant performance differences among students taught by teachers with different academic qualifications were found in this study. This tends to show that students in their second year in tertiary institutions will perform significantly better in Linear Algebra if taught by PHD and B.Sc (Ed) holders

3. WAEC Mathematics results as revealed in the study related significantly with students' academic performance. This tends to show that WAEC Mathematics result is a good predictor of students' academic performance in tertiary institutions. Therefore, Policy makers should continue using WAEC Mathematics result as a pre-requisite requirement during admission processes into science and based programmes

4. NECO Mathematics results as revealed in the study did not relate significantly with students' academic performance. This calls for the attention of Policy makers, especially in the field of education in conjunction with experts in Measurement and Evaluation, to re-examine NECO Mathematics results with a view to identifying the cause(s) of the gap between performance in NECO Mathematics and performance in WAEC Mathematics. This will enable them to take measures that will make performance at the two levels more closely related.

5. A regulatory body should be established to manage the affairs of WAEC and NECO who are conducting parallel examination

6. The finding of this study revealed that the mean score of male students is greater than that of female Students. Therefore, female students should be encouraged to improve in their performance

5.5 Limitations of the Study

1. The researcher had wanted to include schools of Nursing and Health Technology in the study. However, unfortunately their students do not offer the required Mathematics course for the purpose of this research. The only mathematical courses they offer are elementary statistics such as Ratios, Proportions, Percentages, Mean, and Median etc, which could not serve the purpose of this study. All the same, this limitation did not affect the generalization of the result of this study in any way

2.Data used were collected from different tertiary institutions (Universities, Polytechnic, and Colleges of Education). The academic strengths of their students may not be equal

3. The reliability coefficient of the Mathematics Attitudinal Questionnaire (MAQ) was 0.63, higher reliability coefficient would have been better

5.6 Suggestions for further Study

The issues raised, investigated and discussed in this study covered only tertiary institutions in Katsina state due to time and other constraints. Therefore, there is still need for more research on the impact of the factors investigated in this study on students' learning outcomes to cover the six Geo-Political zones of the Country for the sake of generalization. Students' Personality factors, such as Intelligence and Creativity as to how they affect students' learning outcomes could also be investigated to have another dimension. Also, teacher factors such as pedagogy and years of experience as to how they affect students' learning outcomes could be investigated to have another dimension. Furthermore, other areas of standardized achievement tests such as comparability and reliability of grading standard for WAEC and NECO could also be investigated to have another dimension.

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Appendix A

TABLE FOR DETERMINING SAMPLE SIZE FROM A GIVEN POPULATION

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	333
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	225	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	373
150	108	750	256	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Extracted From Krejcie and Morgan (1970)

Note: N = population size, S = Sample size

APPENDIX B

MATHEMATICS ATTITUDINAL QUESTIONNAIRE (MAQ)

Impact of Students' Attitudes, Teachers' Qualifications and Mathematics WAEC/NECO Results on Tertiary Students' Performance in Katsina state, Nigeria

Dear Respondent,

The researcher is conducting a research on the above topic. The information required is purely for academic purposes, and it will be treated with utmost confidentiality.

Section A (Student's Biographic Data)

To be completed by the Researcher/Assistant Researcher

1. NAME OF INSTITUTION _____
2. GENDER: Male[ ] female[ ]
3. FACULTY/ DEPARTMENT_____
4. COURSE OF STUDY _____
5. ADMISSION NUMBER_____
6. CURRENT SESSION_____
7. END OF FIRST YEAR CGPA_____

O-LEVEL MATHEMATICS GRADE

WAEC

A1 [ ] B2 [ ] B3 [ ] C4 [ ] C5 [ ] C6 [ ] D7 [ ] E8 [ ] F9 [ ] NA [ ]

NECO

A1[ ] B2[ ] B3[ ] C4[ ] C5[ ] C6[ ] D7[ ] E8[ ] F9[ ] NA[ ]

Section B

To be completed by the Students

Instruction: This section consists of twenty (40) Statements about your feeling/opinion concerning Students' attitudes towards Mathematics. There is no correct or incorrect response. Please read each item carefully and objectively tick the response that best describes your feeling/opinion in the spaces provided. Use the following response scale to respond to each item.

SA = Strongly Agree, A= Agree, N=Neutral D= Disagree, SD= Strongly Disagree

1. Mathematics is a very worthwhile and necessary subject
   SA [ ] A [ ] N [ ] D [ ] SD [ ]

2. I want to develop Mathematical skills
   SA [ ] A [ ] N [ ] D [ ] SD [ ]

3. I get a great deal of satisfaction out of solving Mathematics problems
   SA [ ] A [ ] N [ ] D [ ] SD [ ]

4. Mathematics helps develop the mind and teaches a person to think
   SA [ ] A [ ] N [ ] D [ ] SD [ ]

5. Mathematics is important in everyday life
   SA [ ] A [ ] N [ ] D [ ] SD [ ]

6. Mathematics is one of the most important subjects for people to study
   SA [ ] A [ ] N [ ] D [ ] SD [ ]

7. High school Mathematics courses would be very helpful no matter what I decide to study
   SA [ ] A [ ] N [ ] D [ ] SD [ ]

8. I can think of many ways that I use Mathematics outside of school
   SA [ ] A [ ] N [ ] D [ ] SD [ ]

9. Mathematics is one of my dreaded subjects
   SA [ ] A [ ] N [ ] D [ ] SD [ ]

10. My mind goes blank and I am unable to think clearly when studying Mathematics
    SA [ ] A [ ] N [ ] D [ ] SD [ ]

11. Studying Mathematics makes me feel nervous
    SA [ ] A [ ] N [ ] D [ ] SD [ ]

12. Mathematics makes me feel uncomfortable
    SA [ ] A [ ] N [ ] D [ ] SD [ ]

13. I am always under a terrible strain in a Mathematics class
    SA [ ] A [ ] N [ ] D [ ] SD [ ]

14. When I hear the word Mathematics, I have a feeling of dislike
    SA [ ] A [ ] N [ ] D [ ] SD [ ]

15. It makes me nervous to even think about having to do a Mathematics problem
    SA [ ] A [ ] N [ ] D [ ] SD [ ]

16. Mathematics does not scare me at all
    SA [ ] A [ ] N [ ] D [ ] SD [ ]

17. I have a lot of self-confidence when it comes to Mathematics
    SA [ ] A [ ] N [ ] D [ ] SD [ ]

18. I am able to solve Mathematics problems without too much difficulty

SA [ ] A [ ] N [ ] D [ ] SD [ ]

19. I expect to do fairly well in any Mathematics class I take
SA [ ] A [ ] N [ ] D [ ] SD [ ]

20. I am always confused in my Mathematics class
SA [ ] A [ ] N [ ] D [ ] SD [ ]

21. I feel sense of insecurity when attempting Mathematics
SA [ ] A [ ] N [ ] D [ ] SD [ ]

22. I learn Mathematics easily
SA [ ] A [ ] N [ ] D [ ] SD [ ]

23. I am confident that I could learn advanced Mathematics
SA [ ] A [ ] N [ ] D [ ] SD [ ]

24. I have usually enjoyed studying Mathematics in school
SA [ ] A [ ] N [ ] D [ ] SD [ ]

25. Mathematics is dull and boring
SA [ ] A [ ] N [ ] D [ ] SD [ ]

26. I like to solve new problems in Mathematics
SA [ ] A [ ] N [ ] D [ ] SD [ ]

27. I would prefer to do an assignment in Mathematics than to write an essay
SA [ ] A [ ] N [ ] D [ ] SD [ ]

28. I would like to avoid using Mathematics in college
SA [ ] A [ ] N [ ] D [ ] SD [ ]

29. I really like Mathematics
SA [ ] A [ ] N [ ] D [ ] SD [ ]

30. I am happier in a Mathematics class than in any other class
SA [ ] A [ ] N [ ] D [ ] SD [ ]

31. Mathematics is a very interesting subject
SA [ ] A [ ] N [ ] D [ ] SD [ ]

32. I am willing to take more than the required amount of Mathematics
SA [ ] A [ ] N [ ] D [ ] SD [ ]

33. I plan to take as much Mathematics as I can during my education
SA [ ] A [ ] N [ ] D [ ] SD [ ]

34. The challenge of Mathematics appeals to me
SA [ ] A [ ] N [ ] D [ ] SD [ ]

35. I think studying advanced Mathematics is useful
SA [ ] A [ ] N [ ] D [ ] SD [ ]

36. I think studying Mathematics helps me with problem solving in other areas
SA [ ] A [ ] N [ ] D [ ] SD [ ]

37. I am comfortable expressing my own ideas on how to look for solutions to a difficult problems in Mathematics
SA [ ] A [ ] N [ ] D [ ] SD [ ]

38. I am comfortable answering questions in Mathematics class
SA [ ] A [ ] N [ ] D [ ] SD [ ]

39. A strong Mathematics background could help me in my professional life
SA [ ] A [ ] N [ ] D [ ] SD [ ]

40. I believe I am good at solving Mathematics problems
SA [ ] A [ ] N [ ] D [ ] SD [ ]

(Tapia & Marsh, 2004)

41.

APPENDIX C

Students' scores in Linear Algebra and their positive response scores

58	51	91	87	68	75	27	51	42	56
64	71	83	85	80	74	56	55	75	78
69	62	55	66	79	84	52	51	76	72
63	70	75	71	51	59	55	52	46	53
88	92	35	51	59	64	50	54	62	68
64	55	74	78	52	53	54	55	73	65
65	72	61	65	48	52	67	61	60	64
63	63	46	53	53	58	80	83	49	53
51	68	86	85	50	52	45	51	74	80
50	55	89	91	57	60	93	87	61	69
78	87	51	63	61	67	69	73	79	74
70	66	95	87	60	64	53	58	54	58
84	79	78	71	58	53	79	81	45	53
55	62	51	54	48	53	56	59	49	51
65	72	61	65	48	52	67	61	60	64

63 63 46 53 53 58 80 83 49 53

51 68 86 85 50 52 45 51 74 80

50 55 89 91 57 60 93 87 61 69

78 87 51 63 61 67 69 73 79 74

70 66 95 87 60 64 53 58 54 58

84 79 78 71 58 53 79 81 45 53

55 62 51 54 48 53 56 59 49 51

58 51 91 87 68 75 27 51 42 56

64 71 83 85 80 74 56 55 75 78

69 62 55 66 79 84 52 51 76 72

63 70 75 71 51 59 55 52 46 53

88 92 35 51 59 64 50 54 62 68

64 55 74 78 52 53 54 55 73 65

65 72 61 65 48 52 67 61 60 64

64 71 83 85 80 74 56 55 75 78

69 62 55 66 79 84 52 51 76 72

63 70 75 71 51 59 55 52 46 53

88 92 35 51 59 64 50 54 62 68

64 55 74 78 52 53 54 55 73 65

65 72 61 65 48 52 67 61 60 64

63 63 46 53 53 58 80 83 49 53

69 62 55 66 79 84 52 51 76 72

63 70 75 71 51 59 55 52 46 53

88 92 35 51 59 64 50 54 62 68

64 55 74 78 52 53 54 55 73 65

65 72 61 65 48 52 67 61 60 64

63 70 75 71 51 59 55 52 46 53

88 92 35 51 59 64 50 54 62 68

64 55 74 78 52 53 54 55 73 65

65 72 61 65 48 52 67 61 60 64

69 62 55 66 79 84 52 51 76 72

63 70 75 71 51 59

Students' scores in Linear Algebra and their negative response scores

50	44	49	41	19	49	48	38	31	47
63	43	41	48	63	37	59	43	48	42
49	40	47	43	50	41	61	48	50	46
24	49	17	45	50	40	49	41	61	46
58	39	51	31	60	33	59	40	56	37
23	49	68	47	84	48	47	27	45	26
37	29	51	28	40	25	44	27	43	28
40	25	44	27	43	28	61	26	48	30
50	44	49	41	19	49	48	38	31	47
63	43	41	48	63	37	59	43	48	42
49	40	47	43	50	41	61	48	50	46
24	49	17	45	50	40	49	41	61	46
58	39	51	31	60	33	59	40	56	37
23	49	68	47	84	48	47	27	45	26
40	25	44	27	43	28	61	26	48	30
50	44	49	41	19	49	48	38	31	47
63	43	41	48	63	37	59	43	48	42
49	40	47	43	50	41	61	48		

4.5	2.5	2.5	2.5	2.5	3.5	2.5	3.5
4.5	3.5	2.5	2.5	2.5	3.5	2.5	1.5
3.5	1.5	2.5	2.5	2.5	3.5	2.5	1.5
3.5	1.5	2.5	2.5	2.5	3.5	2.5	4.5
3.5	2.5	2.5	2.5	2.5	3.5	2.5	4.5
3.5	2.5	2.5	2.5	2.5	3.5	2.5	4.5
3.5	3.5	2.5	2.5	2.5	3.5	2.5	4.5
3.5	3.5	2.5	2.5	2.5	3.5	2.5	4.5
3.5	3.5	2.5	2.5	2.5	3.5	1.5	1.5
3.5	3.5	2.5	2.5	2.5	3.5	1.5	1.5
3.5	3.5	2.5	2.5	2.5	3.5	1.5	1.5
3.5	3.5	2.5	2.5	2.5	3.5	1.5	1.5
3.5	3.5	2.5	2.5	2.5	3.5	1.5	1.5
3.5	4.5	2.5	2.5	2.5	3.5	1.5	2.5
2.5	0.5	2.5	2.5	2.5	3.5	1.5	2.5
2.5	1.5	2.5	2.5	2.5	3.5	1.5	2.5
2.5	1.5	2.5	2.5	2.5	3.5	1.5	2.5
2.5	1.5	2.5	2.5	2.5	3.5	1.5	2.5

2.5	1.5	2.5	2.5	2.5	3.5	1.5	2.5
2.5	1.5	2.5	2.5	2.5	3.5	1.5	2.5
2.5	1.5	2.5	2.5	2.5	3.5	1.5	2.5
2.5	1.5	2.5	2.5	2.5	3.5	1.5	2.5
2.5	2.5	2.5	2.5	2.5	3.5	1.5	2.5
2.5	2.5	2.5	2.5	2.5	3.5	1.5	2.5
2.5	2.5	2.5	2.5	2.5	3.5	1.5	2.5
2.5	2.5	2.5	2.5	2.5	3.5	1.5	3.5
2.5	2.5	2.5	2.5	2.5	3.5	1.5	3.5
2.5	2.5	2.5	2.5	2.5	3.5	1.5	3.5
2.5	2.5	2.5	2.5	2.5	3.5	1.5	3.5
2.5	2.5	2.5	3.5	2.5	3.5	1.5	3.5
2.5	2.5	2.5	3.5	2.5	3.5	1.5	3.5
2.5	2.5	2.5	3.5	2.5	3.5	1.5	3.5
1.5	3.5	1.5	3				