

**TITLE PAGE**

**COMPARATIVE STUDY OF COGNITIVE ACHIEVEMENT IN  
CHEMISTRY AND AFFECTIVE ATTITUDE OF SENIOR  
SECONDRY TWO CHEMISTRY STUDENTS IN SOKOTO  
METROPOLIS.**

**BY**

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## **APPROVAL PAGE**

This project has been read and approved as meeting of the requirement of partial fulfillment for the award of degree of Bachelor of Science in Education (B.sc, Ed) Usmanu Danfodio University Sokoto, Nigeria.

## **CERTIFICATION**

This is to certify that, this project research work has been read and approved by the department of science and vocational education, faculty of education and extension services, Usmanu Dan fodio University Sokoto as satisfying basic requirements for the award of bachelor degree of science education (B.sc Ed) in Chemistry.

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## **DEDICATION**

This project is dedicated to our beloved parent for their love, care and support toward our achievement in life. May Allah's blessing continue to be with them Ameen.

## ACKNOWLEDGEMENT

Thanks are to almighty Allah, the most gracious and the most high for given us the will to carryout this research work and may Allah give us more courage and determination to do more.

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***ABSTRACT***

*The main purpose of this research study is to investigate and compare and cognitive achievement in chemistry and affective attitude of senior secondary II chemistry student in Sokoto metropolis. The data collected for this study were from some selected secondary schools in Sokoto metropolis. A purposive sampling techniques were adopted in selecting sample size in the population. The data generated were analyzed using tables, descriptive statistics, frequency and simple percentage were used in comparing the various result obtained.*

*The outcome of this study shows that there is a positive attitude toward learning chemistry and attitude is function of achievement. Recommendations were made based on the outcome of this study.*

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 BACKGROUND OF THE STUDY**

Chemistry is one of the important science subject taught at the senior secondary school (SSS) level, performance will only be determined along with individual perception. Nowadays, students do not like most of science subject especially Chemistry, Physics, and Mathematics and this lead to their poor performance in science subject. Sokoto metropolis covers Sokoto north and Sokoto south, Sokoto metropolis is one of the earliest town that embrace Islam under Usmanu Danfodiyo caliphate with well Islamic orientation, due to the coming of western education, many secondary school were established within Sokoto metropolis. The influence of these schools was so fell that many parents don't want to take their child to school. The new national policy on education,( 2004) aims and objective stipulated that science education for secondary school, by directing that secondary school system be structured in such away as to diversify the curriculum to cater for the difference in talent, opportunity and roles posses by or open to student after their secondary school carrier.

In recent years, there has been a growing concern over the development of positive attitude toward science in student effective science teaching at public. The concept of attitude has been of great interest to psychologist and educators alike and educational development have endorsed of the needed for the formation of favorable altitude for learning by student. It is interesting to noted that people prefer the literacy

subject and are reluctant to elect for practical courses, biology, chemistry, physics and mathematics if and when they offer.

‘Achievement of various cognitive aspect of intellect’. It is observable achievement from which it is inferred that an individual is exercising one of the intellectual component of knowing such as perceiving, remembering Judging and reasoning’.

- Performance: this is operational used to mean the academic achievement observed in the tests and examination result as recorded in the Chemistry Achievement Test (CAT)
- Attitude: they are tough to be driven from experience rather than innate characteristic which suggests that they can be modified. In education situation cognitive achievement of student on a particular course depends in many factors including their attitude and interest toward the course. International dictionary of education defines attitude as preposition to perceived, feel or in a particular manner. It also ‘Defines attitude as predisposition of the individual to evaluate some symbol or aspect of his world in favorable or unfavorable manner’.

‘Attitude according to these researchers is how we think, feel about and act toward our fellow human being and how they think, feel about act towards us’ Achievement may mean the successful completion or gaining through skill, interest, and hard work. Achievement is defined according to international dictionary of education as ‘performance in school or college in a standardized series of educational test’. The thousands of research of student academic achievement is testimony to this concern. This is as it should be, because the consequences of failure in schools are far-reaching, particularly in developing countries like Nigeria. This is only because a high achievement especially in

the science is the but also because high achievement is particularly value academic success as the stepping stone for upward social and economic mobility, Ukej, (2000). The term is used more generally to describe performance in the subject of curriculum.

## **1.2 STATEMENT OF THE PROBLEM:**

For many years now, experience has shown that students have developed negative attitude toward science in general and chemistry in particular as an academic subject in secondary school. This has been revealed through past western number of students that offer it at this level and other disciplines. Based on this assertion, one wonders what could be the factors responsible for such an ugly situation which has almost come to stay. To this end, the study is aimed at identify these factors that are responsible for the student negative attitude and poor cognitive achievement on chemistry. The reason for choosing this topic arose from our experience as a student teacher in various secondary schools within Sokoto metropolis between 2013/2014. These we observed that the interests of most of the student were not geared toward the study of science in general and chemistry in particular.

We gave chemistry achievement test to (SSII) chemistry students and found that the result and response were not at all that encouraging. Many students were even later found to select Arts courses in their final year (WAEC/NECO) examination. Many people have different opinion on the issue of student negative. Some may say that chemistry needs a lot of memorizing work and the practical aspect of the subject is very tedious, and need much concentration. At this juncture, one might be tempted to ask what could possibly be the problems with our student and the study of science chemistry.

This is only lack of teaching facilities or otherwise. What should be done by state or country to stimulate the study of chemistry at this level of education? An unstructured sampling of some student attitude towards science this by these author showed that some student do not like chemistry, most of the schools have no laboratory and even those with one are poorly equipped to enhance effective learning. There is also lack of current textbooks to go around the student.

The problem of staffing is another important factor to note. This involved lack of chemistry teachers, some as the case with most of schools where some teachers, that have not specialized in chemistry are given the opportunity to handle the course due to lack of quality hands. Schools heads, proprietors and school administrators should provide some helpful means for student's attitude to science. They are supposed to give the student idea about which subject lead to which careers and to direct student to study the subject they know best.

Parent of the student sometimes constituted to the problem, some of them would like their child to become lawyers, doctors, engineers, and so on without knowing which subject will lead their ward to the propose careers. In an ideal situation where a child is allowed to do any subject he feel he can do well. The performance is always encouraging especially at the secondary level. Al society without guidance and counseling services to direct the student on student on subject to offer in line with their senior secondary (II) chemistry student would performance well if teacher uses various methods in teaching chemistry. It is an establishment fact that the affective attitude of chemistry student will certainly affect or directly be proportional to their academic achievement.

### **1.3 OBJECTIVES OF THE STUDY:**

The main objectives of this study are to assess the cognitive achievement and affective attitude of SS (II) chemistry student in Sokoto metropolis, while specific objective are:

1. To find out the significance different between affective attitude of SS II chemistry student in Sokoto metropolis.
2. To find out how SS II chemistry students performance in chemistry achievement test (CAT).
3. To find out how student response to the teaching of chemistry by their teachers.
4. To find out why student in SS II class shows favorable and unfavorable response toward chemistry.

### **1.4 RESEARCH QUESTIONS:**

This study attempt providing answers to the following questions:

1. How do student in SS II class in Sokoto metropolis find chemistry as a subject.
2. How do student of SS II class in Sokoto metropolis in the participatory school perform in the achievement tests (CAT).
3. How do student of SS II class in Sokoto metropolis affective attitude affect their performance in chemistry.
4. How do SS II chemistry student in the participating schools perform under self designed questionnaire.

### **1.5 RESEARCH HYPOTHESIS:**

In this study the researchers will make used of the following hypothesis:

1. Is there no significance different between attitude of student towards science and chemistry in particular in Sokoto metropolis school?
2. Is there no significance different between performances of student in Sokoto metropolis in chemistry achievement test (CAT)?
3. Is there no significance difference between student's academic performance in science and their attitude in science?
4. Is there no significance different of SS II chemistry student in the participatory schools performance in the questionnaire?

#### **1.6 SIGNIFICANCE OF THE STUDY:**

The significance of the study can be overestimated more so as it concerned with cognitive achievement and attitude of SS II chemistry student. The study will certainly help the Sokoto state government toward the improvement of manpower needed for technological advancement of the state .the finding will not only help in modifying the method of teaching chemistry but also help to eliminate or reduce some of the problem encountered by the students during the period of teaching and learning of this subject. this result will help teacher to understand the changes that will be necessary to improve the interest of SS II chemistry student in sokoto metropolis.

The study may go a long way to modify the attitude of teacher's towards student in chemistry class. The result of this study will enable the teacher's and other people concerned with curriculum planning to have first hand information about student attitude in the area under study. On the part of the future researcher's the finding of this study will forms bedrock or at last provide a clue for further study.



## **1.7 SCOPE AND DELIMITATION**

There are forty four (44) secondary school which are widely spread in Sokoto metropolis. The researcher's delimited the study to some of the Secondary School that offered science subject within Sokoto metropolis specifically in the field chemistry. The respondent will comprise some of student toward their attitude in some selected secondary school in Sokoto metropolis.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

#### **INTRODUCTION:**

This chapter is aimed at portraying some relevant views of some distinguished scientist, psychologist and educationist as they affected cognitive achievement and attitudes of students towards science in general and chemistry in particular. In recent time large amount of money and efforts have gone into the development of science in Nigeria especially during this era of New National Policy on education (2004).

The aims and objectives of those efforts are diverse, yet one goal which appears to be gone rally agreed upon by majority is development of more favorably attitude towards chemistry in Nigeria were centre in Secondary Schools, this may be due to the fact that studies were geared at improving student attitude towards chemistry, teaching chemistry and other science to achieve the notion much needed technological development.

#### **2.1 CONCEPTUAL FRAMEWORKS**

- Definition of Cognitive achievement.
- Definition of attitudes.
- Achievement and attitudes relationship.
- Effect of teaching method on student's attitudes and achievement.
- Student and teacher's attitude towards chemistry.
- Parent pressure.

- Environmental Influence on attitude.
- Textbook material influence

## **2.1 DEFINITION OF COGNITIVE ACHIEVEMENT:**

Many Authors defined achievement in various ways but all boils down to measure of success. Britannica Encyclopedia, (1994-2010) defined achievement “as a measure of success in learning academic subjects or other accomplishment or skills. It is also defined as;

- (I) Accomplishment success in bringing about a desires end.
- (II) That which is successfully attained.
- (III) The degree or level of proficiency attained scholastic or academic works while International Dictionary of education defined achievement as performance in school or college in a standardized science of education test.

Achievement can also be defined as the successful finishing or going through skills interest and works hard. The academic achievements of student in secondary schools have usually been examined with respect to the student intrinsic contribution attitude, personally previous academic and so on” Bajah, (1982).

## **2.2 DEFINITION OF ATTITUDES:**

A review of related literature on attitudes reveals that different Psychologist, Educationist, Scientist, defined attitude in various ways; Attitudes can be defined as the positive or negative affective reaction towards a denotable abstract or concrete object or proportion. Mukterjee, (2000): Attitude is also described as a person feeling, thinking or

manner of responding towards a particular activities, object person idea, attitude are predisposition to classify set of object or event and to react to them with some degree of evaluative consistence. While attitudes logically are hypothetical consistent area, they manifested in conscious experience verbal reports, gross behavior and physiologist symptoms. Britannica Encyclopedia vol. 1, (1984-2010).

The International dictionary of Education defined attitude as a preposition to perceive, feel or behave towards specific objects or certain people in a particular manner. Attitude is thought to be derived from experience rather innate characteristic which suggest that they can be modified. Social psychologist focused on attitude as a central concept of seeking to develop their field as a scientific discipline. Indeed attitude seen to perceived that their study might be said to cover the full range of human behavior and experience. The term of attitude is used when trying to explain someone past or present behavior towards some person or object in analyzing attitude a definition is usually made between three components cognitive, affective, and behavioral. The study will mainly deal with affectives and partly with cognitive attitude.

### **2.3 ACHIEVEMENT AND ATTITUDE RELATIONSHIP:**

A lot of findings have proved that there is a significant relationship between student attitudes toward science and their achievement in the subject. Bloom et al, (1980) have postulated that the mastery model would bring about positive attitude toward learning and higher achievement of course content. Cooper et al, (1972) positive relationship was obtained between self concept and academic achievement in classroom learning. Teachers must make decision on how much times to spend on certain educational objectives. In the recent conventional classroom this decision is made by the teachers for

the entire class and all the student in that class are evaluated on the accomplishment of the objective on the same day. Carroll, (1963) proposed a model of learning, he described in terms of the time required for the students to master a fixed amount of materials. Recent science curriculum have focused not only upon more effective cognitive strategies like lecture method but also upon better attitude towards science.

The relationship of student attitude to science and science achievement has been proposed and investigated by many studies. Allen, (1983) Brown, (1955) and Hough, (2004): student attitude to science could be accessed through achievement through test. Attitudes of school student go hand in hand with their academic achievement if a negative attitude to say, chemistry is linked with poor performance in it. This may well be because the subject is badly taught.

A change in teaching strategies therefore, might be well lead to a change in the student attitude and hence improvement in his achievement in the subject. To measure attitude towards achievement of specific objectives, instruments measuring attitude towards science seen to reflect these same problems. Some psychologist tried to use symbolic smiling and frowning faces as a means to measure attitude toward science.

Grareli et al, (1971): The interest of senior secondary (II) student in chemistry is more predictive of academic success in science Allen, (1973).

## **2.4 EFFECT OF TEACHING METHODS ON STUDENT AND ACHIEVEMENT IN SCIENCE:**

Student attitude towards a particular science subject depends deeply on the teacher's present the fact to the students. Blooms, (1968) proposed that the application of teaching strategy which he terms as mastery learning could enable most students to achieve a higher level. Perkes, (1979) indicate the effect of training using the New Science Curriculum or specific technique to the development of a teaching style or altitude in teaching science. It's my belief that student attitude and achievement are directly proportional to the various methods used in teaching the subject. Charam, (1966) compared to an open ended inductive approach in teaching high school chemistry. He observed that students expressed more positive cause it make them think, feel like a real chemist, give them more freedom in the laboratory and more challenging interesting enjoyable, stimulating than traditional approach.

Ausubel theory of meaningful learning is based on the crucial assumption that a person ability to learn new materials independently upon the knowledge that he or she already possess. Ausubel and Robinson, (1979) for those approaching a topic. Anderson, (1971) found that it is important to the teacher's to be enthusiastic and used more indirect teaching behavior-ninth grade pupils interest in science.

## **2.5 STUDENTS AND TEACHERS, ATTITUDE TOWARDS CHEMISTRY:**

Student Attitude towards chemistry is affected by the attitude of their teachers. Okorie, (1980) said that teacher acceptance by his pupils is largely dependent upon his

altitude towards them. Development of scientific attitude of the ultimately on the teacher, the teacher altitude of the teacher's toward a subject he is teaching.

According to Kanoma Aliyu, (1988) in a paper presented in symposium for Chemical Society of Chemistry Student University of Sokoto, titled "Factor Responsible For The Declined in Chemistry Teaching in Sokoto State", mention poor clarity of communication between the teacher and student during instructional process as one of the factors decline interest in chemistry. One notable exception is found in National Study of High School Students that impression of the teacher as like or "Smart" significantly predicted pupils' altitude. The literature overall, suggest that teacher related variable are most important to the development of pupils attitude toward science either personally influence such as classroom climate.

## **2.6 PARENTAL PRESSURE**

Most parents in Nigeria don't seem to understand what career means, some of our parents because they want prestige and honor would like to be called by Doctors, Engineers or Lawyers without thinking of their children capacity to pursue such a course. Most parent force their children to go and study Medicine, Law or Architecture without knowing what is behind each course. Some children because of the influence of their parents may find themselves reading this big course even without the course basic concept.

Durumba, (1980) delivering a lecture titled 'important of guidance and counseling in Nigeria schools' pointed out that parents should not imposed any course on his or her words rather pupils should be guided to pursue courses of their interest and ability and judging with their accumulative performance. On the other hand, parents help to lay a

sound science foundation for their children creativity and intellectual capacity, parents are prepared to spend as much as time and money to provide books recreation tools and conducive atmosphere.

## **2.7 ENVIRONMENTAL INFLUENCE ON STUDENTS ATTITUDE TOWARD CHEMISTRY:**

There has always been interest in the development of positive attitude towards science. The objective of science curriculum includes fostering favorable feeling towards a particular science like chemistry as well as importing cognitive knowledge attitude. An environment however, intellectual demand difficulty and amount of inputs or conflicts is like to show more negative student or conflict. Wholberg et al, (1974) provided a nice overview of money aspect of science altitude including a review of instrumentation. It is still unclear how the school environment affects the development of pupils' attitude to science.

## **2.8 TEXTBOOKS MATERIAL:**

This may have great effect on student's learning in general. According to Akpan, (1985) he said that "a textbook and other published science curriculum materials constituted a major determinant factors of the learning outcomes of our science students. It is a well-known factor that most science teachers and students depend solely on textbooks as their chief sources whereby science knowledge and information are delivered. Textbooks therefore can affect student attitude and achievement in chemistry either positively or negatively.

The independent becomes even more pertinent in developing country including Nigeria where by laboratory facilities, library, audio, visual instructional materials, are



difficult to come by the way learning materials are arranged in their text. It must be recognized that the communication strategies employed by majority of the text are too sophisticated for an average student to understand worse still many science teacher's copy textbook materials verbatim for the student to memorized certainty; these would affect attitude and achievement of students. Akpan, (1985) also reported that many of the chemistry textbooks, currently in used by our teachers did not employed or comply with the WAEC, NECO and STAN recommendation particularly or IUPAC Nomenclature. No wonder that their textbooks (most of which were written by foreign Authors) were found unpopular with the chemistry teachers.

In Akpan, (1985) reasons were given by teachers for using some chemistry textbook in their school; some of the reasons are;

1. It is easy in teaching students.
2. Student feel that they can read and understand books on their own with little teacher assistance.
3. That the new textbook are recommended by STAN, NECO and WAEC textbooks with simple terminology readability, well organized content will certainly motivated student attitude towards science and chemistry in particular. Lawal F.K, (2006)

## **2.9 SUMMARY OF THE CHAPTER:**

The purpose of these chapters was to review the literature related to cognitive of science student in Secondary School in Chemistry. The literature concerning attitude and achievement was used since attitude of student is believed to be influence their achievement of chemistry course. Bloom, (1981) there is greater significant relationship

between student attitude and their achievement in science achievement also had high significantly positive attitude towards it. As Okorie, (1979) put it that “teacher acceptance by the students is largely dependent upon his attitude towards them is no doubt, therefore that science teacher are the backbone and chief intermediary of science programmed. Teachers have more influence on the development of student attitude. The teacher personality, relation and interactions with students, classroom condition reward assignment, all directly controlled by the teacher in the literature review.

It has been suggested that related variable are most important to the development of student attitude toward science, either through personality characteristic such as enthusiasm and other variable, the teacher influence such as classroom climate. Durumba, (1980) show how parent attitude affect the performance of their children in schools especially as regarded to choice of career. He pointed out that parent should not imposed any courses on his word rather students should be guided to pursue courses on their interests and ability judging from their accumulation performance. Anderson, (1976) provided evidence that aspect of the classroom learning environment or climate condition are positively related to science attitude. Akpan, (1985) and Lawal F.K, (2009) cited in Akpan,(1985) according textbook and other published science curriculum material constitute a major determinant factor of the learning outcomes of our science student. Akpan, (1985) conclude that textbooks reliability, simple terminology, well organized content will certainly motivate student attitude towards science and chemistry in particular.

## **CHAPTER THREE**

### **RESEARCH DESIGN AND METHODOLOGY**

The chapter deals with the methodology used in carrying out these researched. It covered the following:

3.1 Research design

3.2 Population of the study

3.3 Sampling techniques

3.4 Instrument for data collection

3.4 .1 Validity of the instrument

3.4.2 Pilot study

3.4.3 Reliability of the instrument

3.5 Procedure for data collection

3.6 Procedure for data analysis

#### **3.1 RESEARCH DESIGN:**

A sample survey design will be used. Data will be collected from the respondent and statistical analysis will be calculated.

### 3.2 POPULATION OF THE STUDY:

The population of the study in secondary schools that offer chemistry as subject in forty four (44) Senior Secondary Schools in Sokoto metropolis that is Science oriented.

### 3.3 SAMPLING TECHNIQUES:

Purposive sampling method will be used in selected school. A total of five (5) secondary schools will be randomly selected from the forty four (44) Senior Secondary Schools in Sokoto metropolis. In other to stick the balance, SS II Students will be selected for the study. This is because SS II students have covered a tangible amount of contents in chemistry syllabus. According to Krejcey and Morgan (1973) table for determined adequate sample for a population (1258), a total of 297 students were randomly proportional selected as presented in table.

S/N	SCHOOLS	POPULATION	SAMPLE
1	Unity Comprehensive Secondary School	120	28
2	Government Day Secondary Rujin Sambo	426	100
3	Sokoto Science College	320	76
4	Nagarta College Sokoto	312	74
5	Asmau Girls Islamic College Sokoto	80	19
	<b>Total</b>	<b>1,258</b>	<b>297</b>

### **3.4 INSTRUMENTATION FOR DATA COLLECTION:**

Two major instruments will be used in this research, these instruments include questionnaire and self designed chemistry achievement test (CAT) to measure the attitude and academic achievement in science chemistry subject. The questionnaire consist of (17) question for the students. The chemistry achievement test, consist of (20) multiple question in chemistry.

#### **3.4.1 VALIDITY OF THE INSTRUMENT:**

Validity here refers to the geniuses of the chemistry achievement test (CAT) by expert in the field and our supervisors to see if the contents are suitable for the intended population.

#### **3.4.2 PILOT STUDY:**

The pilot study is a small scale preliminary student conducted in order to check the feasibility and reliability of the instrument used. To obtain the reliability of the instrument, a pilot study was carried out on the small segment of the population. The pilot study was conducted using one (1) Secondary School that is outside the selected Schools under study. The schools was administered the same questionnaire and chemistry achievement test (CAT) that was designed for the study. The result showed that the instrument was found to be reliable with a reliability index.

#### **3.4.3 RELIABILITY OF THE INSTRUMENT:**

The (CAT) instrument and questionnaire was pilot tested with SS II chemistry students in selected school in Sokoto metropolis to determine it suitability with level of students. The

reliability of coefficient of (CAT) was established as 0.59 with 79 SS II chemistry students in pilot testing using Rama, (2007) for an instrument to be reliable it must be not less than one and it must no more than one.

### **3.5 PROCEDURE FOR DATA COLLECTION:**

The questionnaire and the (CAT) specifically made for the students that offer chemistry in Sokoto metropolis. The questionnaire and chemistry achievement test is administered to the students and collected properly by the researchers within 3 weeks.

### **3.6 PROCEDURE FOR DATA ANALYSIS:**

The achievement test results collected from the (5) selected Senior Secondary School were analyze using descriptive statistics (mean, S.D) and simple percentage for the questionnaire, Finally, the performance of the students in the chemistry achievement test (CAT) and the responses from the questionnaire for the (5) selected Secondary Schools were then compared and contrast, to judge the research question.

## CHAPTER FOUR

### DATA PRESENTATION AND ANALYSIS

#### 4.1 INTRODUCTION

The purpose of this chapter is to analyze and interpret the data collected in the course of this study as well as to test the research questionnaire in the chapter one. A descriptive statistic and simple percentage will be used.

#### 4.2 ANALYSIS OF CHEMISTRY ACHIEVEMENT TEST (CAT):

This section present analysis of the data collected. The analysis is done, using statistical analysis by using mean and standard (SD) deviation for the selected secondary schools students' performance in the chemistry achievement test (CAT). The analysis was done using S.P.S.S Software version 20.0 the result is presented in the table below.

Table 4.2.1: Mean and Standard Deviation (S.D) of performance of students for the selected Secondary School in chemistry (CAT).

S/N	VARIABLE (SCHOOLS)	NUMBER	MEAN ( $\bar{x}$ )	S.D
1	Gov't Girls Sec. Sch. Runji Sambo.	100	19.73	12.97
2	Sokoto Science College.	76	3.63	6.16
3	Nagarta College Sokoto.	74	8.95	5.12
4	Asma'u Girls Islamic College Sokoto.	19	9.42	2.99
5	Unity Comprehensive Secondary School.	28	9.18	3.06
	<b>Total</b>	<b>297</b>	<b>50.91</b>	<b>30.30</b>

Source: CAT test administered 2015.

The analysis of data generated from 297 students who participated in the study gave the following result: A total mean score of 50.91 out of the possible score of 100 and the Standard Deviation (SD) 30.30 were calculated from the data. This is an indication that the performance of students in Chemistry Achievement Test (CAT) is averagely good, judging from the mean score and the result of the standard deviation shows that the students has a little wider range of cognitive achievements and that scores are widely distributed about the mean values in each school.

#### 4.3 ANALYSIS OF THE QUESTIONNAIRE:

The questionnaire used for this study is presented using frequency and simple percentage as it will be shown in the tables below;

Table 4.3.1: How do students find Chemistry?

<b>OPTIONS</b>	<b>FREQUENCY</b>	<b>PERCENTAGE (%)</b>
Difficult due to it nature.	120	40.4%
Complex due to it nature.	50	16.8%
The teachers do not teach well.	127	42.8%
<b>Total</b>	<b>297</b>	<b>100%</b>

Source: Questionnaire administered 2015.

Table 4.3.1: Shows that 40.4% (120) of the students response that chemistry subject is difficult due to its nature, 16.8% (50) of the students response that chemistry subject is complex due to its nature and 42.8% (127) of the students response that the teacher does not teach well.



Table 4.3.2: Students' interest in chemistry

<b>OPTIONS</b>	<b>FREQUENCY</b>	<b>PERCENTAGE (%)</b>
Yes	177	59.60%
No	120	40.40%
<b>Total</b>	<b>297</b>	<b>100%</b>

Source: Questionnaire administered 2015.

From the table 4.3.2: revealed that 59.60% (177) of the students response have interest n chemistry and 40.4% (120) of the students response do not have interest in chemistry. This is an indication that the students have positive attitude toward learning chemistry.

Table 4.3.3: Do you have chemistry laboratory in your schools.

<b>OPTIONS</b>	<b>FREQUENCY</b>	<b>PERCENTAGE (%)</b>
Yes	97	32.66%
No	200	67.34%
<b>Total</b>	<b>297</b>	<b>100%</b>

Source: Questionnaire administered 2015.

From the table 4.3.3: deduce that response from the students, 32.66% (97) of the students response show that they have chemistry laboratory in their school while 67.34% (200) of the student's response show that they don't have any.

Table 4.3.4: How many times do you conduct practical in the laboratory in a week?

<b>OPTIONS</b>	<b>FREQUENCY</b>	<b>PERCENTAGE (%)</b>
Once in a week	50	16.84%
Twice in a week	200	67.34%
Thrice in a week	47	15.82%
<b>Total</b>	<b>297</b>	<b>100%</b>

Source: Questionnaire administered 2015

Table 4.3.4: shows that 16.84% (50) of the students response that they normally have practical once in a week, 67.34% (200) students response that practical is conducted twice in a week and 15.82% (47) students response that practical is conducted thrice in a week.

Table 4.3.5: competence of chemistry teachers.

<b>OPTIONS</b>	<b>FREQUENCY</b>	<b>PERCENTAGE (%)</b>
Yes	100	33.67%
No	197	66.33%
<b>Total</b>	<b>297</b>	<b>100%</b>

Source: Questionnaire administered 2015

From the table 4.3.5: show that 33.67% (100) of the student's response that the teachers are capable to teach while 66.33% (197) of the student's response shows that teachers are incapable to teach.

Tables 4.3.6; which science subjects do you prefer most?

<b>OPTIONS</b>	<b>FREQUENCY</b>	<b>PERCENTAGE (%)</b>
Physics	100	33.67%
Chemistry	50	16.84%
Biology	147	49.49%
<b>Total</b>	<b>297</b>	<b>100%</b>

Source: Questionnaire administered 2015

From the table 4.3.6; revealed that 32.67% (100) of the students in the selected secondary schools in Sokoto metropolis prefer Physics subject most, 16.84% (50) of the students are of the opinion that they preferred chemistry subject and 49.49% (147) of the students response prefer Biology subject.

## CHAPTER FIVE

### SUMMARY, FINDINGS, CONCLUSION AND RECOMMENDATIONS.

#### 5.1 SUMMARY

Chapter one review some of the problems associated with student's attitude towards chemistry as a subject. In this respect for schools within the Sokoto metropolis were visited. The research is aimed at enhancing the researcher's knowledge, identifying the courses of such problems and recommend solution towards solving them. The statements of the researched problem, hypothesis and research question are also stated for the test of the finding of the research work. Issues such as objective of the finding of the research study, significance of the study, and scope delimitation of the study were all discussed in the chapter.

Chapter two review of the related literature on the attitude of students towards chemistry subject and cognitive achievement among Secondary Schools SSII students. The chapter takes a review of conceptual framework. Literature related to definition of cognitive achievement, student and teacher's attitude towards chemistry, parental pressure and environmental influence on attitude and textbook materials influence. However this study is covered students at only Secondary Schools level and specifically to study relationship between student's attitudes towards chemistry and academic achievement among Secondary Schools students in Sokoto metropolis as most of this researcher's study only student's attitudes towards chemistry without study the academic achievement among Secondary students.

However, looking at the above it is contribution cannot over emphasize. Chapter Three is research methodology. The chapter spell out the totality of the procedure employed by researcher's in this research work. It takes a look into research methodology and techniques of data analysis adopted in gaining information towards this research work. It further addresses issues such as, population of the study which comprises five selected Secondary Schools in Sokoto metropolis, sample and sampling techniques. Instrumentation where a questionnaire and self designed achievement test (CAT) were used and techniques of data analysis which used descriptive statistic, simple percentage mean and standard derivation (mean S.D). Chapter four analysis and interprets the data collected in the course of this study. A test of hypothesis stated in chapter one is equal conducted in the chapter. Chapter five is a summary of the entire work, findings, and conclusion and recommendation based on the findings.

## **5.2 FINDINGS**

As the title of this research work indicates it is entirely on the comparative study of cognitive achievement in chemistry and affective attitude of Senior Secondary tow (II) (SS2) chemistry student in Sokoto metropolis. Data were gathered from the distributed question questionnaire, the results of which are presented in tabular form using simple percentage to test the hypothesis stated.

The students academic achievement test at Secondary Schools Levels, in science subject is highly and rapidly progressing which is largely contributed by the students attitude towards science subject. Similarly, the findings revealed that there is positive attitude of students towards chemistry subject in Sokoto metropolis. The study recorded

or observed positive attitude of students particularly towards chemistry subject in Sokoto metropolis.

Conclusively, findings from the study revealed that the attitude of students towards chemistry subject has a positive impact on the academic achievement of students in chemistry subject in Sokoto metropolis.

### **5.3 CONCLUSION:**

The findings of this study have shown that the attitude has significant influence on students' academic performance in chemistry. It has also spotlighted that students' academic performance in chemistry is a function of their attitude. The findings underscore the need for application of effective attitude by students for proper understanding of chemistry and that all negative views about the subject should be jettison. In the main student with positive attitude have cognitive achievement with high academic performance in chemistry.

### **5.4 RECOMMENDATION:**

With references to research findings of this study, students in Sokoto metropolis have a positive attitude towards chemistry subject which have impacted their academic performance, the following are some recommendation made to be adopted for improved in student's attitude toward chemistry subject and academic achievement in Sokoto metropolis.

- 1) The relationship between the students attitude toward chemistry should be improved and encourage as it has positive impact on students academic performance.

- 2) There is need for improving the student learning environment so as to make learning environment so as to make learning so easier and interested to students and staff.
- 3) There is need for training and retraining of chemistry teacher's in order to become more competence and effective as a scientific man power.
- 4) The need for conducting more researchers in order to identify factors responsible for various in student's academic performance among Secondary School in Sokoto metropolis.
- 5) Workshop should be organized by science teacher association of Nigeria (STAN) for all science teachers to emphasized on the use of attitude effective attitude style as a means of achievement better academic performance in chemistry.

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## APPENDICES

### APPENDIX I

#### CHEMISTRY ACHIEVEMENT TEST (CAT)

**Instruction:**

**Time: 30 minutes**

**Please tick ( ✓ ) or circle appropriately from the options provided below and complete the blank spaces with the necessary information as may be appropriate.**

1. The periodic classification of the elements is an arrangement of the elements in order of their.....
  - (a) Atomic weight
  - (b) Isotopic weight
  - (c) Molecular weight
  - (d) Atomic masses
2. When heat is absorbed in a chemical reaction, the reaction is said to be?
  - (a) Thermodynamic
  - (b) Exothermic
  - (c) Endothermic
  - (d) Thermostatic
3. Which of these compounds exhibits resonance?
  - (a) Ethanol
  - (b) Ethane
  - (c) Benzene
  - (d) Butane
4. Which of the following is a mineral acid?
  - (a) Ascorbic acid
  - (b) Nitric acid
  - (c) Sulphuric acid
  - (d) Hydrochloric acid
5. Sodium chloride may be obtained from brine solution by
  - (a) Titration
  - (b) Decantation
  - (c) Distillation
  - (d) Evaporation

6. Alkaline hydrolysis of naturally occurring fat & oil yield?
- Margarine and butter
  - Fats and acid
  - Soap and glycerol
  - Detergent
7. When at equilibrium which of these reaction below will shift to the right if the pressure is increase and the temperature is kept constant
- $-2\text{SO} \longrightarrow 25\text{O}_{2(\text{g})} + \text{O}_{2(\text{g})}$
  - $-2\text{CO}_2 \longrightarrow 2\text{CO}_{2(\text{g})} + \text{O}_{2(\text{g})}$
  - $-2\text{H}_{2(\text{g})} + \text{O}_2 \longrightarrow 2\text{H}_2\text{O}_{(\text{g})}$
  - $-2\text{NO}_{(\text{g})} \longrightarrow \text{N}_{2(\text{g})} + \text{O}_2$
8. The ability of carbon to form long chains or rings is known as
- Catenation
  - Oxidation
  - Mutation
  - Elimination
9. How many isomers does pentane have
- 6
  - 5
  - 4
  - 3
10. Vulcanization involved the removal of?
- A monomer
  - Single bond
  - The double bond
  - A polymer
11. A characteristic of the alkaline family?
- Addition reaction
  - Elimination reaction
  - Substitution reaction
  - Neutralization
12. Oxidation is the process of
- Gain of electrons
  - Loss of electrons

- (c) Gain of hydrogen  
(d) Addition of electropositive element to a substance
13. Which of the following is used as a fuel in jet engine?  
(a) Petroleum gas  
(b) Diesel oil  
(c) Kerosene  
(d) Petrol
14. The formula for heavy water is  
(a) H<sub>2</sub>O  
(b) D<sub>2</sub>O  
(c) 10H<sub>2</sub>O  
(d) H<sub>2</sub>O<sub>2</sub>
15. For the reaction  $2\text{Fe}^{3+} + 2\text{I}^- \longrightarrow 2\text{Fe}^{2+} + \text{I}_2$ . Which of the following statement is true?  
(a) Fe is oxidized to Fe<sup>3+</sup>  
(b) Fe<sup>3+</sup> is oxidized to Fe<sup>2+</sup>  
(c) I<sup>-</sup> oxidized to Fe<sup>2+</sup>  
(d) I<sup>-</sup> is reduced to I<sub>2</sub>
16. How many grams of methyl acetelyne (propane) CH<sub>3</sub>-C-CH will completely discharge the color of 8g of Bromine? Constant (Br=80, C=12, H=1)  
(a) 0.5  
(b) 1.0  
(c) 2.0  
(d) 3.0
17. The positive electrode in which electron enters the external circuit is?  
(a) Anode  
(b) Cathode  
(c) Anion  
(d) Cation
18. Which laws state that the volume of a given mass of gas is inversely proportional to its pressure provided that temperature remain constant.  
(a) Boyles law  
(b) Charles law  
(c) Avogadro's law  
(d) Ohm's law

19. A brand of ink containing Cobalt (II) copper (II) and Iron can best be separated into its various components by?
- (a) Fractional crystallization
  - (b) Fractional distillation
  - (c) Sublimation
  - (d) Chromatograph
20. When Ammonia and Hydrogen ion bond together to form Ammonium Ion, the bond formed is called?
- (a) Ionic bond
  - (b) Electrovalent bond
  - (c) Hydrogen bond
  - (d) Covalent bond

## APPENDIX II

### STUDENTS QUESTIONNAIRE

**Instruction:**

**Time: 30 minutes**

**Please tick ( ✓ ) appropriately from the options provided below and complete the blank spaces with the necessary information as may be appropriate.**

1. Name of school.....
2. Class.....
3. Age.....
4. Is chemistry subject taught in your school?
  - (a) Yes
  - (b) No
5. If yes, how often do you have lesson in your school?
  - (a) Once a week
  - (b) Twice a week
  - (c) Thrice a week
6. Is chemistry subject interesting?
  - (a) Yes
  - (b) No
7. Do you like chemistry subject?
  - (a) Yes
  - (b) No
8. If no, why do you dislike chemistry subject in your school?
  - (a) Difficult to understand
  - (b) Complex due to its nature
  - (c) The teacher does not teach well
9. Which of the science subject do you like test?
  - (a) Physics
  - (b) Chemistry
  - (c) Biology
10. Why do you like it as the best?
  - (a) Too easy to understand

- (b) Very easy to pass it
- (c) The teacher teaches well

11. Do you have chemistry teacher in your school?

- (a) Yes
- (b) No

12. How many chemistry teachers do you have? Indicate the number

.....

13. Do they teach chemistry subject very well?

- (a) Yes
- (b) No

14. If no, why?

- (a) Because of poor teaching method
- (b) Due to lack of text books
- (c) Lack of laboratory

15. Does your school have chemistry laboratory?

- (a) Yes
- (b) No

16. Do you conduct practical in your laboratory?

- (a) Yes
- (b) No

17. How many times do you visit your laboratory for practical per week?

- (a) Once
- (b) Twice
- (c) Thrice