COMPARISON OF SECONDARY SCHOOL STUDENT'S CHEMISTRY PERFORMANCE IN WAEC AND NECO EXAMINATION IN OLAMABORO LOCAL GOVERNMENT AREA, KOGI STATE

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ANTHONY, Esther Eleojo
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A PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF BACHELOR OF TECHNOLOGY (B.TECH) IN CHEMISTRY EDUCATION

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ABSTRACT

This study was designed to compare and contrast between the performance of students in West African Examination Council (WAEC) and National Examination Council (NECO) Senior School Certificate Chemistry Examination in Secondary Schools in Olamaboro metropolis, Kogi State. This study was essentially an Ex-post Facto Design. Six Secondary Schools were purposively selected from the senior secondary schools in Olamaboro metropolis whose students sat for West African Examination Council (WAEC) and National Examination Council (NECO) Senior School Certificate Chemistry Examination during the period of 2015 – 2019 with the population of 725 in NECO and 565 in WAEC sampled for this work using a simple random sample method. The data used were the West African Examination Council (WAEC) and National Examination Council (NECO) Senior School Certificate Examination (SSCE) result in Chemistry during the period of 2015 – 2019. Three null hypotheses were formulated and tested for the study using mean, standard deviation and independent t-test were used to analyse the data obtained. This study discovered that students who sat for WAEC and NECO from 2015 – 2019 in Olamaboro Local Governement Area of Kogi State had no significant difference in their general performance. It was also discovered that male students performed better in WAEC more than female while female performed better than male in NECO Chemistry Examination between 2015 and 2019 in Olamaboro Local Governement Area of Kogi State. The researcher employs school owners and teachers to work hard in improving students' performance both male and female in Chemistry Examination from average to above average level in Olamaboro Local Government Area of Kogi State and others areas likewise.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Education is the total process of human learning by which knowledge is imparted, faculties trained and skills developed (Díaz, *et al.,* 2010). It is an investment as well as an instrument that can be used to achieve a more rapid economic, social, political, technological, scientific and cultural development in a country Secondary schools not only occupy a strategic place in the educational system in Nigeria, it is also the link between the primary and the university levels of education (Alam, 2009). According to Asikhai (2010) education at secondary school level is supposed to be the bedrock and the foundation towards higher knowledge in tertiary institutions. It is rather unfortunate that the secondary schools today are not measuring up to the standards expected of them. There have been public outcries over the persistently poor performance of secondary school students in public examinations.

According to Nwokocha and Amadike (2015), academic performance of students is the yardstick for testing the educational quality of a nation. Hence, it is expedient to maintain a high performance in internal and mostly external examinations. For some years now, Reports on the daily newspaper timeline and ogbomida, 2012 revealed the abysmal performance of students of secondary schools in public examinations. Ajayi (2012), Nwokocha and Amadike (2015), WAEC (2013), Punch newspaper (27th September, 2018), Adeyemi (2018) and Asikhia (2010) have all shown the extent of poor performance of students in public examinations. The persistent decline in students' performance in public examinations is not only frustrating to the students and the parents, its effects are equally grievous on the society. One of the most potent barometers so far, if not the strongest, of measuring school performance of students is through public examinations such as Senior School Certificate Examination (S.S.C.E.) in Nigeria. These examinations are externally moderated and enjoy a lot of public

confidence. The form of education children receive after primary and before tertiary stage is called secondary education. Without secondary school products, it is obvious that the basis for any future academic study cannot be laid. From the aims and objectives of the setting up of schools, one would expect that Public and Private senior secondary school students' performance in Nigeria and specifically in Kogi State would greatly improve. Admittedly, no educational system is problem free. However, the decay in Nigerian educational system is becoming embarrassing. Ogunsaju (2016) described it as calamitous. Though, brilliant students can be found even in public schools, the high percentage of failure in WASSCE and NECO tends to rubbish the good ones among them.

To this end, the importance attached to good academic success or performance by the students as well as their parents and the difficulty experienced by these students have resulted in wide-spread failures, low grades, examination malpractices, cheating, and so on. These are the cases with the students taking the Senior Secondary Certificate Examination (SSCE) of the West African Examination Council (WAEC) and National Examination Council (NECO) (Ojukwu, 2014).

There has been wide cry each year when WAEC or NECO releases their annual results as a result of students' poor performance especially in the Science subjects (Salami, *et al.*, 2012). Candidates' performance at the Senior School Certificate Examination (SSCE) conducted by WAEC and NECO has consistently remained poor with Chemistry having one of the worst and poorest results over the years (Ibe & Madusnum, 2011). For example, a look at the five-year SSCE results in Chemistry from 2015 to 2019 shows that in 2010 out of 105,453 that sat for Chemistry in all the secondary schools in Abia State only 26,680 credited Chemistry. This means that only about one in four students can use Chemistry as one of the subjects that would qualify them for University admission. Yet, chemistry is a prerequisite to all courses in medicine and related field, all engineering courses, pharmacy,

and many others that are considered prestigious by the society. This means that there will be a low number of admissions in them, which will certainly affect the development of the country.

Studies carried out by Ajao, and Awogbem (2012) are not conclusive concerning student performance in WAEC and NECO examination in secondary school. These calls for the need to comparison of student performance in WAEC and NECO examination: a case study of Olamaboro Local Government Kogi State.

1.2 Statement of the Problem

The factors affecting academic achievement of students in WAEC and NECO in science subjects especially in chemistry has continued to be a major concern to educational authorities in Nigeria and other education stake holders. Over the years, the majority of students that sat for the May/ June West African Examinations Council (WAEC) and National Examination Council (NECO) have been recording mass failure, not only in the area of overall performance of the students, but also in the core subjects like English, Mathematics, Sciences (Biology, Physics, Chemistry), Geography, Vocational and Technical Studies and History where the high spate of failures have been a dominant feature of the students' performance both in the Public and Private secondary schools in Kogi Metropolis. The trend achievement has been more pronounced in rural areas such as Olamaboro local government in Kogi State. The academic performance has led to low mean grade for most candidates and thus jeopardize their chances for upward social mobility.

At the national level, the academic achievements has led to low uptake of career in science and technology and in an effort to reverse the trend, various measures are adopted targeting students, teachers and the overall teaching and learning environment. Statistics reeled out by the two examination bodies, the National Examination Council (NECO) and the West African Examination Council (WAEC), which is the particular focus of this study (Mutuku, 2014). Each

time the results of West African Examination Council (WAEC) and National Examination Council (NECO) examinations are released, they point to the fact that students drawn from both Public and Private schools have not been performing up to the required standards despite the high investment which the government, both at the federal and state levels, as well as the parents have been making in the sector, though, some still pull their weight (Kenni, 2015).

Despite these measures, student's chemistry performance in WAEC and NECO in Olamaboro local government in Kogi State continues with lower mean than the national averages being recorded year after year. The continued poor achievement in chemistry in both SSCE examination (WAEC and NECO) have been attributed to a number of factors including student's attitude towards chemistry, students resources for learning, students inter-personal relationship and students regularity to class. However, it is not clear which of the factors are responsible for the poor chemistry performance in Olamaboro local government in Kogi State. The study therefore sought to isolate the factors which could have been responsible for Olamaboro Students poor achievement in chemistry and to compare the performance of students in both WAEC and NECO examination in Olamaboro local government in Kogi State

1.3 Aim and Objectives

The main purpose of this study is to identify the performance of student in WAEC and NECO examination: a case study of Olamaboro Local Government Kogi State. Specifically, this study seek to:

1. Assess the general performance of students in WAEC and NECO examination in chemistry in Olamaboro Local Government Kogi State.
2. Ascertain the performance of male and female students in WAEC examination
3. Assess the performance of male and female students in NECO examination.

1.4 Research Questions

1. What is the general performance of students in WAEC and NECO examination?
2. What is the performance of male and female in WAEC examination?
3. What is the performance of male and female in NECO examination?

1.5 Research Hypotheses

The following null research hypotheses will be tested in the study:

Ho_1 There is no significant difference in the mean performance of Students in WAEC and NECO examination in chemistry in Olamaboro Local Government Kogi State.

Ho_2 There is no significant difference in the male and female performance of students in WAEC examination in chemistry in Olamaboro Local Government Kogi State.

Ho_3 There is no significant difference in the male and female performance of students in NECO examination in chemistry in Olamaboro Local Government Kogi State.

1.6 Significance of the Study

1. The findings of this study will be beneficial to State‘s government and policy makers, Technology Teachers, Curriculum Planners, Parents and the Society

ii. The curriculum planners will make use of the findings during innovations. It will assist them to ascertain how they set goals and objectives of quality education on students’ performance have been achieved and as well seek for improvements where necessary.

iii. The findings of this study will also help students to deepen their interest in the subject, and help them to understand what skills they need to survive in a complex, highly technological knowledge based economy.

iv. It will also improve students directly in their study habit in chemistry. Students will be better enabled to learn and easily refine their analysis and problem-solving skills. It will also help students to have clear understanding about vocational education and it will give student clear understanding about their future decision.

v. The findings of the study will bring an awareness of the usefulness and help the society to be able to give every members of the society proper education in order to acquire proper skill and knowledge of chemistry to improve and develop the society.

vi. The findings of the study will help parents to give adequate sense of motivation to students as this inspire them to pay special attention to the learning of chemistry. It will also encourage parents to be more involved in the school work of their ward by providing them with all the necessary materials needed to encourage them.

1.7 Scope of the Study

This study will be carried out to identify the performance of students in WAEC and NECO examination in Olamaboro Local Government, Kogi State. This study will cover both the Public and Private Secondary Schools in Olamaboro Local Government of Kogi State. the study is limited to 2015-2019 WAEC and Neco Result.

CHAPTER TWO

A REVIEW OF RELEVANT LITERATURE

This chapter deals with the review of relevant literature to this study. The literatures were reviewed under the following headings.

2.1 West African Examination Council (WAEC) and National Examination Council (NECO) as Major Examination Bodies in Nigeria

Nigerian students obtain their Senior School Certificate by passing examinations administered by either the Western African Examinations Council (WAEC) or the National Examinations Council (NECO) (Udofia and Udoh 2017)). Many universities have also begun to administer their own entrance examinations due to allegations that results in these external examinations have been manipulated (Astin 2012).

Established in 1952, WAEC's mandate is to determine examinations required in the public interest in West African Countries. WAEC has five member countries: the Gambia, Ghana, Liberia, Sierra Leone and Nigeria. From 1952 to 1968, WAEC performed its duties well without much criticism. Criticisms started becoming louder in 1967 as a result of massive failure plus other variables, which made the country Nigeria to hold a national conference in 1969. The conference held in 1969 heralded the development of yet another curriculum different from the one Nigerians were used to prior to independence. This curriculum conference was a turning point in the curriculum development history of Nigeria, mathematics inclusive. The outcome of this conference was what gave birth to a new curriculum which comprises some part of the pre-independence curriculum and some new aspects (like Modern Mathematics Curriculum) were introduced (Anibueze, 2015). Anibueze (2015) stated that the WAEC adopted the new curriculum in 1974 but the 1974 results were very poor.

However, from 1970s, some issues appeared to be getting too much for WAEC to handle such as timely release of results, massive failure, uncontrollable population explosion of candidates, overloading of works, cases of leakage of examination papers and increased rate of examination malpractice (Fehintola, 2011). The massive leakage of question papers in 1977 was the climax which led the Federal Government of Nigeria to set up the Sogbetan Commission of Inquiry to investigate the situation. It was as a result of these that made the Federal Government of Nigeria to establish National Technical Examination Board (NABTEB) for technical and business subjects, National Teachers Institute (NTI) for teachers Grade two certificate examination and National Examinations Council (NECO) for Senior Secondary school Certificate Examination These were established based on the Sogbetan Commission's recommendation to the Federal Government of Nigeria in April 1999. The Sogbetan Commission's recommendation also brought about the transformation of the National

Board for Educational Measurement (NBEM) that was established under degree no 69 of August 1993.

In 1999, the government of Nigeria created NECO, which was given the responsibility to administer Secondary School Certificate Examinations (SSCE) (NECO, 2005). NECO administered its first SSCE in 2000. Famakinwa (2009) revealed that NECO was an attempt to bridge the educational gap between the different geographical sections of the country. National Examinations Council (2005) revealed that its arrival was an opportunity for choice of examination body for candidates to patronize. Ahmed (2014) however augured that NECO had standard quality of question papers set and grades when compared to Broom's principles of evaluating students which, according to him, has made NECO to be superior to WAEC.

WAEC and NECO administer the SSCE twice a year: internal or school candidates (i.e., those who are finishing their last year within the secondary school system) write the examination in the spring or early summer, while external or private candidates (i.e., those who are outside the school system) write the exam in late autumn (NECO, 20015, WAEC, 2019). Candidates are tested on a minimum of eight and a maximum of nine subjects. The SSCE grading system is as follows: A1 – Excellent, B2 – Very Good, B3 – Good, C4 – Credit, C5 – Credit, C6 – Credit, D7 – Pass, D8/E8 – Pass and F9 – Fail. The results of the SSCE are reportedly used to obtain employment, to qualify to run in elections and to gain admission into university or college (NECO, 2015).According to the NECO website, however, universities and colleges in Nigeria are required by law to recognize certificates awarded by both NECO and WAEC. Looking at studies that have attempted to compare

WAEC and NECO, it would be observed that most of them were based on opinions. While recognizing the fact that opinions could serve as indicators, they are not the best to be used in taking decisions, when it is possible to obtain facts and those authors that did not rely on

opinions attempted to compare grades obtained in the university by holders of the two certificates (Okoye & Nwafor, 2009).

Apart from the comparison of grades, Okoye and Nwafor (2012) had called for a comparison of the question papers set by the two examination bodies to see if the variances in the performances of candidates possessing the two certificates could be explained using them. Rodriguez, et al., (20015) had made an attempt to do this comparison, but he merely asked teachers and students their opinions about the bodies.

2.2 The State of Chemistry Education in Nigeria

Chemistry is one of the core science subjects in the national education curriculum. It is studied alongside other related basic science subjects such as Biology, Physics and Mathematics. This is to prepare students for the pursuance of Chemistry academically as well as professionally to acquire appropriate and adequate foundation knowledge for such fields of studies like Engineering, Pharmacy, Medicine and Veterinary Medicine etc, to mention but a few. These fields cannot be studied without Chemistry as it serves as pre-requisite to them. Gero (2017) asserted that "chemistry is a science subject from which all science and technology disciplines draw sustenance". According to Gero (2017), "chemistry occupies such a central position in the science world that knowledge of it is required in the study of Agricultural Technology, Medicine, Pharmacy, Engineering, Petrochemical Engineering, Veterinary Medicine, Geology, Technical Education, Industrial Technology, Food Technology, Biological, Dentistry, Dietary and Physical Sciences".

The contribution of Chemistry in the overall development of Science and Technology cannot be overemphasized. Chemistry provides the individuals with the ingredients which make them self-reliant and useful to the society which they belong to. Smitha, (2012) concluded that "Chemistry is a subject which is very ideal for inculcating in students the virtues of honesty, critical thinking, spirit of inquiry, cooperative attitudes and the ability to observe nature

consciously and logically". In view of the above, Gero (2017) further observed that, "Chemistry curriculum should surely reflect, the importance of Chemistry in our daily lives". This brings about the need for a curriculum that is more relevant to the need of our dynamic society.

This must have been the reason for the senior secondary school Chemistry curriculum to have been designed in such a way that the component topics are logically arranged, each unit in the curriculum is organized under topic, performance, objectives, content, activity and notes. The present design is more or less a scheme of work, which has been made available to the teacher to save him time and energy in planning his lesson.

The Chemistry curriculum places more emphasis on guided discovery method than the traditional lecture method. This implies that each science-based secondary school should have a well-equipped laboratory for effective Chemistry instruction and realization of the objectives in view. Here the Chemistry teacher is advised to manage the laboratory resources very well. Another aspect of the Chemistry curriculum is the use of continuous assessment (CA). The CA is the cumulative assessment of the students' performance which reflects the cognitive, psychomotor and effective domains of educational objectives. To ensure that the CA is effectively used in schools, workshops and seminars have been organized from time to time for practicing Chemistry teachers to educate them on the statistical method employed in the use of CA. CA has many desirable advantages which have led to its acceptability in other levels of learning (Baehr, 2015)). This is a step taken to give all students a technological orientation so as to enhance technology education in Nigeria.

However, the pace at which scientific and technological development grow in Nigeria is very slow. This slow rate according to Iloputaife (2010) has been attributed to a number of factors which include lack of facilities, teachers' non-seriousness/dedication to work, lack of interest on the part of the students while some may be related to the state of science education

enterprise in Nigerian schools. For instance, Ette (1990) indicated that a major defect in our science education is that science is presented dogmatically in most schools as a series of disjointed facts and concepts which students find difficult to relate to real world. He further tated that most of our secondary schools' laboratories are ill-equipped and as a result students are denied that feeling of participation and reality which practical classes and demonstration provide.

The WAEC chief Examiner's reports according to Gero (2011) indicated that "the poor performance of students in science subjects has assumed a disturbing dimension. In the light of this, science educators need to seek suitable ways of tackling the current mass failure if they are to halt the drifts of students to arts and social science subjects".

Achor *et al*., (2019), looking at the position of Chemistry Education in Nigeria observed that, a great majority of the currently serving school teachers are not qualified to teach Chemistry at the secondary school level. The teachers we have who teach Chemistry in Nigeria might have been responsible for the poor performance of students in the Senior School Certificate Examination (SSCE) and of course the lack of progress in technology. The relevance of Chemistry among the basic science subjects is apparent; hence the need for it to be taught properly in the secondary schools to enhance students understanding of the subject and improve their performances in both internal and external examinations is required. This can equally increase their chances for gaining admissions in to institutions of higher learning.

Teachers of Chemistry are expected to make Chemistry more relevant, enjoyable, easy and meaningful to students. Teachers need to improve their teaching methods and employ appropriate teaching strategies as the teaching–learning situation may demand.

Chemistry is one of the basic science subjects which are essentially the pre-requisite for technological breakthrough. Hence, the need for effective Chemistry education in Nigeria appears very crucial and therefore, deserves considerable attention. The implication of a

student failing Chemistry at the ordinary level is that he/she will not be enrolled for science based courses at institutions of higher learning. The relevance of Chemistry among the basic science subjects is apparent; the need for it to be taught properly in the secondary schools to enhance students understanding of the subject and improve their achievements in both internal and external examinations is required. This can equally increase their chances for gaining admissions into institutions of higher learning.

Many researchers in science education reported that poor facilities for teaching and teachers' poor presentation of instructional materials in the teaching of Chemistry may be responsible for students' lack of interest in the subject, which eventually results in their failure in both internal and external examinations.

Study by Okebukola, (2005) on variables of teaching comparing different methods of teaching on ability grouping, cooperative learning found poor achievement of students to be as a result of poor classroom teaching and students' poor attitude to school attendance. In particular, the students' performance in Chemistry in senior school certificate examination (SSCE) has been very poor (Adewumi and Monisola 2013). This continuous poor academic performance in Chemistry is an indication that a lot need to be done to make Chemistry education satisfactory in Nigeria. These observations are in line with the trend as described by the WAEC Chief Examiner's reports (2012), where it was indicated that generally candidates' performance in the Paper I was poor due to poor knowledge of fundamental principles and procedures especially in qualitative analysis and lack of exposure to laboratory techniques. In 2014 while making a general comment, the Chief Examiner observed that generally candidates' performance was poor compared to previous years of 2010, 2011 and 2013. In 2005, the WAEC Chief Examiner's in the annual reports lamented that the candidates have inadequate practical exposure and poor knowledge of the concepts of the P^H.

In order to make Chemistry real and relevant in Nigeria, Chemistry teachers should motivate their students by adopting teaching strategies in which they are made to participate actively in lesson and using local and familiar materials in illustrating scientific facts and principles related to Chemistry. Thus, making those things in Chemistry being imagined abstract is made concrete. Literature shows that teachers still hold up to the use of expository or didactic teaching method in Chemistry classroom. This method of teaching leads to rote learning of facts, concepts and principles which is away from the scientific principles of developing skills necessary for solving problems in the society. Ramadan (2016), pointed out that much of what is learnt in school is rote learning whereby students learn statements or formulae directly from the teachers or textbooks and reproduce such information on cue. Such students, he said are unable to use their learning outside the classroom.

Abungu et al., (2014) asserted that Chemistry is an activity oriented subject requiring expertise on the part of the teachers and active involvement of the students in practical work. He further stated that, a study done by Balogun and Olarewaju (2001), has established a significant difference in performance between students taught through the activity method and those taught through the lecture method. Lassa (2000), also observed that activity based science instruction has been found to be superior to non-activity based ones in promoting science processes development, learning of science content, attitudes, creativity and language development.

2.3 Practical Work as a Factor in Chemistry Teaching

The Chemistry curriculum places more emphasis on guided discovery method which is activity oriented than the traditional lecture method for the teaching of Chemistry Practical work has been described as a process of learning which demands activity rather than

receptivity which is characteristics of theoretical work. Arnold *et al*., (2014) noted that science teachers have always recognized the importance of practical work as a means of introducing learners to the scientific process of experimentation. In relation to this, the United Nations Educational Scientific and Cultural Organization (UNESCO) and the International Union of Pure and Applied Chemistry (IUPAC) have participated in numerous international meetings to promote inexpensive experimental based teaching in chemistry. Effective teaching of practical chemistry which laid emphases on bench-work, in Nigerian secondary schools, is of uttermost importance to students, teachers, parents and the government. They continued by saying that chemistry teaching should develop in the student manipulative and experimental skills to make him or her confident in conducting experiments and or researches. Student should do practical work of conducting experiments, reporting their observation and making inferences or conclusions, thus, developing their scientific knowledge and experimental skills and at the same time arousing and maintaining interest of the students in the subject. Nwona and Madu (208) noted that practical work involves the students in observing, counting, measuring, experimenting and recording observations. The aim of practical according to Ugwuanyi (2017) is to inculcate into the students the habit of drawing conclusions based on observation and experimentation. Exposure of students to practical work enables them to develop scientific skills.

Motlhabane, (2013). were of the same view with Ugwuanyi when they stated that practical work helps students to develop manipulative skills through opportunities offered them in enquiry, discovery, practical investigations and the handling of equipment and apparatus. They further observed that practical work helps the student to learn how to generalize their way of thinking such that it is useful to them in the interpretation of phenomenon and solving societal problems. But science educators are worried over continued poor performance of students in chemistry practical in SSCE. A number of studies conducted by

science educators on the poor performance of students in Chemistry pointed an accusing finger on practical work Akalonu (1998) opined that chemistry students failed to acquire the necessary practical skills needed for success in external examination. This view is in line with the WAEC Chief Examiner's reports (2002) which indicated among other things, that students' major weaknesses in practical chemistry examination were in the areas of:

i. Poor description of colors of solution, precipitation, gases or odor of gases.
ii. Poor mathematical competences in questions requiring calculations.
iii. Poor interpretation of scientific data or poor deductive reasoning
iv. Inability to read or measure accurately e.g. burette reading.
v. Inability to relate theoretical knowledge to practical observations
vi. Inability to carry out confirmatory test in qualitative analysis etc

The Chief Examiner further remarked that generally candidates' performance in the paper was poor due to poor knowledge of fundamental principles and procedures especially in qualitative analysis and lack of exposure to laboratory techniques.

This consistent poor performance of students in practical Chemistry may be an indication of the quality of teaching they received in that aspect of secondary school Chemistry. This study looks forward to address this problem in our study of Chemistry in Nigeria.

2.3.1 Laboratory Facilities/Materials as a Factor in Chemistry

The Chemistry curriculum places more emphasis on guided discovery method than the traditional lecture method. This implies that each science-based secondary school should have a well-equipped laboratory for effective Chemistry instruction and realization of the objectives in view. Here the Chemistry teacher is advised to manage the laboratory resources very well. Provision of adequate physical facilities such as well equipped laboratories,

workshops and classrooms will therefore go a long way in promoting effective teaching and learning of science. The present bad condition of science laboratories is quite alarming. Very few laboratories exist and even where they exist, they are virtually either empty or haphazardly filled. This situation is unhealthy for the effective teaching of Chemistry and related subjects. In connection with this, Akomolafe and Adesua (2016) stressed that basic laboratory facilities in Nigerian schools are lacking. He believes that in an ideal situation, different science subjects such as Chemistry, Physics and Biology should have separate laboratories. In reality, however, the condition is very unpleasing. In some schools where science and technology are taught, not even a single laboratory or workshop is available. Students that learn under this condition are exposed to only the theory of science rather than scientific skills. They do not acquire knowledge about discovery method, which will assist them in developing their investigative skills, which could later be applied whenever the need arises.

Potkonjak et al., (2016) while expressing their views on science teaching facilities argue that, "the teaching of science and technology subjects requires the use of specialized laboratories, workshops, machines, tools and equipment. Unfortunately in Nigeria, this low-level of funding of schools makes it impossible to properly and adequately equip their workshops, studios and classrooms

Edomwonyi and Avaa (2011) reported that the noticeable poor performance in chemistry in external examination is caused by lack of laboratory materials which normally result to inadequate practical before the examination. Edomwonyi and Avaa (2011) seems to support the above claim when he reported that physical facilities like classrooms, laboratories are abysmally inadequate, un- maintained and lack requisite apparatus and equipment. Ogunniyi (1996) and F.l.S, Inspection Reports (2004), Studies on resources and laboratory work examined the relationship between laboratory facilities and students' achievement and skill acquisition, the outcome of the study showed that laboratory activities in selected schools was

still more or less an extension of the theoretical class rather than a place to carry out investigation due to lack of facilities. F.I.S. Inspection Reports (2005) found a set of behaviours (manipulating apparatus, observing activity, etc) correlated strongly with manipulative skills and conduct of the experiment, while students' attitude to laboratory work correlated strongly with manipulation of apparatus. Okebukola (2005) while investigating the relationship between laboratory facilities and students' laboratory skills acquisition in secondary schools discovered that many biology, physics and chemistry students revealed poor powers of observation, poor measurement, classification and experimental skills of inferring, predicting and formulating models due to lack of laboratory facilities in some schools.

2.4 Teacher Quality and Students' Achievement in Chemistry

An educational programme can only achieve its goals and objectives if it realizes and recognizes the role of qualified teachers in the teaching and learning processes. The National policy on Education (2004), in recognition of the role of teachers, made it clear that "No education can rise above the quality of its teachers". In order to attain quality in Chemistry Education in Nigeria, much consideration should be placed on the training of qualitative teachers to handle the course. If quality is to be achieved in the teaching and learning of Chemistry, interest must be shown in developing teachers' capability to communicate in the language of Chemistry in the classroom. This is crucial as Ezeano (2002) noted that:

In the classroom, this communication is called pedagogy, which must evolve over the years, decades and centuries. Current wisdom tells us that an effective pedagogy is the one where the involvement of the learner is active, not passive. No longer do we think of students as repositories of what is taught them but as active partners in the learning process.

Chemistry is vital in the science world, being a gateway to professions like Medicine, Pharmacy, Dentistry, Agriculture, Engineering, Biochemistry and a host of others. However,

poor academic achievement of chemistry students is evident in senior secondary school certificate examination. Science educators are worried over poor performance of chemistry students in secondary schools as this does not augur well for science education programs at tertiary institutions of learning.

2.5 Methods of teaching of Chemistry

Method of teaching is a technique adopted by a teacher which enables him to achieve the stated objectives of an instruction. Many science education researchers reported that poor facilities for teaching and teachers' poor presentation of instructional materials in the teaching of Chemistry may be responsible for students lost of interest in the subject and eventually resulting in their failure in both internal and external examinations. Studies on variables of teaching compared different methods of teaching on ability grouping, cooperative learning and enhancement strategies and found poor performances of students to be as a result of poor classroom teaching and students' attitude to school. Wyk, (2011).

Wyk (2002) reported that no one method can be regarded as the best for teaching every situation. Okorie (2004) suggested that a combination of teaching methods should be adopted for teaching chemistry. According to him, a carefully designed teaching method can work wonders in making learning effective. Ali (2002) grouped the various methods of teaching science into three viz: Practically- based teaching method (laboratory, demonstration inquiry, investigation).

Theoretically- based method (lecture execution, seminars, etc).

There are many methods of teaching that can be adopted for teaching chemistry. Effiong and Enukoha (2003), found that both inquiry-based and refined traditional approach could be employed as viable alternatives in science teaching. Ette (1990) indicated that a major defect in our science education is that science is presented dogmatically in most schools as a series of disjointed facts and concepts which students find it difficult to relate to real world. He further

continued that most of our secondary schools' laboratories are ill-equipped and as a result, students are denied that feeling of participation and reality which practical classes and demonstration provide.

The WAEC chief Examiner's reports (2001) indicated that "the poor achievement of students in science subjects has assumed a dangerous dimension. In the light of this, science educators need to seek suitable ways of tackling the current mass failure if they are to halt the drifts of students to arts and social science subjects".

2.5.1 Factors Affecting Students' Achievement in Chemistry

Adeyemi (2008) examined teachers' teaching experience and students' learning outcomes in the secondary schools in Ondo State Nigeria. As a correlational survey, the study population comprised all the 257 secondary schools in the State. This population was made up of 147 rural schools and 110 urban schools. It was also made up of 12 single sex schools and 245 mixed schools. Out of the population, a sample of 180 schools was drawn through the process of stratified random sampling technique. An inventory and a semi-structured interview schedule were the instruments used to collect information for the study. The data collected were analysed using chi square test, correlation analysis and t-test. The semi- structured interview was conducted with selected principals and education officers. Their responses were analysed through content analysis. The findings revealed that teachers' teaching experience was significant with students' learning outcomes as measured by their performance in the SSC examinations. Schools having more teachers with five years and above teaching experience achieved better results than schools having more teachers with less than five years teaching experience. Kaboro, (2015) in their study were concerned with science concept attainment through the use of environmental analogies. They demonstrated the use of analogy models in facilitating conceptual change by using a sample of 248 senior secondary two students selected from two schools in Zaria. A pre-test post-test control group utilizing the analysis of covariance

was used for this study. The experimental group was instructed using teaching with analogy (TWA) modes together with the enriched analogical linkage derived from environment familiar to the students. The control group was instructed using the expository method which has not enriched analogical linkage. The result of the study indicated that those taught with analogies performed better than those taught without analogies.

Gero (2017) conducted a study on the constraints to effective teaching of chemistry practical in SSS. The purpose of the study was to determine the major problems encountered by chemistry teachers in the teaching of practical chemistry as well as to determine the effect of school location on the extent of problems encountered by chemistry teachers in the conduct of chemistry practical. Based on the two research questions that guided the study the researcher found that there exist some constraints to effective teaching of chemistry practical, with rural schools experiencing more difficulties in the conduct of chemistry practical than their urban schools counterpart. Some of the reported factors that militate against the effective conduct of chemistry practical in schools include non-availability of essential chemicals and equipment, as well as lack of interest by chemistry teachers in organizing practical for their students.

In another study Akale and Usman (1996) investigated the effect of practical activities on achievement in integrated science among junior secondary school students in Kaduna state. Based on the three research questions and four hypotheses that guided the study, the researchers reported that there is significant difference in achievement between students exposed to more practical activities and those taught in the conventional way. In another study Ugwuanyi (1998) investigated the effects of guided discovery and expositor teaching methods on students' academic achievement in physics. The purpose of the study was to empirically determine the extent to which expository and guided discovery methods actually

affect achievement in physics. He found out that guided discovery method of instruction in physics is more effective in enhancing performance than expository method.

Some researches on teacher factor in STM teaching examined teachers' academic/ professional qualification (FIS Inspection Reports 2004 – 2005); reported that Okebukola (2005), examined the relationship between teacher perceived difficult topics in Biology Chemistry and Physics with their professional qualifications and their years of experience. The purpose was to determine the extent to which the years of experience have influence on the understanding of those topics in the various subjects. He identified some 'O' level physics, chemistry, Biology etc. topics which teachers perceived as difficult to teach and this difficulty correlated significantly with their professional qualifications and years of teaching experience. In yet another study Bolorunduro (1998) examined the relationship between laboratory facilities, teachers' qualifications, practical periods, interest in chemistry, laboratory as a venue for chemistry lesson for experiments and students' achievement in chemistry. The purpose of the study was to empirically determine the extend to which students use the laboratory facilities, the attitude of students to practical work and also to examine the laboratory facilities available in the chosen schools. The result of his study revealed that students in schools with adequate facilities achieved better than those in schools with less or without laboratory facilities. He also found that students in schools with more qualified teachers achieved better than those with less qualified teachers. Akinyele (1997) reported that students' poor performance in the practical aspect of chemistry examination contributes significantly to the high failure rate in the subject.

The continuous poor achievement of students in practical chemistry is an indication that all is not well with our chemistry education. Chemistry teaching in Nigerian secondary schools is dominated by teachers' lecture/expository method (Gero 2017). This method has failed to

produce chemistry students that are committed to chemistry and who can reason critically and be able to transfer what is learnt to new but similar situations.

2.5.2 Gender as a Factor Influencing Students' Performance in Chemistry

The term gender is often used to indicate the distinction between human beings on the basis of masculinity and feminity in relation to their expected roles. Tobin and Menon sees gender as a cultural construct which; distinguishes the roles, behaviour, mental and emotional characteristics between the male and the female. To Eribe and Ande (2021), gender is a socially defined status as roles and actions ascribed to women and men so as to distinguish who they are, what is expected of them by the society and how they relate to each other for meaningful coexistence. This meaningful coexistence is influenced by the education of both men and women because education is believed to "play a great role in furthering social solidarity and integration in the society" as noted by Eriba and Ande (2021).

Gender can then be understood to mean socially ascribed attribute which explains the condition of being male or female. There are conflicting opinions on gender related issues in science achievement. Some educators pointed that sex plays no significant role in student academic achievement in science while others hold contrary opinion.

Achievement test results over the years have shown an ever increasing gap between the performances of boys and girls in chemistry at senior secondary school level (Smith, 2011). In fact, girls now tend to ignore the subject all together. This has resulted to a situation where there are more boys than girls doing chemistry at this level. As a result, chemistry classes and science classes in general are dominated by boys while the girls go into reading languages and Arts. The perceived low achievement of girls in chemistry is an unpleasant development as it spells doom for those of them who would like to pursue careers in the sciences. This is because a pass at credit level in chemistry is required at Senior School Certificate Examination (SSCE) for admission into science programmes in the universities.

2.6 Theoretical Framework

2.6.1 Jean Piaget Cognitive Development Theory of Learning

Jean Piaget (1896-1980) was primarily interested in how knowledge is developed in human organisms. Cognitive structuring of the knowledge was fundamental in his theory. Some of his propositions on the concept of intelligence and its development are that intellectual development occurs in four broad stages: sensory-motor, pre-operational, concrete and formal operations. The stages are in sequence and overlap. The ultimate goal of intellectual development is cognitive adaptation, or the development of abstract thinking and reasoning. Each stage of intellectual development is characterized by distinct behavior functioning (Zahodne and Tremont 2013). There are some distinct behaviors observed at various developmental stages. During the Sensory-motor Stage, (0 to 2 years) sensory experiences and motor activities dominate. Intelligence is intuitive in nature and knowledge; it is acquired through mental representation during the Preoperational Stage (from age 2 to age 7). At the Concrete Operational Stage (from age 7 to age 11), intelligence is logical, conserved, and dependent on concrete references. The Formal Operational Stage (11 years and above) is the stage when abstract thinking starts and the learner starts thinking about probabilities, associations, and analogies Ozer (2004).

Piaget went further to emphasize a number of factors that facilitate intellectual development as follows:

1. Maturation of body organs and internal structures essential for thinking and learning of different things. This is maturational readiness which is biological in nature.
2. Development and use of language – which aids communication and social interaction within a child's social environment, facilitates self-expression and clarifies thinking.
3. A rich and stimulating environment which provides the child with objects, people and situations to act upon, experiment with and manipulate.

This theory is relevant to this study because the outdoor education components of the BST curricula are in accordance with the developmental stages of the pupils. The outdoor is rich enough with resources to stimulate the pupils into thinking and construction of knowledge. The use of outdoor education in teaching of those science concepts that are better learnt out-of-door as stipulated by the BST curricula of the lower and middle basic education level is also best suited for the pupils at these levels because according to Piaget they still lack abstract thinking and reasoning. Therefore, the likelihood of misconceptions of these concepts is reduced and the incomplete or distorted ideas that the presentation of components of a subject removed from its context creates in the child's schema is removed.

These theories are all learning theories as they deals with the pattern through which learning processes takes place. It can be observed from the theories that learning occurs through the interactive processes of the teachers and the learners that is to say that certain methodologies must have to be employed in a hierarchical order (simple to complex).

This stage shows a dramatic improvement in intellectual operations. This great wave of intellectual revival obviously opens up a new realm of educational possibilities for these young adolescents who get more explorative, restive and adventurous. Cobb (2000) saw this period as one of the most creative of the life span for these individuals. Since one of the goals of education is to create man who is capable of doing new things, men who will not simply be repeating what others have done, then the opportunity at this stage of formal operation needs to be fully explored and sustained.

The individual's explorative tendencies at this stage enable him or her to manipulate facilities available in and around the environment. It is now the sole responsibilities of the teachers of chemistry to improve on teaching approaches like problem solving and so that these skills and knowledge can be fully imparted in them. Memory or intelligence needs nurturing for it to grow.

Apart from what they thought could increase intelligence, Bruce and Carolyn (2005), suggested that children could grow their intelligence if they experienced a stimulating environment. To them, a stimulating environment encourages thinking out ideas as well as emotional intelligence. They advocated that formal reasoning can only be attained through appropriate environmental stimulation. And as noted by Nwachukwu (1999:137), "children are born with inherited potentialities for intellectual growth but that they must develop into that potential through interaction with the environment". There are advantages inherent in creating a stimulating environment and this should be encouraged and guided for positive and meaningful learning to be achieved.

The theory emphasis on the cognitive development of learners. It observes that learning is usually in sequence based on the intellectual development and maturation of the learners. The teachers of chemistry should ensure to adequately arrange the learning tasks to tally with the level of maturation alongside with the appropriate methodology(s) to be adopted so as to effectively promote understanding of ideas, facts concepts etc. by students.

Problem solving and s of teaching can effectively be handled by the teachers of chemistry if the learning environment (classroom) is made stimulating and conducive. Advisably, for teachers of chemistry to perform, teaching materials/facilities should be made available. It is this only that can make the objective of the above teaching methods problems solving to be accomplished with ease.

In school learning, the interest of the learners is very paramount and should be sought after and encouraged. This is why teachers are also encouraged to vary their methods of teaching so as to ensure that learners' interest and attention are guaranteed for effective and meaningful learning to take place.

Well demonstrated and problem solving based lessons could enhance learning as student's interest and attention span are secured. This happens because students play with materials and are also engaged with exercises under a conducive classroom environment.

From the various cognitive theories of learning presented by the researcher, this present study on methods of teaching chemistry, is majorly hinged on Jerome Bruner's theory of learning. The choice of the theory was based on the fact that Bruner was instrumental in formulating discovery approaches in science learning based on his involvement in science formulation curriculum development projects of the 1960's and 1970's. His theory believed that the goal of education should be intellectual development and that the science curriculum should foster the development of problem-solving skills through inquiry and discovery.

From his theory too, it was also observed and stated that discovery learning encourages students to actively use their intuition, imagination and creativity. To really apply Bruner's ideas in the classroom, teacher would present both examples and non-examples of concepts, help students see connections among concepts with questions, pose questions and allow students to find an answer and encourage students to make intuitive guesses. The above can only be effectively facilitated based on the principles of motivation, structure, sequence and reinforcement.

2.7 Review of Related Empirical studies

Saleh et al., (2011), carried out a research on The Relationship Between Students' Achievement in The Theoretical And Practical Aspects Of Senior School Certificate Mock Examination In Chemistry. In this study an attempt was made to compare and find the relationship between students' achievement in theoretical and practical aspects of Mock Senior School Certificate Examinations in Chemistry. The study adopted a correlational research design which specifically, compared recorded scores of students in theoretical and practical aspects of chemistry MOCK Examination of 2007-2009 academic sessions. Five research questions and five hypotheses guided the study. A total of 1200 SS3 students drawn from twelve secondary

schools within Potiskum education zone of Yobe state were used. The students were drawn through purposive sampling technique. Eight male schools and four female schools were used for the study. Mean and standard deviation of scores were used to answer the five research questions while Pearson Product-Moment Correlation analysis was used to test the five null hypotheses at $p < 0.05$. The result showed that students achieved better in the theoretical aspect than in the practical in the MOCK Examination in Chemistry 2007 – 2009 in Potiskum Education Zone of Yobe State. It also indicated that Gender and Location had differential effects on achievement of students in Chemistry Examination. The male students achieved more significantly better than their female counterparts in both theoretical and practical aspects.

The study revealed that students in the urban area achieved more significantly better than their counterparts in the rural area in both theoretical and practical aspects. It also revealed that there were no significant relationships between students' achievement in the theoretical and the practical aspects of the examination. Thus it was concluded that students do not have enough laboratory experience to cope with the demand of the external practical examination in Chemistry. Therefore it was recommended that Chemistry teachers should give more priority to practical experiments as part of instruction in order to improve students' understanding of practically related concepts. Theoretical and practical instructions should be given side by side.

The similarity between this study and the current study is that the study is based on the performance of student in chemistry, and the past results were used in collecting data while the difference is that it is carried out in Yobe State while the current study is carried out Kogi State.

Amoke et al., (2020), carried out a research on Analysis Of Students' Performance In Chemistry In The West African Senior School Certificate Examination (WASSCE) And National Examination Council (NECO) From 2015-2018. The study analysed the students'

performance in Chemistry in the West African Senior School Certificate Examination (WASSCE) and National Examination Council (NECO) from 2015 -2018. An expo-facto design of research type was used for the study. The population for this study comprised of all secondary schools who presented chemistry students for WASSCE and NECO in Ekiti State within 2015 -2018. The sample size of six thousand and seventy-two (6072) from WASSCE 2015-2018 and five thousand and forty-three (5043) chemistry students from NECO 2015-2018 were used for the study. The instrument for data collection for the study was WASSCE and NECO 2015-2018 results of chemistry students in secondary schools in Ekiti State. The formulated hypotheses were tested using inferential statistics of t-test. The findings of the study revealed that there is significant difference in the performance of students that sat for chemistry in 2015 WASSCE and NECO; there is no significant difference in the performance of students that sat for chemistry in 2016 WASSCE and NECO; that there is no significant difference in the performance of students that sat for chemistry in 2017 WASSCE and NECO; there is significant difference in the performance of students that sat for chemistry in 2018 WASSCE and NECO; and there is significant gender difference in the performance of students that sat for chemistry WASSCE and NECO Examinations between 2015 and 2018.

The similarity between this study and the current study is that the study is based on the performance of student in chemistry, and the past results were used in collecting data while the difference is that it is carried out in in Ekiti State while the current study is carried out Kogi State.

2.8 Summary of Review of Related Literature

The literature has been reviewed along the various variables of the study. Relevant concepts, cognitive theories and empirical studies were reviewed. Independent variables like the principals response, teacher's challenges, and school location as it contribute to survey of the challenges to teaching Chemistry in senior secondary curricula were highlighted.

However, in the course of reviewing the literature, certain gaps were identified and the present study made efforts in closing them. First, accessible studies to the best knowledge of the researcher focused on the holistic implementation of the curricula of Chemistry and its related subject in the classroom. The present study is interested on the Survey of the performance of student in WAEC and NECO examination: a case study of Olamaboro Local Government Kogi State with particular emphasis to the use of instructional materials in implementing the subject. Furthermore, studies on the Survey of the performance of student in WAEC and NECO examination within the reach of the researcher reveal that use of different kind of teaching method will enhances students' performance. However, these studies used selected Teachers and principals to know the challenges faced by the teachers or by the management in teaching of chemistry in secondary school. The present study is interested in ascertaining the extend Chemistry teachers used the available resources for effective teaching of performance of student in WAEC and NECO examination: a case study of Olamaboro Local Government Kogi State.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter is aimed at presenting the method and procedure of data collection for the study. The techniques and process involved in the implementation of this research work include, Research Design, Population, Sample and Sampling Techniques, Research Instrument, Method of Data Collection, and method of Data Analysis.

3.2 Research Design

This study is essentially an Ex-po facto design. The researcher got permission from the principal to collect the actual scores of the students who sat for the West African Examination Council (WAEC) And National Examination Council (NECO) examination for the period of 2015-2019 from the examination officer. The study sought to compare the performances of students West African Examination Council (WAEC) and National Examination Council (NECO) Senior School Certificate chemistry Examination from 2015-2019.

3.3 Population of the Study

The population for this study comprises of all the students in Olamaboro Local Government, Kogi State who sat for West African Examination Council (WAEC) and National Examination Council (NECO) chemistry Examination during the period of 2015-2019. Random sampling method was used to select six secondary schools from the population.

3.4 Sample and Sampling Techniques

All the students under the population were sampled in this study so as to capture all students that have sat for West African Examination Council (WAEC) and National Examination Council (NECO) chemistry Examination during the period of 2015 - 2019. Purposive random sampling method will be used to select six schools. A total population of 565 students sat for West African

Examination Council (WAEC) and 725 sat for National Examination Council (NECO) chemistry Examination during the period of 2015-2019.

Table 3.1: Distribution of Students who took WAEC Chemistry Examination (2015 – 2019)

School	Babanawa College, Ikeje-Igah	Ocheba School Igah	Evergreen international College	Olamaboro Community Grammar School Okpo	Ameh Commercial College Etuteape	Igah Community College (ICC)	Total
Year	WAEC	WAEC	WAEC	WAEC	WAEC	WAEC	Total
2015	24	-	16	54	15	14	123
2016	-	32	4	33	-	-	70
2017	33	56	12	60	-	7	168
2018	-	47	1	28	22	7	105
2019	25	56	5	-	7	6	99

Table 3.2: Distribution of students who took NECO SSCE Chemistry Examination (2015-2019)

School	Babanawa College, Ikeje-Igah	Ocheba School Igah	Evergreen international College	Olamaboro Community Grammar School Okpo	Ameh Commercial College Etuteape	Igah Community College (ICC)	Total
Year	NECO	NECO	NECO	NECO	NECO	NECO	**Total**
2015	55	66	18	29	12	6	185
2016	19	53	2	23	33	11	140
2017	-	53	8	42	28	7	138

2018	37	43	2	19	37	6	144
2019	-	41	5	35	30	7	118

Table 3.3: Distribution of students by year and gender who sat for WAEC Chemistry Examination (2015-2019)

Exam	Year	No of male	Percent	No of female	Percent	Total
WAEC	2015	71	57.72%	52	42.78%	123
WAEC	2016	39	55.72%	31	44.28%	70
WAEC	2017	89	52.97%	79	47.02%	168
WAEC	2018	53	50.47%	52	49.52%	105
WAEC	2019	56	56.56%	43	43.43%	99

Table 3.3 Shows the distribution of students by gender of students who sat for WAEC examination (2015 – 2019). The data shows that in 2015; 71(57.72%) candidates were male and 52(42.78%) were females. This implies that we have more male than female that sat for the exams in 2015. In 2016; 39(55.72%) candidates were male and 31(44.28%) were females. This implies that we have more male than female that sat for the exams in 2016. In 2017; 89(52.97%) candidates were male and 79(47.02%) were females. This implies that we have more male than female that sat for the exams in 2017. In 2018; 53(50.47%) candidates were male and 52(49.52%) were females. This implies that we have more male than female that sat for the exams in 2018. In 2019; 56(56.56%) candidates were male and 43(43.43%) were females. This implies that we have more male than female that sat for the exams in 2019.

Table 3.4: Distribution of students by year and gender who sat for NECO Chemistry Examination (2015-2019)

Exam	Year	No of male	Percent	No of female	Percent	Total
NECO	2015	110	59.45%	75	40.54%	185
NECO	2016	87	62.14%	53	37.85%	140
NECO	2017	87	63.04%	51	36.95%	138
NECO	2018	81	56.25%	63	43.75%	144
NECO	2018	70	59.32%	48	40.67%	118

Table 3.4 Shows the distribution of students by gender of students who sat for NECO examination (2015 – 2019). The data shows that in 2015; 110(59.45%) candidates were male and 75(40.54%) were females. This implies that we have more male than female that sat for the exams in 2015. In 2016; 87(62.14%) candidates were male and 53(37.85%) were females. This implies that we have more male than female that sat for the exams in 2016. In 2017; 87(63.04%) candidates were male and 51(36.95%) were females. This implies that we have more male than female that sat for the exams in 2017. In 2018; 81(56.25%) candidates were male and 63(43.75%) were females. This implies that we have more male than female that sat for the exams in 2018. In 2019; 70(59.32%) candidates were male and 48(40.67%) were females. This implies that we have more male than female that sat for the exams in 2019.

3.5 Research Instrument

The research material used for this study was the actual score of each student who sat for West African Examination Council (WAEC) and National Examination Council (NECO) Examination from 2015-2019.

3.6 Method of Data Collection

The data for this study were collected from each selected secondary school. The researcher used the introduction letter given by the department to get access to the examination officer through the

principal. The students result in chemistry West African Examination Council (WAEC) and National Examination Council (NECO) Examination from 2015-2019 was collected to analyzed. The researcher separated the number of males who had A, C, D, and F for each year respectively. Thus the separation was done based on the research question and hypothesis formulated.

3.7 Method of Data Analysis

The grades were converted to numerical scores. The following rating scales were used to convert the grades to raw scores.

Grade: A1, B2, B3, C4, C5, C6, D7, E8, F9.

Rating: 9, 8, 7, 6, 5, 4, 3, 2, 1. the scores obtained were analyzed using mean, standard deviation and the t-test statistics. The results of the data analysed will be shown in the next (chapter) of this report.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

The objective of this study was to compare the performance of Senior Secondary School students in Olamaboro Local Government, Kogi State who sat for West African Examination Council (WAEC) and national Examination Council (NECO) Senior Secondary Certificate Chemistry Examinations for the period of 2015 - 2019 This chapter shows the data analysis, result and discussion of the major findings of the study Mean, Standard deviation and t-test statistic were employed to analyze the data

4.2. Presentation of Results

4.2.1 Analysis of Research Question One

Research question one is aimed at finding out the general performance of students in WAEC and NECO examination.

Table 4.1: Distribution of Students' Performance in WAEC and NECO 2015 - 2019

Grade	WAEC	Percent	NECO	Percent
B3 – A1	20	3.5%	54	7.4%
C6 – C4	528	93.45%	671	92.6%
D7 – E8	17	3.0%	0	0%
F9	0	0%	0	0%
Total	**565**	**100%**	**725**	**100%**

From table 4.1 above, it is clear that 20 candidates scored between B3 – A1 in WAEC representing 3.5% and 54 candidates for NECO representing 7.4% of the population for the year 2015 - 2019. This implies that more got B3 – A1 in NECO than WAEC. 528 candidates scored between C6 – C4 in WAEC representing 93.45% and 671 candidates for NECO representing 92.6% of the population for the year 2015 - 2019.17 candidates scored between

D7 – E8 in WAEC representing 3.0% and no candidate who had that score for NECO representing 0% of the population for the year 2015 - 2019. No candidate scored between F9 in WAEC representing 0% and no candidate for NECO representing 0% of the population for the year 2015 - 2019.

4.2.2 Analysis of Research Question Two

There is no mean difference in the mean scores of male and female students in West African Examination Council (WAEC) Senior Secondary Certificate Chemistry Examinations for the period of 2015 - 2019. To test this hypothesis, independent t-test was used and the analysis presented below.

Table 4.2: t-test comparison of the mean scores of all the male and female students in WAEC Chemistry Examination for the years 2015- 2019

	Group	N	Mean	S.D	Df	t-value	p-value	Remark
WAEC	**Male**	308	4.21	0.67	563	2.701	0.008	Significant
	Female	257	4.74	0.82				

Table 4.2 shows the t-test comparison of the mean scores of the male and female students in some selected schools in Olamaboro Local Government, Kogi State West African Examination Council (WAEC) for the year 2015 - 2019. Male have a mean score of 4.21 with standard deviation of 0.67 while female have a mean score of 4.74 with standard deviation of 0.82. The degree of freedom is 563, t-value is 2.701 and p-value is 0.008. $P < 0.05$ which implies that there is a significant difference between the male and female performance in favour of the male. Hence the hypothesis is rejected.

4.2.3Analysis of Research Question Three

There is no mean difference in the mean scores of male and female students in National Examination Council (NECO) senior secondary Certificate Chemistry Examination for the

period of 2015 – 2019. To test the formulated hypothesis, an independent t-test was used and the analysis is presented below.

Table 4.3: t-test comparison of the mean scores of all the male and female students in NECO Chemistry Examination for the years 2015- 2019

	Group	N	Mean	S.D	Df	t-value	p-value	Remark
NECO	**Male**	435	4.42	0.82	723	9.739	0.00	Significant
	Female	290	5.23	1.25				

Table 4.3 shows t-test comparison of the mean scores of all the male and female students in NECO Chemistry Examination for the years 2015- 2019. Male have a mean score of 4.42 with standard deviation of 0.82 while female have a mean score of 5.23 with standard deviation of 1.25. The degree of freedom is 723, t-value 9.739 and p-value 0.00. $P < 0.05$ which implies that there is significant difference. Hence the hypothesis is Rejected.

4.3 Summary of the findings

From the analysis of the results above, it is clear that majority of students scored between C4 –C6 in WAEC and NECO for the period under review. 93.45% for WAEC and 92.6% for NECO in the school selected for the study. This implies that majority of students sitting for WAEC and NECO have passed with grades between C4 – C6. The category that followed was those that scored between A1 – B3; 3.5% for WAEC and 7.4% for NECO. This indicates that only few students who sat for WAEC and NECO passed with grades between A1 –B3 within the period under review in schools selected for the study. Only 3.0% got grades between D7 – E8 in WAEC and no students got a grade between D7 – E8 in NECO. No candidate scored F9 in both WAEC and NECO within the years under review in the selected schools.

The results of the study also revealed that there is significant difference in the performance of both WAEC and NECO. This indicates that the grades of male and female candidates vary

significantly when compared. From results of the study, it was observed that the difference in performance in WAEC was in favour of male candidate and that of NECO was in favour of female candidates. The findings of the study are similar to those of a study carried out by Amoke et al. (2020) in Ekiti State. The study compared the performance of candidates in chemistry between 2015 – 2018. The result of the study revealed that there is significant difference in the performance based on gender of candidates who sat for Chemistry in WAEC and NECO examinations between 2015 – 2018.

4.4 Summary of Findings

The major findings of this study based on the result of the analysis above are summarized below.

1. More students got A1 – B3 in NECO than WAEC, 528 candidate in WAEC and 671 candidates in NECO scored between C4 – C6 in WAEC and NECO respectively. 17 candidates in WAEC Scored D7 – E8 and no candidate scored F9 in both WAEC and NECO.
2. There is a significant difference between male and female performance in WAEC in favour of the male.
3. There is a significant difference between male and female performance in NECO in favour of the female.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Introduction

The research was carried out with the aim of finding out the difference in the performance of students in Chemistry examinations using National Examination Council (NECO) and West African Examination Council (WAEC) result. The study was carried out using some selected senior secondary school students' performance in National Examination Council (NECO) and West African Examination Council (WAEC) Senior School Certificate Chemistry Examination between the periods of 2015 - 2019. The review of the related literature shows relevant information to this study. The research instrument was the West African Examination Council (WAEC) and National Examination Council (NECO) result in Chemistry

5.2 Conclusion

Within the limit of the present study the following conclusions were made:

1. The students had a significant difference in their general performance in National Examination Council (NECO) and West Africa examination council (WAEC). Senior school Chemistry examination between 2015 – 2019.
2. Generally the performance was average which calls for better improvement by students.
3. Female students performed better in National Examination Council (NECO) than West Africa Examination Council (WAEC) Senior School Certificate Chemistry Examination.
4. Male students performed better in West Africa Examination Council (WAEC) than National Examination Council (NECO) Senior School Certificate Chemistry Examination.

5.3 Recommendations

Based on the findings of this study, the researcher recommended that:

1. Both examination bodies should try and find the true causes of the identified differences in the performance of the students in the two examinations.
2. Conferences, seminars and workshop should be organized for Chemistry teachers and tutors in secondary schools in order to improve teaching methodology.
3. West Africa Examination Council (WAEC) should check whether their cut-off mark for their various grades are too high, as this would scare many students from entering for West African Examination Council (WAEC) Examination
4. National Examination Council (NECO) should check whether their cut-off mark for their various grades are too low as this would not be in the interest of students of the nation.

5.4 Limitations of the Study

In the course of conducting this study, the researcher accepted the following as limitations to the study:

1. The sample of schools used for this study were limited to some selected private and government owned secondary schools
2. The study was limited to only West African Examination Council (W AEC) and NECO result alone for the period of 2015 – 2019

5.5 Contribution to Knowledge

The following are the contributions of this study to existing knowledge:

1. The study is useful to science teachers which will help shed more light on student's general performance in WAEC and NECO examination.
2. It has also contributed to the existing scholarly literature and provides additional knowledge and information on the performance of students in Chemistry

5.6 Suggestions for Further Study

From the findings of this study, the researcher has the following suggestions:

1. A research should be carried out on the problems of average performance students in WAEC and NECO Chemistry examination.

2. A research should be carried out to discover ways in which students' performance can be improved significantly.

REFERENCE

Abdullahi, A. (1996). *Science teaching in Nigeria*. Ilorin: Akoko Press Ltd

Abonyi, O.S. (1998). *Effect of an ethno science base instructional package on students' Conception of scientific phenomena and interest in science*. Unpublished doctorate thesis. University of Nigeria Nsukka.

Adegboye, A.O. (1998). The study of the relationship between students' performance in English language and science. *Pro Science Education Journal,* 1&2, 73-83.

Adeyegbe, S. O. (1992). A Critical appraisal of the alternative (CESAC) Chemistry syllabus for the G. C. E. Ordinary Levels. *Journal of Research in Curriculum, 2*(1), 26-30.

Adeyemi, T. O. (2008). Teachers' teaching experience and students' learning outcomes in secondary schools in Ondo State, Nigeria. *Educational Research and Review, 3*(6), 204-212. Retrieved from http://www.academicjournals.org/ERR on 27th February 2008.

Agbi, A. I. (2004). *Fundamentals of Science Education* (1st ed.). Kaduna: Datura Publishers.

Agulana, G. G. and Nwachukwu, F. J. (2001). Psychology of Learning. *Putting Theory into Practice, (*1st ed.) Mbaise: New Vision Publishers.

Ahiakwo, E. I. (2000). Gender disparity in Education: causes and solution. *Bichi Journal of Education, 1*(1), 74-85.

Aigbomian, D. O. (1995). *Relationship between understanding of physics concepts and achievement in WASC physics examinations*. Unpublished Doctoral Dissertation, University of Nigeria, Nsukka.

Ajayi, T. and Alani, R. A. (1992). *Contemporary Issues in Nigerian Education*. (1st ed.). Ibra-shak Printing Co. Ltd.

Ajewole, G. A. and Okebukola, P. A. O. (2000). Effect of Guided Discovery and Expository Instructional Methods on students' transfer of Learning. *Journal of Science Teachers' Association of Nigeria, 28*(1), 101-107.

Akale, M. A. G. and Usman, I (1996). Effect of Practical Activities on Achievement in Integrated Science among junior secondary school students. *Journal of Science Teachers' Association of Nigeria, 28*(1), 101-107.

Akalonu, H. O. (1998). Towards result oriented Chemistry practical. National workshop Proceedings of the Chemistry Panel. *Journal of science teachers' association of Nigeria, 1*(1), 12-17.

Akinyele, B. A. (1997). Why our student fail the practical chemistry examination (Volumetric analysis) at the ordinary level. *Journal of Science Teachers' Association of Nigeria, 25*(1), 33-35.

Alberts, H. H. (1999). *Principle of management: A modern approach*. New York: John Willey and Sons Ltd.Al-faleh, N and Hary, H. (1993). Saudi Arabian students Chemistry Achievement and science Attitude steaming from lecture-Demonstration and small group laboratory teaching method. *Journal of Research in Science Teaching, 20*(9), 161-180.

Ali, A. (1993). Effect of manipulating science materials and equipment on science process skills possessed by Nigerian students. *Jos Journal of Education, 1(1),* 231-234.

Ali, A. (2002). Science, Technology and Mathematics Education as Tools for Poverty Alleviation. *Keynote address presented at the 2nd National conference of the school of sciences. Federal College of Education, Eha-Amufu,* 27-30 November.

Amaefule, A. A. (2000). The comparative effects of two Teaching Methods on Students' Achievement in Chemistry. *Gombe technical Education Journal, 2*(1), 23-29.

Amaefule, A. A. (2001). Chemistry Education as a basis for Technological Development: *Gombe Technical Education Journal, 3, 63-75*

Amaefule, A. A. (2000). *The Effects of the Three Teaching Methods on Students' Achievements in Chemistry.* Unpublished M. Ed Thesis, Abubakar Tafawa Balewa University Bauchi.

Anene, A. O. (1997). *The influence of laboratory Experiments on the Performance of the Nigerian secondary schools in the University of Nigeria Nsukka.* Unpublished Ph. D thesis University of Nigeria Nsukka.

Anibueze, C.O. (2015). Dr. Onoh's Assignment. An unpublished Assignment.

Anih, H. U. (2001). *Evaluation of Gifted Education Practices in Nigeria: a case study of Suleja Academy.* Unpublished Ph. D thesis University of Nigeria Nsukka.

Anih, H. U. and Magboh, N. (1997). The Influence of Location and sex difference on the knowledge of basic Physics possessed by entering form one in students in Kwara State secondary school. *Journal of Arts and Social Science Review, 1*(1), 43-48.

Aniodoh, H. C. O. (2000). Stimulating and Sustaining Interest in Chemistry. *Journal of Science and Computer Education Esut, 1*(1), 236-241.

Asim, A. E., Bassey, U. U. and Essien, M. I. (2005). Trend Analysis of West African Senior Certificate Examination results in Science, Technology and Mathematics (STM): Implications for learning in Nigerian secondary schools. *Being a paper presented at the 31st Annual Conference of International Association for Educational Assessment in Nigeria with the theme Assessment and the future of schooling and learning in Nigeria at Nicon Hilton Hotel Abuja, Nigeria from 4th- 9th September 2005.* Retrieved from http://www.academicjournals.org/ERR on 27th February 2008.

Balogun, T. A. (1994). Science society and science teaching. Effectiveness in Nigeria. *Journal of Science Teachers' Association of Nigeria, 21* (1), 14-21.

Balogun, T. A. (1995). Interest in science and Technology Education in Nigeria. *Journal of Science Teachers' Association of Nigeria, 23* (1&2), 92-94.

Bessong, F. F., & Obo, U. B. (2003). Students' performance in Science, Technology and Mathematics in the era of Globalization. *Education for Today*, 3(1), 37-49.

Bilitho, R. (1991). Aspects by Teachers Training and Demonstration Lesson: *In Holding Science Teacher Training* (9-10). London: Modern English Publication Ltd.

Bolorunduro, O. M. (1998). Laboratory facilities and students' Performance in Chemistry. A study of selected Schools in Zong. *Journal of Educational Studies, 2*(2), 62-66.

Daniel, F. (2005). A Survey of the Teachers' and Students' Opinion on WAEC and NECO SSCE Examinations in Mathematics, Abuja Journal of Education, 6 (1), 32-39.

Dibu-Ojerinde, O. O & Faleye, B.A. (2005). Do they end at the same point? Journal of Social Science, (3), 239-241.

Dienye, N. E. and Gbamanja, S. P. T. (1990). *Science Education: Theory and Practice*. Owerri: Totan

Doma, A. G. (2001). The proficiency level of secondary school Chemistry teachers in the application of instructional skills during Chemistry lessons, G*OTEJ*. 6(1), 29-35.

Durum, A. I. (2003). *Education and Training of the Scientist Defects in our system of Training,* Unpublished B. Sc. Ed. Thesis, University of Ibadan.

Effiong, U. U., & Enukoha, O. I. (2003). Cognitive Preferences of Nigerian Science students in the era of Globalization. *Education Today*, *3*(1), 1-11.

Eriba, J. O. and Ande, S. (2006). Social solidarity and integration. *Educational Research and Reviews, 1*(6), 170-173. Retrieved from http://www.academicjournals.org/ERR on 7th November, 2008,

Eshieh, I. T. (1994). Using Demonstration in the teaching of the concept of Diffusion of gases. *Journal of Science Teachers' Association of Nigeria, 24*(1), 20-26.

Eze, A. E. (2001). *Science Education for Self Employment*. An unpublished paper presented at the National Conference of the Department of Science and Computer education, ESUT Enugu

Eze, C. U. (2000). Constraints to Effective teaching of Chemistry practical in SSS. *Journal of Science and Computer Education ESUT, 1*(1), 35-45.

Ezeano, C. O. (2002). Chemistry Education for Poverty Eradication. *Journal of the Science Teacher Today. 1*(1), 134-135.

Ezeiruoma, C. O. (1995). *A Comparison of the availability of Teaching Facilities and the school result Biology performance of 14 schools in Aguota L. G. A. of Anambra State.* Unpublished B. Sc. Ed. Thesis University of Lagos

Ezeliora, B. (1997). *Effect of Learning Material type on students' achievement and retention in Chemistry.* Unpublished Ph. D Thesis, University of Nigeria Nsukka.

Famakinwa, S. A. (2009). A Comparative Analysis of Candidates' Performance in SSCE Conducted By WAEC and NECO as a Measure of Mathematical Understanding of Prospective Undergraduate Teachers. http://www.solahudd eenfamakinwa.com/2. Doc.

Federal Inspectorate Reports (2000-2005), Federal Ministry of Education (FIS) Calabar.

Foin, W. (2001). The Effect of Class size on students academic Achievement in Secondary School Mathematics. *Journal of Research in Science Education, 1*(1), 25.

Garble, D. and Sherwood, R. C. (1990). The Effect of Students' Manipulation of Molecular Models on Chemistry Students Achievement According to the Piagethian level. *Journal of Research in Science Teaching, 16*(6), 23-27.

Garble, D. and Sherwood, R. C. (1994). Analysing difficulties with mole concept tasks by using familiar analogue tasks: *Journal of Research in Sciences/teaching, 4*(2), 247- 252.

Gero, S. M. (2001). Science Education as a basis for National Development: *Gombe Technical Education Journal, 3* (1), 26-33.

Gipps, C. (1994). A Gender inclusive multidimensional approach to the empowerment of learners in science education. Mauritus: M.I.E. Publishers.

Harbor Peters, V. F. A. (1994). Teacher gender by student gender interaction in SS III students Mathematics Achievement. *Journal of Research in Science and Education, 1*(1), 125-29.

Ibitoye, L. N. (1998). The Effect of a mastery learning strategy on achievement. *Journal of Research in Science Teaching, 16*(6), 33-37.

Igbokidi, J. N. (28August, 1990). Tackling the problem of Science Education. *Daily Times,* 7.

Igwebuike, T. B. (1994). Towards effective integrated science teacher education. *The development of a flow chart for process-oriented teaching, paper presented at the STAN Conference at the University of Jos,* 11^{th} -13^{th} September.

Iloputaife, E. C. (2000). *Effects of Analogy model (ANAMS) and conceptual-change instructional model on physics achievement of boys and girls taught simple electric circuit in Enugu State senior secondary schools.* Unpublished Ph.D Thesis Report University of Nigeria Nsukka.

Iloputaife, E.C. (1995). *The effect of investigational practical work method on practical physics process skills attainment level of senior secondary school system.* Unpublished M.Ed. Thesis, University of Nigeria Nsukka..

Ivowi, U. M. O. (1995). Students' misconception about motion. *Journal of Research in curriculum,* 3(2), 57-64.

Jegede, B. A. (1994). Non-cognitive correlates of secondary schools students'achievement in physics. *J. STAN*, 22(2), 78-88.

Jegede, S. A. (2007), Students' anxiety towards the learning of Chemistry in some Nigerian secondary schools. *Educational Research and Review, 2*(7), 193-197. Retrieved from http://www.academicjournals.org/ERR on 9th March 2008.

Keller, E.F. (1991). Gender and science. In: E. Thermey (Ed.) *Women's studies encyclopaedia* (153-156). New York: Peter Beduck.

Kolade, T. (1991). *Assessing the educational programmes of Nigeria.* Ile-Ife: University of Ife Press.

Kolawole, E. B., Oginni, O. I. and Fayomi, E. O. (2011). Ordinary Level as Results Predictors of Students' Academic Performance in Chemistry in Nigerian Universities, Educational Research and Reviews, 6(16), 889-892.

Kolawole, E. B. (2007). A Comparative Analysis of Psychometric Properties of Two Nigerian Examining Bodies for Senior Secondary School Students Mathematics. Medwell Research Journal of Applied Sciences 2(8), 913 – 915.

Lassa, P. N. (1994). Teachers of the 21st century. *A keynote address at a workshop on transition from senior secondary school to Colleges of Education*. Jos 8-10.

Lie, S. (1994). Gender differences in middle grade science achievement: Subject domain and course emphasis. *Journal of Science Education, 60,* 613-65

Maduabum, A. M. (1994). *Teaching Biology effectively*. Jos: university Press.

Maduabum, M.A. (1995). The relative effectiveness of the expository and guided discovery in secondary school students achievement in biology. *ESUT Journal of Education*, 1(1), 122-131.

Maiwada, D. A. (2006). Examinations in Nigeria: Appraisal, Issues and Problems. In A.A Ekoja and C.U. Mgboro (Eds) Examinations in Nigeria: Appraisal, Issues and Problems, 1-5. Awka: Erudition Publishers.

Mamah, M. C. (1998). *Effect of Audio-picture instructional System on Students' Achievement in Biology*. M. Ed Research project, Faculty of Education, University of Nigeria Nsukka

Mills, H. R. (1999). *Teaching and Training*: *A Hand book for Instructors.* Mac Millan press Ltd. London and Bosingstoke.

National Examinations Council, (2005). Introduction and Examinations Being Administered By the Council, NECO.

National Policy on Education (2004). Federal Republic of Nigeria, Lagos, NERC Press.

National Population Commission (2006). National Census Reports.

Ndana, M. (2000). Improvisation in the teaching of science in a depressed economy. *Nigerian journal of Research in Education, 1*(1), 31-37.

Njoku, Z. C. (1994). *Effects of practical work under different sex groupings on students skills acquisition and interest in chemistry practical activities.* Unpublished Ph. D Thesis University of Nigeria Nsukka.

O'Connor, J. P. (2001), an Overview of FEMSA. *A paper presented at FEMSA/AFCLIST Gender Workshop, Nairobi Kenya*. December, 6-8.

Obande, M. (2003). *Sex differences in the study of stoichiometry among secondary school students in Makurdi Local Government.* An Unpublished PGDE Project BSU Makurdi.

Obiom, G. O., & Odibe, M. O. (1997). The effect of small group instructional techniques on mathematics achievement of Junior secondary school learners. *JSTAN, 25*(2), 335-338.

Obioma, G. O., & Ohuche, R. O. (1995). The effect of an instructional treatment on two mathematical ability groups in number sentence problem. *JSTAN* . *23*(182), 179-185.

Odunsi, T. O. & Nneji, L. (1995). Effects of Lecture and project methods on the achievement of secondary school pupils on high and low abilities. *JORIC*, 3(2), 127-132.

Ogbe, A. E. (1991), Teaching Styles and Teachers' Characteristics as Determinant of Students' Learning out comes in Secondary School Biology. *African journal of research in science and education, 4* (1&2), 45-59.

Ogunleye, A. O. & Baiyelo, T. D. (1998). Analysis of students Achievement in physics utilizing three laboratory methods. *JORIC*, 6(1), 144-147.

Ogunleye, A. O. (1999). Constraints to women and girls participation in science, technology and mathematics (STM) education: The way forward. *Proceedings of the 1st National conference on Women Education and Development. Department of Curriculum students.* Unical

Ogunniyi, M. B. (1996). *Teaching science in Africa*. Ibadan, Nigeria: Salen Media

Okebukola, P. A. (2006). Students' performance in practical Chemistry: A study of some related factors. *Journal of Research in Science Teaching, 2* (2), 119 –126.

Okebukola, P. A. and Jegede, O. J. (1999). Determinants of occupational stress among teachers in Nigeria. *Educational Studies, 15*(1), 23 -31.

Okebukola, P. A. O. (2005). The Race Against Obsolescence: Enhancing The Relevance of STAN to National Development. *Memorial Lecture Series*, 17, Science Teachers' Association of Nigeria.

Okeke, E. A. C. (1996), Attracting Women into Science Based Occupations: Problem and Prospects. *Science and Public Policy, 13*(3), 146-151.

Okorie, J. U. (2004). *Fundamentals of Teaching Practice*. Enugu: Fourth Dimension Publishers.

Okoye, R. O. and Nwafor, V. C. (2009). A Comparison of SSCE Questions Set by the West African Examinations Council and the National Examinations Council, Nigeria, An International Multi-Disciplinary Journal, Ethiopia, 3 (5), 304-320.

Okoye, R. O. and Nwafor, V. C. (2009). A Comparison of SSCE Questions Set by the West African Examinations Council and the National Examinations Council, Nigeria, An International Multi-Disciplinary Journal, Ethiopia, 3 (5), 304-320.

Okpala N. P., & Onocha, C. O. (1998). Perceived Difficult topics in the Nigerian secondary school physics syllabus. JORIC, 6(1), 75-86.

Oladimeji, C. A. D. (1998), Improvisation in Integrated Science. *Journal of Science Teachers' Association of Nigeria*, *16*(2), 101-105.

Olarewaju, O. and Balogun, F. A. (1994), Attitude and Teaching Methods of some Integrated Science Teachers and Students Achievement. *Journal of Research in Curriculum, 2*(1), 15-27.

Omaze, M. I. (1992), Evaluating Science Laboratory Skills. *The Science Teacher*, *47*(1), 21-24.

Onekutu, A. and Onekutu, P. O. (2002), Gender differences in achievements in junior secondary school examination in integrated science: Implication for National Development. *Journal of Science Teachers' Association of Nigeria, 21*(3), 161-165.

Onwioduokit, F. A. (1996), The survival of Science Education in Nigeria. A case study of University of Uyo. *Journal of Quality Education.*

Onyegegbu, N. (1999). *Effect of Video and Audio Radiography on Students' Achievement and Retention in the understanding of Schistosomiasis*. Unpublished Ph. D Thesis faculty of Education University of Nigeria Nsukka.

Pwol, C. S. (1992), Conducive Classroom Environment for STE Education, Teacher effectiveness and management of classroom Environment. *Paper presented at the* 33^{rd} *Annual Conference of STAN Enugu.*

Shettima, A. G. (1996), Gender issues in monitoring the environment: The case of rural Nigeria. *A paper presented at the 39th Annual Conference of NGA held at the University of Maiduguri*, May, 5-6th.

Simon, A. and Ward, L. O. (1993), Correlates of performance in a P. G. D. E. course. Education for Development. *Journal of Faculty of Education (University College), 19*(19), 10-24.

Sola, A. O.and Ojo, O. E. (2007), Effects of project, inquiry and lecture- demonstration Teaching methods on senior secondary students' achievement in separation of mixtures practical test. *Educational Research and Review, 2*(6), 124-132. Retrieved from http://www.academicjournals.org/ERR on 7th February 2008.

Ugwuanyi, J. U. (1998), Effect of guided Discovery and expository teaching methods on students Achievement in Physics in selected schools in Nsukka. *Nigerian Journal of Technical Education, 15*(1), 79-82.

UNESCO, (1998). *The state of education in Nigeria*, UNESCO Country Office, Lagos-Nigeria.

Victor, F. P. and Juliana, E. I. (2006). School Facilities, Teacher Qualifications, School Location And Students' Academic Achievement. *The African Symposium, 6*(3 & 4), 95-104.

WAEC 1998, 1999, 2000, 2001 Statistical Results.

WAEC Chief Examiner's Reports 1998-2005

Williams, D. and Jacobson, S. (1990), Growth in skills during the intermediate years: Sex differences and school effects. *International Journal of Research in Education, 14* (4), 157-174.

Yobe State Education Resource Center (YSERC) Damaturu annual reports 2006-2009.

Young, B. (1994), Some Ideas for Elementary Teaching of Valence School. *Science Review, 3*(53), 216-235.

Zanna, K. G. (2002). The teaching of chemistry in developing countries with particular reference to Nigeria. *Journal of Science Teachers' Association of Nigeria, 21*(3), 90-95