# A COMPARISM OF CHEMISTRY STUDENTS PERFORMANCE IN WAEC AND NECO EXAMINATION

BY

# IKYEGH CICERO SHAGBAOR 2013/1/45861BE

# DEPARTMENT OF SCIENCE EDUCATION, SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION, FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA.

NOVEMBER, 2019

## A COMPARISM OF CHEMISTRY STUDENTS PERFORMANCE IN WAEC AND NECO EXAMINATION

BY

# IKYEGH CICERO SHAGBAOR 2013/1/45861BE

# DEPARTMENT OF SCIENCE EDUCATION, SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION, FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA.

## IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF BACHELOR OF TECHNOLOGY (B.TECH) DEGREE IN SCIENCE EDUCATION

NOVEMBER, 2019

#### ABSTRACT

This study presents the findings of the relationship between students' performance in Chemistry conducted by the West African Examination Council (WAEC) and the National Examination Council (NECO) in two selected secondary schools in BossoLocal Government Area of Niger State, Nigeria. The analysis showed that there is significant positive relationship between chemistry in all the selected schools contrary to the hypothesis that says there is no relationship in WAEC and NECO chemistry results in the schools. It is therefore recommended that students should develop more interest in sitting for either of the two examinations since they produce equivalent results.

Keywords: WAEC, NECO, Comparative, chemistry Results, Performance, Student

### TABLE OF CONTENT

Title P	lage	i	
Declar	ation	ii	
Certification			
Dedica	ation	iv	
Ackno	wledgement	v	
Abstra	ct	vi	
Table	of content	vii	
CHA	PTER ONE		
INTR	RODUCTION	1	
1.1	Background of the Study	1	
1.2	Statement of Problem	5	
1.3	Purpose of Study	6	
1.4	Significance of Study	7	
1.5	Research Questions	7	
1.6	Research Hypothesis	7	
1.7	Scope of the Study	8	
1.8	Delimitation of the Study	8	
1.9	OperationalDefinition of Terms		
CHA	PTER TWO		
LITE	CRATURE REVIEW	10	
2.1	Conceptual framework	10	
2.1.1.	Qualified Chemistry Teachers in Schools	10	
2.1.2	Students' Variables	17	
2.1.3	Lack of Equipment and Instructional Materials	25	
2.2	Theoretical framework	27	
2.3	Empirical Framework	31	

## CHAPTER THREE: MATERIALS AND METHODOLOGY

3.1	Research Design		
3.2	Population of the Study	31	
3.3	Procedure for Data Collection	37	
3.4	Procedure for Data Analyses	38	
3.5	Assumptions		
CHA	APTER FOUR : EMPERICAL ANALYSIS, RESULT & FIND	INGS	
4.1	Analysis and Interpretation	39	
4.2	Testing of Hypothesis	40	
4.3	Summary of Major findings and discussion		
CHA	APTER FIVE: CONCLUSION, RECOMMENDATION		
ANI	D SUGGESTION		
5.1	Conclusion	43	
5.2	Recommendation	44	
5.3	Suggestion	44	
	References	46	

#### CHAPTER ONE

#### 1.0 INTRODUCTION

#### **1.1** Background to the Study

Science is a branch of knowledge or study dealing with a body of facts or truths systematically arranged and showing the operation of general law. The mathematical sciences. Systematic knowledge of physical or material world gained through observation and experiment. Study of chemistry is very important to our lives and we use it directly or indirectly for our daily activities, in secondary schools it is taught through two main categories, as Basic Science at the Basic secondary school and the separate science subject as Chemistry, Physics and Biology at the Senior Secondary. It has been a problem for some time now that their has been low Performancein secondary science but our focus been on Chemistry. One of the major issues that bothers students in Nigeria presently is their academic performance, poor performance of students in internal and external examinations is a reflection of the problems and challenges facing the educational system in Nigeria. This study focuses on student performance in chemistry in WAEC and NECO, there has been wide cries over the years when NECO and WAEC results has been released due to the bad performance I science subjects with Chemistry having on of the poorest results over the years. For example look at the five years SSCE results in chemistry from 2010 to 2014 shows that in 2010 out of 105,453 that sat for Chemistry in all the secondary school in Abia State only 26,680 credited Chemistry.

Scientists and researchers like Oyekan (2010) saw science and technology as basic tools for industrial and national development. These if properly utilized could bring about economic and social happiness by providing and improving the welfare of the citizenry. Consequently, the teaching and learning of science has become a great worry to scientists and researchers.

As people think about the teaching and learning of science in our schools, the picture of the state of Science and Technology in a country like Nigeria becomes dazzling. This was expressed in the annual conference proceedings of Science Teachers Associations of Nigeria (STAN) in 1998 on the theme "winning more students for Science and Technology". This theme came as a result of bad performance by students in science examinations. This bad performance often resulted in bad enrolment of students in science at the secondary and tertiary institutions.

The bad performance of students could be accredited to a number of reasons including bad participation of students and bad level of exposure in the practical part of science especially Chemistry. Agbo and Mankilik (2010) quoted the then Minister of Education in Nigeria as saying that the performance of students in the sciences was not encouraging in spite of the huge amount of money expended on the purchase of science materials and equipment. Dajili (2011) also showed his concern about the bad performance of students in science examinations. This concern arose from the increasing realization that the nation could not develop as fast as she aspired to without adequate tools of scientific and technological man power at all levels in her working populace. Dajili further maintained that the state of science at the secondary school level was very important. This is because the performance at this level determines the quality and quantity of intake into the tertiary institutions in the country. This is why the performance in science examinations at this level as observed by Agbo and Mankilik (2010) and Dajile (2011) should be investigated.

The natural sciences (Biology, Physics and Chemistry) have two components, the theory and the practical parts which make the teaching and learning of science real. Over the years report shows that candidates do not perform well in practical aspect. Ministry of Education (2011) and WAEC Chief Examiners Report (2012) accredited the bad performance especially in practical aspect of Chemistry to their non-familiarity with the use of simple laboratory equipment, imprecise statement, spelling errors, inadequate exposure to laboratory techniques, lack of observational

skills, inability to determine mole ratio from equations, omission of units in calculated values, inability to write symbols properly and assign correct charges to ions, among others. In the theory paper, bad performance of students was also accredited to a number of reasons which include their inability to represent simple reaction by balanced equations, violation of the convention for IUPAC nomenclature, tendency to crowd their answers together, bad spellings, definitions and diagram, not been familiar with some contents of the syllabus, lack of depth and precision in the responses to essay questions, lack of understanding of the fundamental principles in Chemistry, inability to differentiate between physical and chemical properties and incompetence in basic Mathematics and other factors that affect students' performance in Chemistry.

The West African Examination Council (WAEC) for a number of decades has been the only examination body in this country especially for ordinary level examinations. A lot of concerns have been shown by large number of concerned citizens on students' failure especially in mathematics and English language. In the year 2000, the Federal Government of Nigeria came up with another examination board referred to as "National Examination Council" (NECO). Is this new body efficient in its work? What aboutstudents' performance if compared with that of WAEC? Is there any relationship between WASSCE mathematics results and NECO mathematics results? These are some of the questions that shall be answered during the course of this research.

This study presents the result of a study of the relationship between students' Performancein Chemistry conducted by the West Africa Examination Council (WAEC) and the one by the National Examination council (NECO), in selected secondary schools in BossoLocal Government Area of Niger State. It is a fundamental statement nowadays that we are in the age of science and technology and Nigeria has also imbibed the idea. The school curricula thus lay emphasis on science subjects of which chemistry takes a higher rank. (Amini, 2010)

The suggestions and recommendations in this study will go a long way in deciding which examination body should be preferred by the schools or students based on the results of the analysis.

#### **1.2** Statement of the Problems

Lately, there has been a lot of increasing public criticism on the fallen standard of education in the media and public places even though there has not been available or little data to back up this statement. There has also been criticism against NECO. Some even say their questions are harder than those of WAEC. Some universities who once rejected NECO results now accept it. Many private owned secondary schools now register their students for NECO. One of the reasons could be that WAEC and NECO have the same syllabus and each of them has a regulatory body. So, their results should be equivalent.

The importance of chemistry in studying science has long been acknowledge world-wide. Now that there are two major examination bodies, is there any relationship between students Performancein both examinations with respect to chemistry? If there is, how strong or weak is it?

#### **1.3** Aims and Objectives

The general aim of the study is to identify the relationship between students' Performance in Chemistry conducted by the West Africa Examination Council (WAEC) and the one by the National Examination council (NECO), in selected secondary schools in Bosso Local Government Area of Niger State. Specifically this study sought to:

- To find out the difference between the students Performance in WAEC and NECO chemistry examination in Bosso Local Government area of Niger State.
- (ii) find if there is a positive and high correlation between students' performance in chemistry.

#### **1.4** Significance of the study

Hopefully, the result obtained from this research will point out the influence of WAEC and NECO chemistry examination on students wishing to study basic science courses. The study could also serve as a reference material for various stake holders in the educational sector, such as principals, parents, ministry of education, properietors, communities, chemistry teachers, officials of WAEC and NECO and other policy makers in other to help seek ways of improving the Performanceof students in WAEC and NECO chemistry examination in Bosso local government area.

#### **1.5** Research Questions

The following research question were raised in the study

- (i) What is the difference between chemistry student Performancein WAEC and NECO in Bosso Local Government area?
- (ii) Will school location influence students' performance in chemistry?

#### **1.6 Research Hypotheses**

The following null hypotheses were formulated in this study:

 There is no significant difference between chemistry students Performancein WAEC and NECO.

#### **1.7** Scope of the Study

The present study is to cover two randomly selected senior secondary schools in BossoLocal Government Area of Niger State.The Scope of data spans through the period 2014-2018

#### **1.8** Delimitation of the Study

The time for this study was short and therefore just a few schools were used for this research.

#### **1.9** Operational Definition of Terms

# **WAEC:** The **West African Senior School Certificate Examination (WASSCE)** is a type of standardized test in West Africa. It is administered by the West African Examinations Council . It is only offered to candidates residing in Anglophone West African countries.

**NECO:**National Examinations Council which was the promulgation of a decree, in April 1999 by AbdulsalamiAbubakar military administration.

**Comparative Study:** Cross-cultural studies, sometimes called holocultural studies or comparative studies, is a specialization in anthropology and sister sciences that uses field data from many societies to examine the scope of human behavior and test hypotheses about human behavior and culture **Chemistry:** the branch of science concerned with the substances of which matter is composed, the investigation of their properties and reactions, and the use of such reactions to form new substances.

**Results:** a thing that is caused or produced by something else; a consequence or outcome. An item of information obtained by experiment or some other scientific method; a quantity or formula obtained by calculation.

**Performance:** The accomplishment of a given task measured against present known standards of accuracy, completeness, cost and speed. In. a contrast, performance is deemed to be the fulfillment of an obligation, in a manner that releases the performer from all liabilities under the contrast.

**Student:** A **student** is a learner, or someone who attends an educational institution. In some nations, the English term (or its cognate in another language) is reserved for those who attend university, while a schoolchild under the age of eighteen is called a **pupil** in English (or an equivalent in other languages.

#### **CHAPTER TWO**

#### 2.0 LITERATURE REVIEW

#### **2.1 Conceptual framework**

The following concepts are reviewed as they are related to the study

#### **2.2.1. Qualified Chemistry Teachers in Schools**

It is generally acknowledged that encouraging teacher quality is a key element in improving primary and secondary education. With decades of research, however, there is no consensus on what factors enhance, or even signal, teacher quality.One reason for the uncertainty regarding the effects of teacher training is that past studies have not been able to overcome three methodological challenges in estimating the effects of training on teacher quality. First, it is hard to isolate productivity, especially in teaching where a student's own ability, the effects of a student's peers, and other attributes of schools also affect measured outcomes. The problem is aggravated by the fact that assignment of students and teachers to classrooms is usually not random, leading to possible connection between observed teacher qualities and unobserved student behaviors.

Second, like in other occupations, there is an existing selection problem in assessing the effects of education and training on teacher output. Unobserved teacher behavior, such as "innate" ability, may affect the amount and types of

10

education and training they select to obtain as well as future performance of teachers in the classroom. Third, it is hard to obtain data that give much detail about the various types of training teachers receive and even more hard to relate the training of teachers to the Performanceof the students they teach. Talking about all of these issues in a single study brings about significant data and estimation challenges. (Douglas and Tim 2010)

Educational policy makers have begun to identify the challenges posed by teacher turnover. Schools and students are affected when new teachers leave the profession after only 2 or 3 years, just when they have gained important teaching experience. Constant turnover also affects efforts to build a strong organizational culture and to maintain organized instructional programs throughout the school. Keeping effective teachers is a problem for schools that serve high proportions of lowincome and minority students.

Although some translate these turnover designs as evidence of teachers' discontent with their students, recent large-scale quantitative studies provide proof that teachers choose to leave schools with poor work surroundings and that these surroundings are most popular in schools that minority and low-income students typically attend. Thus, evidence suggests that the seeming relationship between student demographics and teacher turnover is driven not by teachers' responses to their students, but by the situations in which they must teach and their students are required to learn. (Susan and others 2012).

#### **1.** The Teacher's Workplace

Despite increasing recognition of the importance of working situations, researchers have only begun to understand how different elements of the workplace affect teachers' ability to teach well, their sense of self-efficacy, how content they are with their role and assignment, and their willingness to stay in their school and in the profession. In 1990, Johnson suggested a comprehensive framework for analyzing the teacher's workplace. Its contents ranged from the physical teaching environment (e.g., safety and comfort), to economic factors (e.g., pay and job security), to work structures (e.g., workload and supervision), to cultural and social elements (e.g., strength of the organizational culture and behaviors of colleagues and students). Interviews with 115 teachers showed how interdependent these many factors are in deciding individuals' success and satisfaction.

Not surprisingly, those who would increase students' learning by changing the teacher's workplace typically focus on factors that can be easily changed, such as pay, class size, or job security. However, many features of the teachers' workplace remain far from the reach of collective bargaining, legislation, and administrative rule-making. These are the components of the social context of schooling, which significantly affect efforts to improve schools and school outcomes for children

(Bryk et al., 2010). During a decade of work in the Chicago Public Schools (CPS), Bryk et al. have inspected various role relationships in the school—"teachers with students, teachers with other teachers, teachers with parents and with their school principal". They came to an agreement that the level of "relational trust" in these day-to-day relationships is vital, and they documented "the powerful impact that the quality of social exchanges can have on a school's ability to improve".

Clearly, any important analysis of teachers' working surroundings must recognize the full range and interdependence of the factors that define a teacher's workplace, from the concrete and transactional (e.g., pay, workload, contractual responsibilities) to the social and transformative (e.g., interactions with colleagues and administrators, organizational culture). There is convincing proof not only that teachers' ability to give effective directions is deeply affected by the situation in which they work, but also that this situation may vary greatly from school to school and district to district.

#### 2. The Role of Work Context in Teacher Turnover

New findings about working situations in schools have begun to change our understanding of the causes of teacher turnover. In a vivid review of the literature, Borman and Dowling (2012) discovered that teacher demographic attributes, teacher qualifications, school organizational behavior, school resources, and school student-body attributes are all connected to teacher attrition. They argued that "the attributes of teachers' work surroundings are more salient for predicting attrition than previously noted in the literature".

However, disentangling the relative contributions of student and school attributes is challenging. Horng (2010) explicitly attempted to different among these possible determinants of turnover by using a survey that asked teachers their choices for different types of hypothetical schools with different sets of demographic attributes, working surroundings, and salaries. She found that working surroundings —especially administrative support, school facilities, and class size—are more important to teachers than salary and much more important than student demographics. The advantage of this study is that Horng could examine the trade-offs that teachers reported among these different factors. However, she could only measure the liking that teachers show on a survey, not the working surroundings that they actually experienced or the decisions they eventually made.

#### **3.** Recruitment of Teachers

Education systems face a demanding task in employing high-quality graduates as teachers, especially in shortage areas. Different countries have applied a range of strategies to help them do so. Competitive compensation, career prospects, career diversity, and giving teachers responsibility as professionals are important parts of this. Active recruitment campaigns can stress the fulfilling nature of teaching as a profession, and seek to draw in groups who might not otherwise have yjought about teaching. Where teaching is seen as an appealing profession, its status can further be enhanced through selective recruitment that makes teachers feel that they will be going into a career sought after by high-fliers. All this also needs initial education to get new teachers ready to play an active role in the design and running of education, rather than just following standardized practices.

In face of general shortages that, in many countries, will soon grow as large cohorts retire, intelligent incentive structures are needed to get qualified graduates into the teaching force. Pay levels can be part of this equation. However, countries that have succeeded in making teaching an appealing profession have often done so not just by pay, but by raising the standing of teaching, giving real career possibilities, and giving teachers responsibility as professionals and leaders of change. This requires teacher education that helps teachers to become innovators and researchers in education, not just deliverers of the curriculum. (OECD 2011)

# 4. Attractive Surroundings Can Improve Morale, Lower Turnover and Widen the Teacher Pool

Employers increasingly acknowledge the need to provide workers with a good work-life balance and opportunities to merge work with family responsibilities and other activities. Some countries allowpart-time teaching or opportunities

15

throughout the career to gain knowledge outside schools throughsabbatical leave, extra leave without pay, and job swap with industry. Although all such enterprise involve costs, those costs need to be set against the benefits of lower staff turnover, improved morale, and introducing new knowledge and skills into schools.

# 5. Genuinely Engagement of Teachers in Improvement can be more Rewarding

The essence of professional work can be seen as the acknowledgement that it is the professional, and not the supervisor, who has the knowledge needed to make the important choice as to what services are needed and how they are to be provided. Organizations filled with professionals are those in which there are fewer layers of management, workers are contacted on all matters of consequence, and workers have reasonable discretion with respect to diagnosing client needs and deciding which services are best to address those needs. Indeed, in many professions, and for many professionals, the worker is also the manager and, in many cases, the owner as well.

#### 2.2.2 Students' Variables

#### 1. Motivation

It has been defined as the level of effort a person is willing to expend toward the Performanceof a certain goal. (Annick, 2012) state that motivation is typically

16

defined as the forces that account for the arousal, selection, direction, and continuation of behavior. Both definitions imply that motivation comes from within a person; therefore, schools' responsibility is to create the surroundings that will enhance students' zeal to pursue academic goals actively over a long period of time.

Theorists have developed several approaches to motivation which fall in four broad categories. Using these approaches can assist teachers in their effort to provide the right surroundings for student learning: (1) the behavioral view, (2) the cognitive view, (3) the humanistic view, and (4) the Performancemotivation theory.

(Annick M. Brennen 2012)

#### 2. The Cognitive View

The cognitive view of motivation stress the arousal of cognitive disequilibrium as a means to drive students to learn something new. For example, if students face a problem, they will want to solve it. This is consistent with Piaget's concepts of organization, adaptation, and schemes. According to Piaget, when people experience a discrepancy between something new and what they already know or believe, it produces a state of disequilibrium they are driven to eliminate in order to achieve equilibration. To achieve this state of disequilibrium, Jerome Bruner

recommends posing questions that will cause students to recognize gaps in their thinking, which they will want to fill.

Cognitive theory stresses intrinsic motivation. When teachers utilize intrinsic motivation techniques, such as the arousal of disequilibrium, students appreciate learning for its own sake. The major limitation of the cognitive view of motivation is that it is very difficult to "induce students to experience a cognitive disequilibrium sufficient to stimulate them to seek answers (Annick. 2012).

#### **3.** The Behavioral View

The behavioral interpretations of motivation rests on B. F. Skinner's behavioral learning theories and emphasizes on the reinforcement of desired behavior through the use of extrinsic reward. Biehler and Snowman (2011) state that behavioral interpretations of learning help to explain why some pupils like particular subjects and dislike others. Social theorists, such as Albert Bandura, emphasize the impact of students' identification and imitation of someone, pointing out their resulting positive academic results.

Psychologists have noted that immoderate use of extrinsic forms of motivation such as praise and rewards may lead to bitterness, limitation of transfer, may cause reliance on teachers, the undermining of intrinsic motivation, and viewing learning as a means to an end. They suggest that to limit the bad effects of extrinsic rewards, teachers should use extrinsic forms of reward only when correct or desired responses occur.

#### 4. The Humanistic View

Abraham Maslow, the most quoted humanistic psychologist, advanced in his book, Motivation and Personality, that people are driven by their personal needs to address certain natural worries. These worries in turn, can be placed hierarchically in terms of importance. He thus proposed a five-level hierarchy of needs:

1. physiological needs,

2. safety needs,

3. belongingness needs,

4. esteem needs, and

5. self-actualization needs.

Physiological needs are the most basic human needs such as hunger, thirst, and shelter. Safety needs refer to the desire to find a safe and secure physical environment. Belongingness needs allude to an individual's desire to be accepted by his peers, while esteem needs refer to the wish to have a positive self-image and to receive acknowledgement from others. Self-actualization needs are at the top of the pyramid and represent the concern for the development of full individual potential. The main premise of this theory is that people will not seek to please higher needs, such as self-actualization needs, unless the lower needs, called

deficiency needs by Biehler and Snowman, are met. In the educational setting, students will be led to seek satisfaction and self-actualization if their basic needs for safety, relaxation, belongingness, a clean and orderly environment are addressed and met. Teachers, therefore, are in a key position to satisfy these basic needs.

Biehler and Snowman (2011) pointed out that Maslow described cognitive needs and aesthetic needs which play an important role in the satisfaction of basic needs. They said that Maslow maintained that such surroundings has the freedom to investigate and learn, fairness, honesty, and orderliness in interpersonal relationships are important because their absence makes satisfaction of the five basic needs impossible.

The limitation of Maslow's theory is that teachers may not know which of a student's wants is not satisfied; or even if they know, they might not be able to fill that want. However, teachers can always enhance students' self-esteem by creating classroom surroundings that will improve students' achievement.

#### **PerformanceMotivation Theory**

The PerformanceMotivation Theory rests on the belief that most persons want to achieve and experience levels of aspiration. The level of aspiration concept, stresses that people tend to want to succeed at the highest possible level while at the same time avoiding the chances of failure. The need for Performanceis increased when persons experience success. If students experience success their want for Performancewill thus be strengthened.

Psychologists have developed the Attribution Theory to explain the factors to which students attribute failure. Small achievers tend to attribute failure to a lack of ability, and success to luck. Big achievers, tend to attribute failure to a lack of effort, and success to effort and ability. Bernard Weiner has been quoted in the Journal of Educational Psychology (2014) as one of the major contributors of cognitions which include causal attribution, self-efficacy, and learned helplessness. Brennen (2012) mentioned two limitations of the Performance and Attribution theories:

- aspirations, need for achievement, fear of success, and reactions to success and failure are often difficult to observe or analyze.
- (2) lack of consistency in these behaviors.

Students will be more driven to work if they know what objectives they are working towards. Thus, it is a good idea not only to articulate objectives for the course, but also for specific lectures, discussions, and assignments. For example, before starting a lecture, an instructor might write on the board the skills, knowledge, and perspectives students will gain that day (with appropriate effort), using concrete, student-centered language—for example, "When you leave today,

21

you should be able to debate the pros and cons of a single-payer health plan; apply a specific economic framework to make predictions about interest rates; identify, illustrate and compare three theoretical approaches in child development." Articulating learning objectives is important for different reasons, but it plays an important role in motivation by showing students the specific value they will get from a particular course, unit, or activity.

#### Performance-Base Pay for Teachers on Students' Performance

Performance-based pay implies rewarding something other than credentials and years of experience, both of which have been shown to be poor indicators of teachers' effectiveness. Those who argue in favor of performance-based pay say that it is fairer to reward teachers who perform well rather than paying all teachers equally. They also note that performance-based pay drives teachers, and that a clearer connection between spending on schools and result builds public support. Those who are against performance-based pay argue that fair and accurate evaluations are hard to achieve because performance cannot be determined objectively, co-operation among teachers is reduced or teaching becomes narrowly focused on the criteria being used.

It has not helped that empirical analyses of the effects of performance-related pay has generally been inconclusive. These effects are simply hard to assess, since data are limited and so many aspects need to be taken into consideration, such as how performance is defined, how performance is measured, what the scale of the rewards is, and whether rewards operate at the school or individual level.

Even if performance-based pay is a viable policy option, it is important to know how to implement the system effectively. First of all, measures of teacher performance need to be valid, reliable and considered by teachers themselves to be fair and on point. Some measures are based on many observations by trained evaluators using a standards-based rubric that teachers believe reflects good practices. Others include contributions to school-improvement efforts or performance in particular areas based on external certifications.

Still others include student performance, which then requires data-management systems that can connect student and teacher data. In particular, if "value-added" measures are used, databases need to be able to track student success from year to year, to give an indication of what any individual teacher has added to a student's achievement.

Another issue is whether the rewards are targeted to individual teachers, groups of teachers or the whole school. Individual rewards can drive people to work harder and give them a sense of control over their chances of reward. But it can be hard to differentiate the impact made by an individual teacher, compared to previous teachers or other factors, such as the school environment.

An alternative is to consider the performance of a group of teachers as a unit – such as grade-level teams, disciplinary departments, or another grouping that fits a school's structure and mission. Group rewards have been discovered to promote staff cohesion, feelings of fairness and productivity norms, and they may bring about mutual learning among teachers. School-wide rewards can encourage collaboration among teachers to make sure that the school meets certain criteria; but they may dilute the link between individual effort and reward, and run the risk of creating "free riders" who are rewarded simply because they teach in that particular school.

Systems are also different in whether they structure the payout of rewards as a fixed global sum shared according to ranked teacher performance (for example, a bonus for the top quarter of performers), or as a bonus for any teacher reaching a certain level of performance. The first establishes at the outset the maximum amount of money that a district or country will spend. However, as noted above, it may discourage some teachers from trying to improve their performance. The second option requires a clear definition of what teachers need to do to meet the requirement for a bonus. While it allows for more teachers to earn rewards, it could also increase the amount of money that must be set aside to fund the rewards, if

most or all teachers earn the bonus. To renege on the payment of rewards will doom this kind of programme, as teachers will question the commitment to improvement that it represents. (PISA,2012)

But support for performance-based pay is by no means unanimous. Florida Governor Charlie Crist vetoed a bill in April that would have tied both teacher pay and tenure to measured student Performance(Gabriel & Cave 2010). The bill has drawn harsh criticism from Florida teachers who question its potential to improve public education and fear its repercussions for existing employees.

#### **2.2.3 Lack of Equipment and Instructional Materials**

Instructional resources which are educational inputs are of vital importance to the teaching of any subject in the school curriculum. Jekayinfa (2014) was of the opinion that the use of instructional resources would make discovered facts glued strongly to the memory of students. He added that, a well-planned and imaginative use of visual aids in lessons should do much to get rid apathy, supplement inadequacy of books as well as arouse students' interest by giving them something practical to see and do, and at the same time helping to train them to think things out themselves.

He said that selection of materials which are connected to the basic contents of a course or a lesson, helps in-depth understanding of such a lesson by the students in

that they make the lesson attractive to them, thereby arresting their attention and thus, driving them to learn. He suggested a catalogue of aids which could be used to teach history. He advocated the use of pictures which will help children in grounding their thoughts and feelings. He said that pictures are used as substitutes to real objects where it is impossible to show students the real objects, and they do serve effectively in tan imagined activities.

School facilities have been observed as a potent factor to quantitative education. The importance to teaching and learning of the provision of adequate instructional facilities for education cannot be over-emphasized. The dictum that "teaching is inseparable from learning but learning is not separable from teaching" is that teachers do the teaching to make the students learn, but students can learn by themselves, without the teachers. According to Owoeye and Yara (2011), learning can happen through one's interaction with one's environment. Environment here refers to facilities that are available to facilitate students learning outcome. It includes books, audio-visual, software and hardware of educational technology; so also, size of classroom, sitting position and arrangement, availability of tables, chairs, chalkboards, shelves on which instruments for practicals are arranged.

Facilities constitute a strategic factor in organizational functioning. This is so because they determine to a very large extent the smooth operation of any social organization or system including education. He further stated that their availability, adequacy and relevance influence efficiency and high productivity. In their words, suggested that the riches of a nation or society could determine the level of education in that land; emphasizing that a society that is rich will establish good schools with quality teachers, learning infrastructures that with such, students may learn with ease thus bringing about good academic achievement.

#### 2.2 Theoretical Framework

In Nigeria, the importance of chemistry in the development of the nation cannot be taken lightly especially as her national income depends on petroleum and petrochemical industries (Ameh & Dantani, 2004). The constant poor performance of secondary school students in chemistry has however remained a major obstacle to its learning. The Chief Examiner's report on the conduct of the 2010 senior secondary school certificate examination of the West-African Examination Council in Chemistry stated that there was no major improvement in the performance of candidates when compared with those of previous years (WAEC, 2010). In this regard NECO chief examiners report concluded that the poor performance by students in external examinations seems to suggest that the end to the country's educational woes is far from being over (NECO, 2011). This decimal performance

may be related to the failure of teachers among other things to use the right methods in handling the teaching of chemistry content.

Chemistry is most commonly regarded as the "Central Science" or the "Mother of all Science" owing to its confluence and influence (Ahiakwo, 2000). Okeke and Ezekannagba (2000) also defined chemistry as a branch of science that deals with composition and changes of matter. Chemistry could therefore be defined as the science that deals with structure and composition of matter. Curriculum as defined by Onwuka (2013) is the intended learning outcome of the school programme. The current WAEC SSCE and National Examination Council (NECO) SSCE syllabus on chemistry cut across topic in physical, inorganic, organic, environmental and analytical chemistry systematically arranged under twenty topics.

The cognitive (Gestalt) theorists define learning as a development of insight. It states that learning involves personal involvement, re-organization of perceptions and gaining of insight in a purposeful activity (Okoye, 2015). This theory which is also called insight theory of learning stresses the importance of organization of activities in the psychological field. It states that with numerous experiences the learner fixes the new experiences in the old and reorganizes the old in terms of new events and perceives significant factors involved (Hartmann, 2013). According to this theory, all problems are solved as soon as the learner achieves insight into their essential relationship. Learning does not happen through trial and error or

conditioned stimuli, but happens in a flash of lightening and throws light on the problem as a whole. It is creative and akin to invention. It is a fact that insight learning depends on previous learning or experiences. This however, will happen if the ground is prepared for, by trial and error. The concepts learnt in theoretical aspect of Chemistry would make insightful learning relevant to the practical work in Chemistry. The teacher as a facilitator has to guide, drive and attempt to get the attention of the leaner for insightful learning to take place.

The theory of transfer of learning depends on the ability of individual to transfer what He or She has gained or acquired in one situation to another. This theory is important in this study because we expect students to use what they gained in the theory aspect of Chemistry (or other science subjects too) to solve problems in the practical aspect of the course. Some theories have been advanced on the mechanism of transfer of learning. These are the theory of identical elements; theory of generalization and the theory of similar though not identical elements (Thorndike, 1916). Thorndike conducted his experiments on identical elements in 1904. On the basis of his experiment, he discovered that transfer happens from one situation to another based on the presence of identical elements. These identical elements are grouped as identities of substance (matter) and identities of procedure (method). This theory is important here as it applies to some aspects in Chemistry. Thus, what has been learned in the theoretical aspect should improve students'

performance in practical Chemistry. There are few elements of similarity or identity and it could be possible to have transfer of learning. Although these theories do not tell us the causes of transfer of learning, the descriptions are relevant to our education practice especially as it relates to Chemistry and other sciences.

Linking these theories to this study, for students to perform well in Chemistry which is one of the main parts of science, they will have to be involved themselves in both practical and theoretical aspects of the course. The students have to be familiar with some of the concepts in the sciences, gain knowledge into the learning processes, get used to the materials and equipment in the laboratory. This would improve their skills in operating these materials or equipment for a meaningful end result. The theorists emphasized the importance of exercises. The teacher should, therefore, involve the students in gainful exercise such as weekly practical work which could help them to improve their skills, hence better performance.

Effective teaching of chemistry can only take place when adequate and relevant instructional materials are used (Afolabi and Adeleke, 2010). Aside the availability of instructional materials, effective teaching and learning of food and nutrition depends on teacher expertise and pedagogical content knowledge (Orji, 2016).

#### 2.3 Empirical framework

Chemistry is not entirely abstract but has practical parts. It touches all parts of life. According to Greek philosophers, the whole life is synonymous to chemistry. The Greek believes that everything can be chemistry. On the other hand, according to Lawton(1983), curriculum has to do with a whole range of mattersand tasks relating to contents, experiences and the implementation of the plans into practice by the class-room teachers. For all science secondary school students in Nigeria, it is compulsory to offer chemistry. This is in line withthe National Policy on Education (FRN, 1981) which emphasizes chemistry as a "vehicle" ofscience and technology. The National Educational Research and Development Council (NERDC) which was established late 2010 organized series of seminars and workshops between 2013 and 2015 on how to plan a curriculum and produce syllabi textbooks and other instructional materials for allevels of education. This was in anticipation of the proposed new policy on education.

In his work, Fakuade (2016) declared that it is a fact that excellence in the knowledge and use of chemistry is an essential factor in the development programme of any nation that wants to have respectable status among other nations of the world.Due to Technological awareness and the need to teach Science and Mathematics for meeting societal wants and aspirations, quite a number of science

curriculum projects were prepared for primary and secondary schools and are constantly reviewed.

Notably among these include: African Primary Science Programme (APSP) which was later known as Science Education programme for Africa (SEPA), Midwest Bendel Primary School Science andNigerian Integrated Science Project (NISP) and so on. Abdullahi (2010) pointed out that chemistry like an octopus has its numerous tentacles in allbranches of knowledge. It was such lives and cries that pushed the government to organize anational conference on curriculum development in Lagos between September 8-12, 1969. Theconference on curriculum was sponsored by the Nigerian Educational Research Development Council (NERDC) and was saddled with the onerous responsibility of reviewing the nation's educational system with specific emphasis on the objectives of education and the content of the curriculum in the light of the peoples' needs; both as individuals and as a nation (Dada, 2012).

The Sogbetun Commission of enquiry recommended the setting up of NECO, along with Angulu led Commission in 1989 when Professor Bab Fafunwa became Minister of Education (FRN, 1989).

The following are some of the roles of WAEC and NECO:

i. Conduct examination and award certificates.

- ii. Set questions and conduct examinations to cover such areas as practical, oral and Essay.
- iii. Set a common standard through their syllabi and draw a uniform time table for conduct of examinations.
- iv. Provide data or feedback on students' performance to schools, thus helping to fast- track improvement in teaching and learning in schools. (Ibrahim 2003)

Adeogun(2011) showed the relationship between students' performance in chemistry and mathematics insome selected secondary schools in Ilorin Local Government Area of Kwara State. Twelve (12) schools wereselected by stratified random sampling technique. Twenty (20) students from each of the selected secondary schools were chosen by systematic random sampling techniques. Among the findings by the researcher are:

- i. There is a positive and high correlation between students' performance in chemistry and mathematics.
- ii. The locations of the schools (urban or rural) had influence on students' performance in chemistry and mathematics (Adeogun, 2011)

A lot of concern has been shown by a large number of concerned citizens on students' attitudes tosciences. Their verdict was that there was low enrolment of

33

students in science. (Aminu, 2012). The importance of students' performance in science and mathematics could not be taken lightly at ithelps in pursuit of academic and industrial revolution. The importance of mathematics in studying and understanding sciences has long been recognized worldwide (Ale 2010, Osibodu 2010).

Aliyu (2013), in his research study, came to a conclusion that chemistry topics which need chemistry forproper understanding are difficult areas for Nigeria High School students in terms of comprehension. He therefore concluded again that there is a relationship between mathematics and chemistryempirically. Students who find mathematics easy to understand tend to turn towards chemistry andthose who find mathematics difficult choose against chemistry.Continuous assessment is the mechanism whereby this final grading of a student in cognitive affective and psychomotor domains of behavior takes into consideration a systematic way of all his performance during a given period of schooling (FRN, 2014)

Adeyemo (2016) has his primary objective highlighting the relationship between continuous Assessment and Junior school Certificate Examination scores in mathematics. Terminal assessments are those administered on learners after a number of lessons, usually coveringmany different concepts or topics that have been taught (Ayodele, 2015). He highlighted further that such assessments are usually carried out at the end of the term, session or the middleof the session. Ayodele (2015) also said something about periodic assessments. These are more often especially with mathematics teachers, usually in form of quizzes, mental sums, and shorttests.

Spencer (2010) was of the opinion that mathematical experience could be interesting and fruitful indeveloping individual abilities to understand social institution and in equipping one to meet moreeffectively problems which happen in his personal life. Another study by Ogunleye (2012) was carried out in sampled secondary schools in Ikole LocalGovernment Area of Ekiti State, Nigeria. The study examined the relationship between students'attitude toward chemistry and their performance in it. Some hypotheses were formulated and testedstatistically.

Within the limitation of the study, mathematics attitudes are conclusively related to Performancein mathematics. An investigation revealed significant correlation between attitudes and chemistry achievement(Jackson,2014). Since his review focused on measured attitude towards mathematics, one maythen conclude that attitude towards particular subjects are more related to school Performancethan ageneral attitude towards the school.

Arinola (1996) examined the correlation between the performance in MOCK-SSCE and SSCE examinations in chemistry from 1990 to 1994 at Ajibade Grammar School, Ibadan. The correlation analysis was used to determine the relationship that exists between the MOCK and SSCE examination. That is to examine the contribution of the mock examination on the final SSCE examination. The findings showed that the MOCK- SSCE and SSCE results were closely related for the period of study (1990 to 1994). These results however, showed that there is less relationship between the two sets of grades for MOCK- SSCE and SSCE. Thus, the insignificant correlation obtained shows that both results were generally poor.

#### **CHAPTER THREE**

#### 3.0 MATERIALS AND METHODOLOGY

#### **3.1** Research Design

The research design for the study is performance descriptive research. This is because the study has to do with collection of data from given population of respondents scattered at different locations. Ndagi (2002) stated that descriptive research is concerned with the collection of data for the purpose of describing and interpreting existing conditions, prevailing practices, beliefs, attitude, on-going process, etc.

#### **3.2** Population of the Study

The population of this study is made up of the entire science students of selected senior secondary schools in Niger State who took part in NECO and WAEC chemistry for the under review (2014-2018). The schools are:

- 1. Government Senior Secondary School
- 2. Mariam Banbangida Girls Science College

#### **3.3** Procedure for Data Collection

The data (secondary) for the study were collected from two selected senior secondary schools in BossoLocal Government Area of Niger State, Nigeria using Simple Random Sampling.

37

#### **3.4 Procedure for Data Analyses**

The Scope of data spans through the period 2014-2018. The correlation coefficients (r) of the relationship between students' performance in WAEC chemistry and NECO chemistry in various school were calculated. The computational formula for correlation coefficient, r, as defined or deduced by Karl Pearson is

The method of analysis is chosen because the Pearson Product Moment Coefficient is sufficient to provide the direction and magnitude of the relationship between the two variables (WAEC Chemistry and NECO Chemistry) for this study.

#### 3.5 Assumptions

The following assumptions were made on the students in each of the schools selected:

- 1. All the students used the same textbooks;
- 2. The students used the same syllabus in Chemistry
- 3. The students were subjected to the same environmental and social conditions;
- 4. The students have the same educational background.

All the grades scored were changed to marks for easy computation of the correlation coefficient (see appendix for conversion table).

## **CHAPTER FOUR**

## **EMPIRICAL ANALYSIS, RESULTS AND FINDINGS**

#### 4.1 Analysis and Interpretation

Table 4.1: Relationship between Students' Performance in WAEC and NECO

Chemistry in Government Senior Secondary School for the Period 2014-2018.

Government Senior Secondary School	Correlation Coefficient
	( <b>r</b> )
Year 2014	0.55
Year 2015	-0.12
Year 2016	0.54
Year 2017	0.37
Year 2018	0.04

Table 4.1 shows both an average positive (r = 0.55) for year 2014 and low relationship (r = 0.04) for year 2018 between students' performance in WAEC and NECO chemistry

Table 4.4: Relationship between Students' Performance in WAEC and NECOChemistry inMariam Babangida Girls Science College for the Period 2014 -2018

Mariam Babangida Girls Science	<b>Correlation Coefficient (r)</b>
College	
Year 2014	0.20
Year 2015	0.54
Year 2016	-0.15
Year 2017	0.62
Year 2018	0.60

Table 4 shows a high positive value of r = 0.62 for the year 2017, lowest value of r = 0.30 for the year 2014 and an inverse (negative) relationship of r = -0.15 for the year 2016 between students' performance in WAEC chemistry and NECO chemistry.

## 4.2 Testing of Hypothesis

Table 4.5: Summary of Testing for the Significance of Correlation CoefficientGovernment Senior Secondary School

Year	R	t-calculated	t-table	Remark
Year 2014	0.55	3.576	2.048	Significant
Year 2015	-0.12	-0.746	2.048	Insignificant
Year 2016	0.54	3.390	2.048	Significant
Year 2017	0.37	2.448	2.048	Significant
Year 2018	0.04	0.212	2.048	Insignificant

#### Mariam Babangida Girls Science College

Year	R	t-calculated	t-table	Remark
Year 2014	0.20	1.654	2.048	Insignificant
Year 2015	0.54	3.575	2.048	Significant
Year 2016	-0.15	-0.857	2.048	Insignificant
Year 2017	0.62	4.524	2.048	Significant
Year 2017	0.60	4.179	0.048	Significant

#### 4.3 Summary of Major Findings and Discussions

The following major findings were made by the researchers in this study:

- There was significant positive relationship between students' performance in WAEC and NECO chemistry in Government Senior Secondary School for the year 2014, 2017 and 2018
- (2) There was significant positive relationship between students' performance in WAEC and NECO chemistry in Mariam Babangida Girls Science College for the years 2015, 2017and 2018within the limitation of this study, it has been revealed that there is positive relationship betweenWAEC and NECO chemistry results. The findings of the study revealed that a student who had credit in WAEC mathematics would have at least a credit or pass in NECO mathematics.

Majority of the Students who had credit and above in NECO chemistry obtained at least passes in WAEC chemistry and those who failed in NECO chemistry also failed in WAEC chemistry. The correlation coefficients calculated for each of the schools studied indicated that there was apositive relationship between students' Performancein NECO chemistry and WAEC chemistry in four out of five year's data used for the study. In this study, the research hypothesis that there is no significant relationship between WAEC andNECO chemistry results in all the schools was found invalid. High marks in WAEC chemistry implied high marks in NECO chemistry and low marks inWAEC chemistry implied low marks in NECO chemistry as illustrated in Government Senior Secondary School for the year 2017 and so on.

The least correlation coefficient (r = 0.04) calculated for this study was from school Government Senior Secondary School.

#### **CHAPTER FIVE**

#### CONCLUSION, RECOMMENDATIONS AND SUGGESTIONS

#### 5.1 Conclusion

Life, according to Butter (2012) is the art of drawing sufficient conclusion from insufficient premises. Emanating from the discussion above, the following conclusions are drawn out:

 (a) There was significant positive relationship between students' performance in WAEC and NECO chemistry Government Senior Secondary School for the years 2014, 2016and 2018.

There was significant positive relationship between students' performance in WAEC and NECO chemistry in Mariam Babangida Girls Science College for the years 2014, 2017and 2018. Since it has been found that there is positive relationship between studentsperformance in most of the schools in the two examination bodies, the hypothesis that there is no significant correlation between WAEC and NECO chemistry results in all the schools was rejected.

#### 5.2 **Recommendations**

The following recommendations are made in an attempt to improve students' Performancein both WAEC and NECO chemistry:

- i. Students should develop more interest in sitting for either of the two examinations since theywere found to be the same or equivalent.
- ii. Chemistry teachers and school authorities should encourage the students to prepare adequately for both examinations.
- iii. Students who perform very well in WAEC chemistry should be able to perform well in NECO chemistry so as to confirm the notion that the two bodies produce equivalentresults.
- iv. Parents should encourage their children to put more efforts in studying to reduce the high rateof failure in the two chemistry.

#### 5.3 Suggestions

On the basis of the above findings, it is suggested that further research should be carried out to:

 i. investigate whether students who gained admission into higher institutions through WAEC O'level result perform better than students who were admitted through NECO O' level result.  iii. investigate whether or not the urban male or female students performance in WAEC chemistry and NECO chemistry differ significantly from those of their rural male or female counterparts.

#### References

- Adeogun, I.O (2011), The Relationship between students' performance in chemistry and mathematics. An unpublished PGDE thesis submitted to the Institute of Education, University of Ilorin.
- Adeoye, B. (1991),"Mathematics, prerequisite for successful learning of Physics," Journal of mathematics Association of Nigeria.
- Adeyemi, J.A. (1991), Relationship between Students performance in continuous Assessment and Junior School Certificate Examination in Mathematics, An Unpublished B.Sc (Ed) thesis submitted to the Institute of Education, University of Ilorin.
- Aiken, L.R. (1970), "The Effect of Attitudes on Performance in Mathematics," Journal of Educational Psychology,52 (1)
- Aina, Alonge and Owa(1988). "What Mathematics is to the Physical Sciences". Journal of Science Teachers Association of Nigeria,24. (2)
- Ajeyalemi, D. (1987),"The Teaching of Chemistry and Mathematics as an Experimental Experience in Nigeria Secondary Schools. Problems and prospects," Journal of Science Teachers Association of Nigeria, 21 (2)
- Akinola, J.A. (1992). Students Mathematics Background and their Performancein Physical Sciences, An Unpublished PGDE thesis Submitted to the Institute of Education University of Ilorin.
- Ale and Oshibodu (2012). "The importance of Mathematics in studying and Understanding Science," Journal of Science Teachers Association of Nigeria, 19 (1)
- Aliyu, A. (2013), "An Investigation into the difficult area of the Ordinary Level Chemistry Syllabus for Nigeria Secondary Schools", Journals of Sciences Teachers Association of Nigeria," 21 (2)

- Ameh, PO, & Dantani, YS. Effects of lecture and demonstration methods on the academic Performanceof students in chemistry in Nasarawa Local government area of Kano State. *International Journal of Modern Social Science*. 2012; 1(1)
- Aminu, J. (1987), "Traffic Warden at Ribadu Road," A paper Presented at the 25 years of Centralized University Education in Nigeria
- Anthony, A. (1984), "The performance of Nigeria school O' level Sciences Students on Mathematics tasks Essential in Secondary School Science, "Journal of Science Teachers Association of Nigeria 22 (2) Arinola, A.A.(1996), Performance at MOCK /SSCE and SSCE mathematics, An Unpublished PGDE thesis submitted to the Institute of Education, University of Ilorin.
- Castle E.B. (1959), Principles of Education for Teachers in Africa, Oxford Press (59)
- Fafunwa, A.B. (1974), History of Education in Nigeria, George Allen and Unwin London
- Fakuade, A. (2016), "Uses of Mathematics, Journal of Curriculum Studies, 2(2)
- Federal Republic of Nigeria (2004), National Policy on Education, 4th ed., Lagos, NERDC.
- Jackson, O.C. (2014), "Correlation between Attitudes and Mathematics Achievement", Journal of Educational Psychology, 51 (2).
- Jones, L.V. (1980), Changes in PerformanceTest Scores of Pre- College Students in Mathematics and Science, A Review of the Evidence, Chapel Hill, University of North Carolina.
- Joyce, D.F. (1998), History of Mathematics , <u>http://alepho.clarku.edu/-</u> <u>djorce/mathlist.html</u>.

- Lawton, C. (1983), Designing of Curriculum, New York: Harper and Row Publishing
- NECO Chief examiner's report, Minna. 2009-2011.
- Ninan. D.C., Gill, N. (1970), "Relationship between Attitude Towards Schools Subjects and School Achievement, Journal of Educational Research, 63(5)
- Odunsi, T.O. (1984), "A Study of the Attitude of Some Nigerian Science Students towards Science Teaching," Journal of Science Teachers Association of Nigeria 22 (2)
- Ogunleye, J.A (2012), Relationship between the Students Attitudes Towards Mathematics and their Performances. An Unpublished PGDE thesis submitted to the Institute of Education, University of Ilorin.
- Oyeyemi, M.O. (1988), Effect of Family Background on Academic Performance in Mathematics. An Unpublished PGDE thesis Submitted to the Institute of Education, University of Ilorin.
- Roberts, L.S. (1974), "The Correlation of Science Knowledge of Preserve Elementary Teacher of Education", Journal of Educational Research, 22 (2)
- Spencer, C.R. (1961), "Mathematical Experience means of Developing a Fruitful Individual," Journal of Educational Psychology, 24 (3), 17-21.

WAEC Chief Examiner's Report Lagos. 2010.