SEX AND ATTITUDE OF SECONDARY SCHOOL STUDENTS LEARNING CHEMISTRY IN EGOR L.G.A OF EDO STATE

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A PROJECT SUBMITTED TO THE DEPARTMENT OF CURRICULUM AND INSTRUCTIONAL TECHNOLOGY, FACULTY OF EDUCATION, UNIVERSITY OF BENIN, BENIN CITY.
IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF BACHELOR OF SCIENCE DEGREE IN EDUCATION B. Sc (Ed) CHEMISTRY.

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CERTIFICATION

We, the undersigned, certify that this study was carried out by Nnamdi EGBUONU in the Department of Curriculum and Instructional Technology (CIT), Faculty of Education, University of Benin, Benin City.

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DR. F.O. IDEHEN

Ag. HEAD OF DEPARTMENT

_____

Date

DEDICATION

This project is dedicated to God Almighty and to my parents and all those who supported throughout my journey of pursuit of Tertiary Education.

ACKNOWLEDGEMENT

I give glory to Almighty God, who is the source of life, knowledge and strength and without whom this research work would not be possible.

I also want to appreciate my project supervisor, Dr. I. J UMOH who was very patient and supportive throughout the duration of this research.

Special thanks to my Family especially Mrs Ebere Okoye who has been a major source of support to me throughout the journey of my education.

My sincere gratitude also goes to Dr Pedro, Dr Bishop Ataha and all the lecturers in the department of Curriculum and Instructional Technology for their positive impact and great knowledge.

I would also like to extend my gratitude to my course mates especially Miss Okolie Charity Nkechi who made the journey of my academic pursuit enjoyable.

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ABSTRACTS

This study was carried out to scrutinize sex and Attitude of secondary school students in learning chemistry in Egor Local Government Area of Edo State.

In achieving this aim, four research questions were raised to serve as a guide for this study. The research design used in this study is descriptive survey design utilizing questionnaire as method of data collection. A total of 100 respondents were selected to represent the entire population of the study. The data collated were presented on a frequency distribution table and analyzed using simple percentage.

This study will be of great importance to the society, Examination Bodies, especially Chemistry teachers because of its scientific nature, economic and technological application and values it has especially on the students on how they reason and how their creative skills can be improved through an effective and efficient method of learning.

Finally, the experience gained from this study will provide future researchers with empirical evidence of the mode that enables students to learn better and hence form the basis for further research.

CHAPTER ONE

INTRODUCTION

BACKGROUND TO THE STUDY

Chemistry is one of the compulsory science subjects for whoever wants to study science and technology courses in tertiary institutions. It is the natural basis of technology disciplines and natural sciences. Thorty (2008) noted that Chemistry has been identified as a very important school subject and its importance in scientific and technological development of any nation cannot be overemphasized. Chemistry has helped in the development of modern technology through the application of its principles to modern inventions (Asiyai, 2015). Chemistry is a core science that deals with the composition, properties and uses of matter. Abubakar and Ashiru (2010) stated that Chemistry is a science subject that deals with the study of the compositions and structures of matter. Obodo (2005) observed that life on earth depends on chemistry, chemicals and chemical products, not only from the cradle, but also to the grave. All that exist is chemistry. The study of chemistry is very important to mankind because chemistry is capable of explaining natural phenomena and everyday occurrence.

Chemistry as one of the main science courses that aid the transformation and development of nations has continually played very important roles in the production of many technologies, ranging from the life-saving pharmaceutical to computers and other information technologies. Chemistry is regarded as a 'central science' because of the central role it plays in the successful study of science-based courses such as medicine, pharmacy, biochemistry,

engineering, agriculture and so many others and this underlines the importance and need to study it. Okorie (2014) noted that chemistry and its impact on lives of individuals will continue to grow, and probably even at a faster rate in the 21st century, as a number of innovative secondary school chemistry curricula have emerged across the globe since the turn of the 21st century.

The importance of Chemistry in our everyday life, in the society and industry cannot be over-emphasized. These are in line with the general objectives of Chemistry curriculum at the senior secondary school level. The revised edition of the Senior Secondary School Chemistry curriculum is expected among other things to enable students to:

i. develop interest in the subject of chemistry;
ii. acquire basic theoretical and practical knowledge and skills;
iii. develop interest in science, technology and mathematics;
iv. acquire basic STM knowledge and skills;
v. develop reasonable level of competence in ICT application that will engender entrepreneurial skills;
vi. apply skills to meet societal needs of creating employment and wealth;
vii. be positioned to take advantage of the numerous career opportunities offered by chemistry;
viii. be adequately prepared for further studies in chemistry.

In addition to the above objectives, the curriculum:

ix. Will facilitate a smooth transition in use of scientific concepts and techniques acquired in the new Basic Science and Technology curriculum with chemistry;

x. Provide students with the basic knowledge in chemical concepts and principles through efficient selection of content and sequencing;

xi. Show chemistry and its inter-relationship with other subjects;

xii. Show chemistry and its links with industry, everyday life activities and hazards, and

xiii. Provide a course which is complete for students not proceeding to higher education while at the same time provides a reasonably adequate foundation for a post-secondary school chemistry course.

These objectives have to be achieved for a successful chemistry education and science education in general.

In spite of the importance of chemistry in science and technological development, students' academic performance in the subject at Senior School Certificate Examination (SSCE) has been consistently poor (Giginna, 2013). In support of this statement Ibe, Igboejesi and Okoro (2012) noted that against the backdrop of the importance of chemistry in the home, society and industry coupled with the fact that it is a requirement for students' admissions into higher education in the physical sciences and science-related disciplines, it is very surprising that students do not show much seriousness in the subject as the learning outcomes have been

worrisome. Some other educationists also have expressed similar views. For instance, Anuonye (2013) observed that:

> *As Nigeria enters into the 21st century with great ambition to attain greatness in science, technology and mathematics through chemistry education, experience has shown that many students perform woefully in and shun away from chemistry. This glaring negative attitude and poor performance of students offering chemistry at the senior secondary level may not all be unconnected with the abstract and difficult nature of the subject, or the methods employed by teachers in teaching the subject.*

Ibe, (2017) observed that some of the reasons for the poor performance of students in chemistry can be linked to students' poor academic background. The students' poor academic background could be as a result of inappropriate teaching methods used by the teachers, unavailability and inappropriate use of adequate instructional materials in teaching and learning chemistry, lack of qualified teachers teaching chemistry, phobia and lack of interest on the part of the students, inadequacy of funds to carry out practicals.

Chemistry is said to be effectively taught and learnt when the students' academic achievement are on the positive side. In spite of the prime position chemistry occupies in our educational system and previous efforts made by researchers to enhance academic achievement, students' performance in chemistry are still low (Okorie, 2014). Despite the fact

that the National Policy on Education has given chemistry education an enhanced status in Nigeria, it is still faced with numerous problems (NPE, 2014). These problems threaten the realization of the goals of chemistry education in Nigeria. Ulunna (2000) and Nnadi (2004) have reported that students' performances in Chemistry in West African Senior School Certificate Examination (WASSCE) and National Examination Council (NECO) have been poor. This is because of some difficult concepts in chemistry. Some of these concepts perceived to be difficult in chemistry are electrochemistry, Periodic Table, Ionic Equilibria, Rate of Chemical Reactions, Chemical Bonding, Mole Concept and Thermodynamics (WAEC Chief Examiner's Reports; 2012, 2013, 2014, 2015, 2016, 2017 and 2018; Demirioglu & Yadigaroglu, 2013 & Ibe, 2017).

Ibe, (2017) defined difficult concepts as those that teachers find difficult to teach or students find difficult to understand.

Methods play a vital role in ensuring effective, interesting and stimulating learning and as such inappropriate teaching methods may hinder learning. Teaching methods therefore, appears to contribute significantly to the problem of low achievement among secondary school chemistry students. There are as many methods and techniques of teaching as there are different views of the nature of science. A teachers' approach to teaching will therefore generally reflect his view of the subject or how he was taught himself (STAN 2015). However, for effective teaching and learning, the teacher can begin by avoiding two mistakes. The first is to stop assuming that a method of teaching is a fixed formula that should be

employed rigidly for effective teaching and learning. The second is to stop assuming that a given method of teaching will be suitable to the characteristics of all his learners. Both mistakes usually lead to undesirable results, for if teaching method is mismatched with learners' characteristics, a destructive collision is inevitable (Bruce and Marsha, cited in Ibe, 2017).

Ojo (2015) inferred that a good science teacher should see scientific method as a necessary condition in the resolution of scientific problems emphasizing that appropriate methods such as discovery, enquiry, demonstration and project, if judiciously employed by the teacher will lead to the acquisition of those skills which are the bedrock of scientific method. Oriaifor (2014) suggested that in seeking solution to the problems of underachievement of students, effort should be made towards finding answers to the problems of teaching method applied in chemistry.

Educationists seem to agree that there is no best method of teaching and that the best method, however, is that which involves the learner in a number of meaningful activities, where the teacher does not do it all alone (Ezeani 2014). By combining several methods such as discovery, problem solving, experimentation, activities including the personality of the teacher, science can be taught and understood by students. Ukegbu, (2013) opined that in choosing methods for teaching, teachers should consider the methods that will successfully capture and sustain students' interest.

Interest is a feeling of like or dislike towards an activity. Interest is concerned with choice or preference for a particular type of activity to the other. Interest is a feeling somebody has when one wants to know or learn more about something. It is a zeal or willingness to participate in an activity for which one derives some pleasure (Ojo, 2015). According to Ukegbu (2013), the interest of students is thwarted by several factors which include negative attitude of teachers and influence of other people's attitude. Also, students' interest can be generated and sustained through several methods. These include motivation, relevant set induction techniques, effective use of instructional materials, most especially use of computer. Interest in periodic table could be achieved when students are made to see the importance of what they are about to learn. It involves linking the new concept to be learnt to the learners' previous experiences.

Ojo (2015) noted that interest is used as a motivating force through which learning should take place. However, Ibe (2017) noted that new ways of accessing the processes that link interest and learning are required. Ojo (2015) suggested that in addition to more standard quantitative and qualitative methodologies, the complexity of academic development in specific domains requires the creation of alternative techniques that can document and describe the nature of interest and the influence of interest on students' learning. Both the nature and the influence of interest on students' learning may vary across gender.

Gender has been identified as one of the factors influencing students' interest and achievement in chemistry (Nworgu, 2015). Gender issues as a factor or variable are not yet

skewed to any direction. There are different findings on gender matters, some in favour of males, others in favour of females and sometimes no gender differences are found. Giginna (2013) remarked that chemistry are traditionally taught and reflected in a masculine approach to the world that tends to marginalize women. Gana (2013) found no significant difference in the achievement between male and female students in periodic table. This agrees with Isiyaku (2006) who also found no significant difference between male and female SS1 students' performance in chemistry scores. Contrary to these findings, Josiah (2012) ascertained that there exists a significant gender difference in favour of boys in computational problems while girls out performed boys in verbal problems. In view of the fact that gender issues are still inconclusive, gender implication especially as it affects achievement and interest needs more verification especially in computer technology.

According to Gordon Allport, "An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related." Frank Freeman said, "An attitude is a dispositional readiness to respond to certain institutions, persons or objects in a consistent manner which has been learned and has become one's typical mode of response."

Thurstone said, "An attitude denotes the total of man's inclinations and feelings, prejudice or bias, preconceived notions, ideas, fears, threats, and other any specific topic."

Anastasi defined attitude as “A tendency to react favorably or unfavorably towards a designated class of stimuli, such as a national or racial group, a custom or an institution.”

According to N.L. Munn, “Attitudes are learned predispositions towards aspects of our environment. They may be positively or negatively directed towards certain people, services, or institutions.”

“Attitudes are an ‘individual’s enduring favorable or unfavorable evaluations, emotional feelings, and action tendencies toward some object or idea.” — David Krech, Richard S. Crutchfield, and Egerton L. Ballackey.

“Attitude can be described as a learned predisposition to respond in a consistently favorable or unfavorable manner for a given object.” — Martin Fishbein and Icek Ajzen.

“An attitude is a relatively enduring organization of beliefs around an object or situation predisposing one to respond in some preferential manner.” — Milton Rokeach.

According to Curty et al. (2017), attitude is a term used to describe a person's overall feelings, moods and actions as well as their behavioral patterns, preconceived notions, fears, feelings of insecurity (Olasehinde & Olatoye, 2014), and beliefs in relation to a specific topic (Pell & Jarvis, 2003).

As attitude is very complex and sticky so it is impossible to quantify it directly (Brown et al., 2014; Brown et al., 2015), so the attitude is measured indirectly (Reid, 2006; van Aalderen-Smeets & Walma van der Molen, 2013).

Individuals' belief is the main origin of the attitude and such beliefs organize the behaviors; Attitude is basically categorized into three components like cognitive, affective and behavioral attitude (Kurniawati et al., 2012; Pickens, 2005). According to Lawton et al. (2009), cognitive components focused on concentration, sensation, and trust, such as a person's attitude towards something like science, it affects people's cognitive approach, especially students. According to Schwarz and Bohner (2001), affective components are dependent on thoughts and feelings, such as the fact that a legal process has not been initiated to legalize the substance, but the individual believes that use is legal.

According to the behavioral components, the individual has a negative attitude toward the substance, writes an application, and tries to prove that drug usage is a good habit (Rhodes & Courneya, 2003). The researchers unbuckled the various factors which influence the attitude in any way like cognitive, affective and behavioral factors (Azubuike, 2011; Davadas & Lay, 2017; Delafrooz et al., 2009; Kaakeh et al., 2019).

When it comes to influencing one's attitude, social factors include how strongly one chooses and responds to the things and people in one's life, as well as how much one can afford to spend. Attitude is inconsistent to some degree, and this inconsistency influences how people perceive the attitude and their actions (Hornsey & Fielding, 2017). A child's outlook on life is heavily influenced by his or her parents. Some of the attitudes that are formed as a result of parental guidance will be re-examined. Some attitudes, however, such as personal preferences, social networks, and career paths, do not alter over time (Oon et al., 2020). According to

Prabowo and Nugroho (2019), common sense and mutual sharing based on the cognitive approach to attitude. People must pick how they will communicate with one other in daily life.

A survey was conducted revealing that 48 statements of the survey covering different topics were the same. Maximum statements were sensible, even if relevant items were melted away through feedback form (Vilia et al., 2017). In accordance with cognitive dissonance theory, students' conduct is controlled. People's attitudes are formed and dealt with. The research also discussed people's constant and stable thinking (Prabowo & Nugroho, 2019). Cognitive dissonance is generated when two or more views, feelings, beliefs, or opinions are unpredictable and unreliable. They can do it by exchanging opposing ideas (Markic & Childs, 2016).

The primary goal of the current study was to assess Sex and attitudes of students towards the learning of chemistry and determine whether or not there was a connection between that knowledge and their gender attitudes. The last 35-45 years have seen a substantial shift in how science educators view chemistry. Students aren't enrolled in chemistry classes because of a lack of funds or a bad attitude. Choosing a field of study can be a daunting task for students who have little or no interest in the subject matter. As student progress through the grades, a growing number of them exhibit a negative attitude toward chemistry (Aguilera & Perales-Palacios, 2020; Olakanmi, 2017; Vishnumolakala et al., 2017; Wan & Lee, 2017).

An individual's, group's or society's attitude towards chemistry is conveyed by research (Olakanmi, 2017). Another study defined chemistry as spirits, situations and locales, methodology, opinions, approaches, concepts and standards (Irwansyah et al., 2017).

There is a considerable agreement of trust that preserves the productive, promising, constructive attitude. It's difficult to grasp the attitude's significance clarified attitudes and science (Chan & Bauer, 2015). The research state that they want to foster positive attitudes toward scientists, foster scientific inquiry as a way of thinking, foster scientific attitudes, foster interest in science, foster scientific activities, foster interest in following and working in science, and inspire scientific careers (Klopfer & Madden, 1980; Norris, 2021). According to Schibeci (1984) and Carlson et al. (2019), there are two major sorts of attitudes: science attitude and scientific attitude. according to Astalini et al. (2020), philosophical ideas, beliefs, and thinking patterns are linked to scientific attitude (McPhetres & Zuckerman, 2018). Science attitude is a constructive and cognitive thinking for pupils' development (Pelch & McConnell, 2017; Zeidan & Jayosi, 2015).

According to Lee (2007), Secondary instructors' chemistry attitudes may vary. In this context, it is necessary to improve science attitudes, particularly in chemistry towards learning. It is time to show the existing situation clearly.

There are so many factors which affect the attitude directly or indirectly; these are the factors which caused the poor attitude of the examinees towards chemistry; it includes the

- Conservative or trivial methods,
- Coordination gap among intellectual approach of students and teachers (Azubuike, 2011),
- Lengthy chemistry syllabus with prearranged time span,
- Inexperience chemistry teachers,
- Deficiency of attentiveness in activities (Ozden, 2008),
- Inaccessibility of chemistry Laboratories (Cheung, 2011)
- Peer understanding,
- Social commutation circle,
- Peers' attitude in chemistry,
- Enjoyment in chemistry (Penn & Ramnarain, 2019),
- Setting of chemistry laboratory and milieu of chemistry class (Penn & Ramnarain, 2019),
- Depression and performance in chemistry,
- Pedagogical dexterity and learning ability (Davadas & Lay, 2017).

It is not possible to measure the attitude measured directly. Present study was integrated the attitude of students towards learning chemistry. Various techniques were used to measure and investigated the attitude (Laforgia, 1988); Likert Scaling Technique (Bertram, 2007; Boone & Boone, 2012), TOSRA (Lang et al., 2005; Wong & Fraser, 1996), Thurstone Scaling Technique (Lipovetsky, 2007; Lipovetsky & Conklin, 2004), Guttmann Scaling Method

(Conway & Guttmann, 1996), Semantic Differential Technique (Bauer, 2008; Stoklasa et al., 2019), Scientific Orientation Test (S.OR. T) (Adolphe, 2002).

Secondary chemistry curricula have dynamic features that distinguish them in chemistry exams. There is no doubt that secondary school chemistry students face challenges in understanding various chemistry principles. The question is how to overcome the obstacles and help students do better in chemistry. It is required to investigate Sex and attitudes towards chemistry. So the objective of the study was:

To determine the Sex and Attitude on secondary school students' learning of chemistry in Egor LGA of Edo State.

STATEMENT OF THE PROBLEM

Chemistry education plays a significant role in scientific, technological and national development. However, there is ample evidence in literature that students' achievement and interest in the subject is very poor. The poor achievements in chemistry may be as a result of gender or attitudes of the students or teachers' use of ineffective teacher-centred methods which make students passive in the teaching/learning process. The use of teacher-centered methods may be due to large class size and teachers' inability to use some of the innovative learners' centered techniques for effective learning of chemistry. These current classroom situations is characterized with the inability of the students to actively participate in the teaching and learning process which advertently affect effective learning of chemistry concepts. The students are mostly passive in the classrooms where these teacher-centered

methods are employed. These results to the inability of the students to internalize, remember easily, transfer what is learnt to new situations and hence achieve poorly and lack interest.

RESEARCH QUESTIONS

The following research questions guided the study:

RQ1: What are the Sex and attitudes of Secondary school Chemistry students in Egor LGA?

RQ2: Is there a difference in attitude of secondary school chemistry students based on Sex?

RQ3: Is there a difference in attitude of secondary school chemistry students based on Socio-economic status of parents?

RQ4: Is there a difference in attitude of secondary school chemistry students based on School ownership (Private and Public)?

PURPOSE OF THE STUDY

The purpose of this study was to determine the Sex and Attitude on secondary school students' learning of chemistry in Egor LGA of Edo State, Is there a difference in attitude of secondary school chemistry students based on Sex, Is there a difference in attitude of secondary school chemistry students based on Socio-economic status of parents? Is there a difference in attitude of secondary school chemistry students based on School ownership (Private and Public) ? in Egor LGA of Edo state.

SIGNIGICANCE OF THE STUDY

The study was aimed at studying Sex and Attitude on secondary school students' learning of chemistry in Egor LGA of Edo State.

The findings of this study when published will be useful to students, teachers, parents, examination bodies, researchers, curriculum planners/experts and ministry of education in the following ways:

Help in understanding the Sex and attitudes of Secondary school Chemistry students in Egor LGA,

Note the differences in attitude of secondary school chemistry students in Egor LGA based on Sex, Socio-economic status of parents, school ownership (private and public)

The findings of the study are expected to be of great benefit to the students. This may in turn help students to understand other topics and hence improve students' achievement in chemistry since other topics in chemistry revolves round the periodic table.

It will help the above-mentioned bodies and ministry of education to organize seminars and workshops for chemistry teachers on the 21st century instructional strategies in order to get the teachers acquainted with some attitudes of gender in teaching and learning of chemistry. The result of the study will also inform all educational stakeholders the need to recruit qualified chemistry teachers to public secondary schools where they are needed.

Finally, the experience gained from this study will provide future researchers with empirical evidence of the mode that enables students learn better and hence form basis for further researches.

SCOPE OF THE STUDY

The study was restricted to determine the Sex and Attitude on secondary school students' learning of chemistry in Egor LGA of Edo State.

The study was limited to senior secondary school students, in the given area stipulated. The choice of these students for the study stemmed from the fact that the students have chosen chemistry as one of the subjects they will offer in the Senior Secondary Certificate Examination (SSCE) and National Examination Council (NECO). More importantly, they have made up their minds on career choices in which a credit pass in Chemistry will help them to gain University admission.

DEFINITION OF TERMS

ATTITUDE

Attitude is the manner, disposition, feeling, and position about a person or thing, tendency, or orientation, especially in the mind.

According to Gordon Allport, "An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related." Frank Freeman said, "An attitude is a dispositional readiness to respond to certain institutions,

persons or objects in a consistent manner which has been learned and has become one's typical mode of response."

SEX - Sex is the trait that determines whether a sexually reproducing organism produces male or female gametes.

JAMB - Acronym for Joint Admissions and Matriculation Board. A Nigerian educational body that conducts entrance unified tertiary matriculation examinations for qualified prospective undergraduate students into Nigerian tertiary institutions.

LGA - Acronym for Local Government Area. A subdivision of a state in a country.

PUBLIC SECONDARY SCHOOL- refers to a secondary school freely open to members of a country with full funding and control by the government.

SENIOR SECONDARY SCHOOL- refers to the later part of secondary education usually consisting of students within the ages of 15-18 years old in Nigeria. This is the educational stage that precedes tertiary education. Akin to 11th to 12th grade in the United States.

PRIVATE SCHOOL -A private school is a school not administered or funded by the government, unlike a public school. Private schools, are schools that are not dependent upon national or local government to finance their financial endowment.

SSCE - Acronym for; Senior Secondary Certificate of Education administers the Senior Secondary School Examination

WAEC - Acronym for West Africans Examinations Council; is an examinations board for West Africans.

CHEMISTRY- Chemistry is a science subject that deals with the study of the compositions and structures of matter. Obodo (2005) observed that life on earth depends on chemistry, chemicals and chemical products, not only from the cradle, but also to the grave. All that exist is chemistry. The study of chemistry is very important to mankind because chemistry is capable of explaining natural phenomena and everyday occurrence.

Chemistry as one of the main science courses that aid the transformation and development of nations has continually played very important roles in the production of many technologies, ranging from the life-saving pharmaceutical to computers and other information technologies. Chemistry is regarded as a 'central science' because of the central role it plays in the successful study of science-based courses such as medicine, pharmacy, biochemistry, engineering, agriculture and so many others and this underlines the importance and need to study it.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

This chapter presents the review of Literature relating to Sex and attitude of students in learning chemistry in Egor LGA of Edo state. The literatures were synthesized from various journals, articles and publications of previous researchers

For the purpose of a proper examination and presentation of knowledge on Sex and attitude of students in learning of chemistry, the following subheadings would be examined in this chapter;

- The Concepts in Chemistry
- Teaching of Chemistry in Secondary Schools
- Sex and Academic Achievement
- Interest as a Factor in Learning chemistry
- The Concept of Attitude
- Students' Disposition and Learning of Chemistry in Secondary Schools
- Students' Perception and Learning of Chemistry in Secondary Schools
- Students' Interest and Learning of Chemistry in Secondary Schools
- Factors Influencing Students' Attitude towards Learning of Chemistry in Secondary Schools
- Sex and Academic Achievement in Chemistry
- **Interest and Academic Achievement in Chemistry**

The Concepts in Chemistry: Chemistry is a science subject that deals with the study of the compositions and structures of matter. Obodo (2005) observed that life on earth depends on chemistry, chemicals and chemical products, not only from the cradle, but also to the grave. All that exist is chemistry. The study of chemistry is very important to mankind because chemistry is capable of explaining natural phenomena and everyday occurrence.

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successful study of science-based courses such as medicine, pharmacy, biochemistry, engineering, agriculture and so many others and this underlines the importance and need to study it.

There is no doubt, the more abstract or theoretical a concept, the more difficult it is to teach or learn. However, one can also relate the degree of difficulty to the personal attributes of the teachers and learners of chemistry.

The Teacher Factor: Many teachers do not understand the concepts sufficiently enough to impart the knowledge to learners. Again, the drain of chemistry teachers, usually the very brilliant ones from the teaching profession moving to other more attractive sectors of the economy could erode the system leaving it with less capable hands who view some chemistry concepts as difficult to teach.

The Student Factor: Peer views on the difficulty level of learning a given concept could influence individual students' preparedness to learn. It could equally be proposed that concepts which appear meaningless to students in application in life situation could result in loss of interest in learning such concepts and therefore assuming the dimension of difficulty.

Teaching Facilities/Infrastructure: The absence of chemistry laboratory and teaching facilities (Laboratory equipment) makes the learning of certain chemistry concepts difficult, thereby retarding the learning process. In Nigeria, we do not have the technology to manufacture some of the specialized teaching facilities such as melting point apparatus, spectrophotometer, mass spectrometer, Electronic Balance etc. but our science curricula expect our students to use them, manipulate them and learn with them.

lbole (2001) observed that “radiochemistry is a very interesting aspect of chemistry and the content will thrill the students if teachers find enough time to teach them. However, she observed that there are problems in teaching these areas as they are purely based on theory. The schools and colleges cannot afford to buy the equipment for teaching these practically. In any case, do the teachers really use the very common instructional materials in the laboratory for teaching chemical reactions? Andzutsi and Kim (2001) observed that many teachers have taught science without applying common sense and this has resulted in the presentation of Chemistry as a course with strong concepts and reasoning and common sense to chemical calculations.

However, many factors have contributed to the problems encountered in teaching and learning of Chemistry in the secondary schools. In a survey conducted by Andzutsi and Kim (2001) on problems hampering the effective teaching and learning of Chemistry in secondary school, most of the respondents 41.2% of them were of the opinion that their teachers made the concept uninteresting, 35.3% of them were of the opinion that the mathematical concepts were difficult, while 23.5% considered most of the concepts as abstract. According to them, the three most difficult topics as identified by the respondents were:

- Balancing of Chemical equations (20.5%)
- Calculation from Chemical equations (stoichiometry) (16.4%)
- Periodic Table (13.9%)

Other areas of difficulty include:

- I.U.P.A.C Nomenclature (12.3%)
- Mole concept (11.5%)
- Radioactivity (10.7%)
- Redox Reaction (9.0%)
- Electrolysis (5.7%)

Njoku (2005) observed that many factors as poor teaching methods, including instructional resources, mathematical nature of Chemistry and abstract nature of Chemistry concepts and laws, and students' lack of flair for Chemistry account for students' poor performance in the subject. Buttressing the above view, Ehujuo (2014) observed that students' poor performance in the practical aspect of the subject contributes substantially to the high failure rate in O'level Chemistry. Similarly, Akalonu (2005) observed that students fail to acquire the necessary practical skills for success in the external senior secondary certificate exams.

Effective teaching of chemistry according to Achimugu (2011) helps students to develop science process skills such as observing, classifying, predicting, measuring, recording data, hypothesizing, drawing inferences, etc. It also enhances students' better understanding of concepts and principles which significantly contributes to students' high achievement in chemistry.

In their study, Anaso and Kassim (2001) revealed that students have difficulty in interpreting gas laws involving chemical calculations. The result also showed that students cannot work at abstract level, since most of the concepts entailed in the gas laws are abstract and require

students to have high level of cognition. In addition, the study also revealed that students have difficulty in understanding the concept of gas laws. This results as a problem of linguistic difficulty since chemistry as a subject is being taught in English language which is a second language used as a medium of instruction.

However, Olaniran (2001) believes that the learning of chemistry can be made exciting and pleasurable. According to her this can be done "if we apply the principle, that is change chemistry from D.D.D. (Dry, Dull and Difficult) to E.E.E. (Easy, Exciting and Enjoyable)". She added that we have to think of common and available resource round us that the students can easily lay their hands on and use at home or in the laboratory. Not only this, teachers can think of presenting concepts in forms of charts, diagrams, models etc to make the class interesting and exciting. Anaso and Kassim (2001) suggested that one of the ways of mitigating the problems of teaching chemistry especially those difficult concepts included among other things, the use of concrete models and practical exercises to explain the behaviour of abstract and theoretical phenomena. Actually, the teachers' technique of delivery and simplification will help students overcome their predicaments. Adding further, the level of difficulty of a concept to learners can be much reduced if we teachers will devote time to study and understand concepts themselves.

An assessment of the quality and quantity of chemistry textbooks (as guide and as resource materials) in our schools; today will show that, there is gross inadequacy of standard chemistry textbooks and the ones available lack content coherence. Ezeliora (2001) stated

that “textbook is to the teacher what food is to the body, without which teaching and learning process will not be effectively carried out by the teachers. Without good textbooks even the best teacher is handicapped”. Any meaningful investment in the future through excellence in education is not possible without standard textbooks. Thus, there is need for top quality textbooks if educational objectives can be achieved.

She further added that one of the major issues facing science education in this country is lack of standard science textbooks. She observed that “the existing textbooks are more than ten years old and are inadequate to address the problems of the chemistry teachers”. In some of the books the topics are presented in abstract illustrations, too complicated or inadequately explained. Put differently most of the widely used chemistry textbooks have little potential for helping students learn chemistry rather they make the difficult concept more difficult to understand. The books lack the integration that enables students identify as sense of purpose for studying and using these concepts in daily living, develop scientific concepts and promote students thinking. She noted that these flaws in our widely used Chemistry textbooks have compounded and the problems of Chemistry teachers and Chemistry students in the teaching and learning of Chemistry.

Teaching of Chemistry in Secondary Schools

One of the goals of science is to contribute to the preparation of students and lead them to full and satisfying lives and to produce a sufficient number of scientists to meet the needs of a science and technology dependent society. Generally speaking, chemistry concepts are

perceived by students as abstract and difficult to understand. Efforts have been made by science educators to make the concepts as simple and friendly as possible.

Chemistry concepts are either empirical or theoretical. Concepts such as mass, length, volume or objects, concepts such as plants, animals and materials are empirical as they are observable and easily measurable by simple devices. Theoretical concepts on the other hand are not visually observed, cannot be easily measured with relatively simple methods. To this class belong concepts such as electron, atom, orbital, dipoles, bonds molecules etc, which cannot be easily perceived and therefore difficult to make definitive statements about their nature, shape or structure (Iwuozor, 2001).

Anuonye (2013) identified difficult concept in Chemistry with the following common properties:

- Candidates tend to avoid answering questions drawn on such concepts.
- Candidates who choose to attempt questions on such concepts perform relatively poorly when compared with their performances in questions drawn on other concepts in the same paper.
- Teachers complain of difficulty in teaching of such topics and records in examination performances over some years reveal poor performances in the subject in years when questions drawn on such concepts dominated the question paper.

According to Ibe (2017) and Ojo (2015) some concepts perceived to be difficult in chemistry include electrochemistry, ionic equilibria, stereochemistry, chemical kinetics, thermodynamics, orbital hybridization, mole concept, Periodic Table, Nuclear/ Radio

Chemistry and organic chemistry etc. Ibe (2017) identified a number of factors that make a concept difficult to teach. These include: the nature of the concept/topic, the teacher factor, the student factor, teaching facilities, language and culture. He further explained each of the factors in the following statements:

Sex and Academic Achievement

Sex is the trait that determines whether a sexually reproducing organism produces male or female gametes.

Although many empirical research on the influence of Sex on students' achievement are conflicting and inconclusive, most of the literature reviewed showed that male students still perform relatively better than female counterparts in science.

Nwosu (2001) stated that girls are denied out of school and preschool experience especially those involving visual activities-behaviour. This is a problem as it inhibits the development of mathematics and science capabilities in girls. The researcher suggested the need to use activity experiences at home to acquire science and technology skills. Gana (2013) noted that boys achieve better result in science and show more positive attitude to the subject than girls. The researcher went further to enumerate some factors that tend to contribute to this state of affairs such as:

- The preferential attention given to boys by teachers and less attention to girls.
- Teachers tend to reprimand boys more severely than girls for poor performance in science subject because they expected the boys to do better.

Many teachers are not bothered when girls contribute less to classroom discussion because girls seem to be expectedly quiet in nature. Njoku (2004) asserted that girls perform poorly relative to boys at all levels of science education in Nigeria. Also, Njoku (2004) opined that many socio-cultural factors jointly and separately depress female interest, participation and achievement in science at all levels of education. According to Gbodi and Nworgu (2006) there are stereotypical disciplines associated with males and females for example, the Spartans and the Aristocrats of Medieval era taught the males military subjects while the females were taught to learn domestic subjects, all in an attempt to prepare them for their roles in the society. Sex difference is one of the factors affecting learning and many researchers have focused their attention on studies relating to its effect on pupils' have not produced conclusive results. Some findings indicated that significant differences existed between the performance of male and female students while other findings showed that sex factor had no impact on students' performance (Isiyaku, 2006).

Interest as a Factor in Learning

Interest according to Encarta dictionary is defined as (1) curiosity or concern, a feeling of curiosity or concern about something that makes the attention turn towards it. (2) Quality that attracts attention, a power, quality or aspect of something that attracts attention, concern, or curiosity (3) enjoyable thing, something that somebody enjoys doing. Giginna (2013) defined interest as a readiness to engage in a topic. In line with this, once interest is generated it is sustained by pleasurable activities. Giginna (2013) carried out a study on science, technology and society interactions and the teaching of physics and chemistry. The result shows that

students' interest can be aroused and sustained when a better instructional strategy is used in teaching of chemistry. If the lesson is not interactive, it makes students not to be interested in the learning of chemistry and makes them to even reject chemistry as a subject in schools. Solves and Vilches also pointed out that interest must point learner to the need of the society. According to the authors, the method used can increase students' interest in the study of chemistry.

Obomanu and Adaramola (2011) identifies lack of interest by students of Chemistry as one of the factors that leads to low achievement in chemistry. In the same vein, Uzoechi (2011) found out that the teaching and learning of science in most of our schools is predominantly by memorization and regurgitation of facts which makes the students not to be interested in learning of Chemistry.

Njoku (2003) gave four different types of interest. They are:

1. **Expressed Interest:** This is verbal declaration of like or dislike or indifference in an object or activity.
2. **Manifest Interest:** This type involves professing of interest in an activity and going ahead to participate in those activities. Manifest interest is easily noticed because it is shown when a person participates in the activity of interest.
3. **Inventorial Interest:** It refers to an individual's performance on a large number of activities listed in an interest inventory. The response of the individual is weighted in

order to determine the person's score which indicates her/his level and pattern of interest in the object of measure.

4. **Test Interest:** It is a type of interest measured by interest scale. This scale is structured in such a way as to bring out the nature of interest possessed by the respondent.

   Ibe (2017) observed that students' poor achievement in chemistry can be improved if students' interest is secured and sustained throughout the three years of senior secondary school. The question now is, could using computer as a tool and tutor help to develop and sustain students' interest in Chemistry.

Concept of Attitude

A lot of students nowadays are losing interest in the science subjects such as chemistry. Attitudes of students could also be affected by the changing environment. Nowadays, young people all over the world are engrossed in computer gadgets and online social networking which may decrease their interest in learning science.

Attitude is the feelings that can be either unfavorable or favorable, positive or negative, and are typically directed towards some specific object. Attitude implied a psychological construct which is inferred from responses to a given stimuli (Ayodele & Olatunbosun, 2015). There are six dimensions regarding attitudes: confidence, anxiety, value, enjoyment, motivation and expectations (Sofiani, Maulida, Fadhillah & Sihite, 2017).

According to Gordon Allport, “An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual’s response to all objects and situations with which it is related.” Frank Freeman said, “An attitude is a dispositional readiness to respond to certain institutions, persons or objects in a consistent manner which has been learned and has become one’s typical mode of response.”

Thurstone said, “An attitude denotes the total of man’s inclinations and feelings, prejudice or bias, preconceived notions, ideas, fears, threats, and other any specific topic.”

Anastasi defined attitude as “A tendency to react favorably or unfavorably towards a designated class of stimuli, such as a national or racial group, a custom or an institution.”

According to N.L. Munn, “Attitudes are learned predispositions towards aspects of our environment. They may be positively or negatively directed towards certain people, services, or institutions.”

“Attitudes are an ‘individual’s enduring favorable or unfavorable evaluations, emotional feelings, and action tendencies toward some object or idea.” — David Krech, Richard S. Crutchfield, and Egerton L. Ballackey.

“Attitude can be described as a learned predisposition to respond in a consistently favorable or unfavorable manner for a given object.” — Martin Fishbein and Icek Ajzen.

“An attitude is a relatively enduring organization of beliefs around an object or situation predisposing one to respond in some preferential manner.” — Milton Rokeach.

According to Curty et al. (2017), attitude is a term used to describe a person's overall feelings, moods and actions as well as their behavioral patterns, preconceived notions, fears, feelings of insecurity (Olasehinde & Olatoye, 2014), and beliefs in relation to a specific topic (Pell & Jarvis, 2003).

As attitude is very complex and sticky so it is impossible to quantify it directly (Brown et al., 2014; Brown et al., 2015), so the attitude is measured indirectly (Reid, 2006; van Aalderen-Smeets & Walma van der Molen, 2013).

Individuals’ belief is the main origin of the attitude and such beliefs organize the behaviors; Attitude is basically categorized into three components like cognitive, affective and behavioral attitude (Kurniawati et al., 2012; Pickens, 2005). According to Lawton et al. (2009), cognitive components focused on concentration, sensation, and trust, such as a person's attitude towards something like science, it affects people's cognitive approach, especially students. According to Schwarz and Bohner (2001), affective components are dependent on thoughts and feelings, such as the fact that a legal process has not been initiated to legalize the substance, but the individual believes that use is legal.

According to the behavioral components, the individual has a negative attitude toward the substance, writes an application, and tries to prove that drug usage is a good habit (Rhodes &

Courneya, 2003). The researchers unbuckled the various factors which influence the attitude in any way like cognitive, affective and behavioral factors (Azubuike, 2011; Davadas & Lay, 2017; Delafrooz et al., 2009; Kaakeh et al., 2019).

When it comes to influencing one's attitude, social factors include how strongly one chooses and responds to the things and people in one's life, as well as how much one can afford to spend. Attitude is inconsistent to some degree, and this inconsistency influences how people perceive the attitude and their actions (Hornsey & Fielding, 2017). A child's outlook on life is heavily influenced by his or her parents. Some of the attitudes that are formed as a result of parental guidance will be re-examined. Some attitudes, however, such as personal preferences, social networks, and career paths, do not alter over time (Oon et al., 2020). According to Prabowo and Nugroho (2019), common sense and mutual sharing based on the cognitive approach to attitude. People must pick how they will communicate with one other in daily life.

A survey was conducted revealing that 48 statements of the survey covering different topics were the same. Maximum statements were sensible, even if relevant items were melted away through feedback form (Vilia et al., 2017). In accordance with cognitive dissonance theory, students' conduct is controlled. People's attitudes are formed and dealt with. The research also discussed people's constant and stable thinking (Prabowo & Nugroho, 2019). Cognitive dissonance is generated when two or more views, feelings, beliefs, or opinions are unpredictable and unreliable. They can do it by exchanging opposing ideas (Markic & Childs, 2016).

An attitude is an expression of favour or disfavour toward a person, place, thing, or event. Attitude can be formed from a person's past and present. An attitude is an evaluation of an attitude object, ranging from extremely negative to extremely positive. Attitudes are formed with respect to situations, persons or groups with which individual comes in contact in course of the growth and development of his personality.

Once they are formed, they put the pressure that the individual reacts in a specific or characteristics way to these or related situations, persons or groups (Deeksha, 2016). Attitude denotes a functional state of readiness which determines the organism to react in a characteristic's way to certain stimuli or stimulus situations.

Ngogo (2014) defined attitude as the accumulation of information about an object, person, situation or experience which forms an individual's opinion about or predisposition towards that thing. Attitude can also be defined as a mental or neural state of readiness organized through experience influencing dynamically or directly the individuals' response to all objects and situations with which it is related. Elias, Smith and Barney (2012) defined attitude as an evaluative judgment, either favourable or unfavourable, that an individual possesses and directs towards some attitude object, which may be abstract or concrete.

Achieng (2012) defined attitudes as how one thinks and feels about an act towards objectives and ideas. It also defines attitude as positive or negative feelings that an individual has about objects, persons or concepts. Attitude is a concept, which arises from the attempt to account for the observed regularities in the behavior of individual persons, the quality of which is

judged from the observed evaluative responses one tends to make. An individual can show positive or negative attitude towards a particular object, subject or idea. Achieng (2012) posited that positive or favourable attitude towards vocational education positively impacts on the learning and performance of students of vocational education. This is due to the fact that individuals are typically biased towards those attitude objects which they evaluate positively and against those evaluated negatively.

A study on the attitudes of the students towards a particular subject like chemistry has shown that achievement in that chemistry is determined by one's attitude towards the subject(chemistry) rather than one's attitudes being determined by one's achievement in the subject (Chepkorir, 2013). Miranda (2012) stated that attitudes of students towards a particular subject (chemistry) does not only encourage their involvement and commitments in the teaching and learning process but affect their performance as well.

Research revealed that positive attitudes are conducive to good achievement in any subject (Senthamarai, Sivapragasam & Senthilkumar, 2015). Jain (2014) stated that attitudes are relatively lasting clusters of feelings, beliefs and behavior tendencies, directed towards specific persons, ideas, objects or groups.

Psychologists define attitude as learned tendency to evaluate things on certain ways including people, issues, objects and events (Cherry, 2015). Cherry (2015) reiterated that such evaluations are often positive or negative or uncertain at times. Han and Carpenter (2014) stated that attitudes consist of cognitive, affective and behavioral reactions that individuals

display towards an object or the surrounding based on their feelings or interest. Han & Carpenter (2014) recapped those affections is person's emotions, feelings and moods towards object, behavioral is person's past and future activities towards object) whereas cognitive is person's thought and beliefs about object. Students' attitudes are intrinsic and it is developed over a period of time, it is as a result of experiences (Abdul Majeed, Darmawan & Lynch, 2013).

If the students' experience with a subject like chemistry is negative and not successful, it is more likely that his/her attitude towards that subject will be negative and vice versa.

Students' Disposition and Learning of Chemistry in Secondary Schools

Attitudes in terms of disposition, like academic achievement, are important outcomes of science (chemistry) education in secondary school. The development of students' positive attitudes regarding chemistry as a school subject is one of the major responsibilities of every chemistry teacher.

Attitude through students' disposition towards chemistry is essential; it denotes interests or feelings towards studying chemistry. A disposition is a quality of character, a habit, a preparation, a state of readiness, or a tendency to act in a specified way that is inherited or may be learned. The National Council for Accreditation of Teacher Education (NCATE) (2019) conceptualized dispositions as the values, commitments, and professional ethics that influence behaviors toward students, families, colleagues, and communities that affect student learning, motivation, and development as well as the educator's own professional

growth. Dispositions are steered by attitudes and beliefs related to values like caring, honesty, fairness, empathy respectfulness, responsibility, and thoughtfulness. Almerico, Johnston, Henriott & Shapiro (2015) defined dispositions as the personal qualities or characteristics that are possessed by individuals including attitudes, beliefs, interests, appreciations, values, and modes of adjustments.

Almericoet al. (2015) further expressed disposition as a pattern of behavior exhibited frequently and in the absence of coercion, and constituting a habit of mind under some conscious and voluntary control, and that is intentional and oriented to broad goals. Heilbrunn (2010) in a study of an elementary school in Israel reported that pupils rated significantly higher on proactive disposition, preference for innovation and achievement motivation than pupils from a traditional school. In a subsequent study at secondary school level, Heilbrunn & Almor (2014) added valuable findings with regard to the role of the school and teacher support.

The presence of problems of poor learning and low achievement in chemistry has been conceived and grow and increasingly particularly over the decade (Guido, 2015).

As important as the subject is and in spite of the efforts of both the federal and state governments to encourage chemistry education, students still shun the subject (Woldeamanuel, Atagana & Engida, 2014). It has been observed that most students fear chemistry and hence they see chemistry as difficult to understand, which may be as a result of the abstract nature of chemistry and the method (lecture method) being used by most of the

chemistry teachers. Students' anxiety for chemistry learning can also be attributed to students' perception about the difficult nature of chemistry, involvement of multitude of facts, and its disconnection from reality. Students' anxiety for chemistry learning leads to loss of interest in the sciences (Woldeamanuel et al., 2014).

Students' Perception and Learning of Chemistry in Secondary Schools

Perception is a process of being aware of one's environment through the senses. How one perceives the world consequently determines how one reacts to it. Perception involves analyzing and interpreting items picked out by the senses in order to assign meaning to them (Kabui & Maalu, 2012). How one analyzes and interprets a sensory reception is determined by many factors which include cultural setting, memories, values, imaginations and past experiences. As such, different people will perceive the same object differently because the content and degree of these influences is different. Consequently, perception is not external reality. Perception plays a critical role in attitude towards learning.

With dynamism of science (chemistry), an encouraging attitude through positive perception is necessary in chemistry, perception regulates the behaviour of the students in their availability, readiness for the subject and their interactive manner during the class (Adebisi & Ajayi, 2015). Better perception yields better attitudes and learning. Attitude is believed to be strongly connected to academic success. Attitudes are developed and can come from the environment e.g., parents, siblings, school, place of worship, among others. Academic skills are and should be the primary focus of instruction in school. Therefore, the perception of

students about chemistry is very crucial to how they respond to learning and eventual academic performance in chemistry.

However, researchers have suggested that student learning and achievement also depends on academic enablers such as perception (attitudes) and behaviours that allow a student to participate in and ultimately benefit from academic instruction in the classroom (Idika, 2017). While there are other factors such as teacher factor, laboratory inadequacy, non-coverage of syllabus, class-size and environment, the place of attitude (perception) cannot be over-emphasized. The independency of boys pre-disposed them to excess time with which studies in chemistry is imperative; hardly do boys become so insulated that they would have no access to time enough for practice in chemistry. Idika (2017) further stated that boys do not involve in house chores (washing plates, sweeping the house, cleaning the kitchen, washing the mother, father and junior clothes, and/or baby dirtying). In fact, cooking of food is not always assigned to boys in Nigerian homes. As preferred Sex, the boy is the head of the family after the father; and thus, possesses most authorities of the father. While the male possesses the air of total freedom for studies in chemistry, the girl-child cannot always boast of such time allowance for chemistry.

Salta & Tzougraki (2011) surveyed 576 high school students in Greece using an attitude scale with four subscales: the difficulty of chemistry course; the interest of chemistry course; the usefulness of chemistry course for students' future career; and the importance of chemistry for students' life. They found that female students had positive perception in attitudes regarding usefulness, and importance of chemistry.

On the previous facts, it is evident that chemistry is important for society. However, (female) students considered chemistry an unimportant and uninteresting subject (Broman, Ekborg & Johnels, 2011). One of the reasons can be that many of the concepts used in chemistry are abstract, and are inexplicable without the use of analogies or models. Similar ideas are described in the study of Turner, Ireson & Twidle (2010) wrote in their study the reasons why female students disliked chemistry in a more detailed form. To more frequent reasons belong: writing too many sheets of paper; too many words to learn; complicated experiments; room smells; hard homework. Also, the reasons why the chemistry is popular among students (for example, it is practical and fun). When students see chemistry as hard and not understandable, their learning and achievement in this subject deteriorates. Therefore, it is important to find out their perception of chemistry, because these findings show to researchers, why chemistry is uninteresting and unimportant for pupils. Anwer, Iqbal & Harrison (2012) found out that girls had more positive attitudes toward science (chemistry) in comparison with boys, but in the majority of cases, the boys had more positive attitudes toward science (chemistry) than girls. Khan and Ali (2012) found out relatively neutral attitudes of high school students toward chemistry. They showed, attitudes are strongly influenced by teachers and their methods of teaching.

Students' Interest and Learning of Chemistry in Secondary Schools

Interest could be defined as the focusing of the sense organs on or giving attention to some person, activity, situation or object. It is an outcome of experience rather than gift. It could either result or cause motivation. It could also be regarded as a pre-determinant of one's

perceptions that is, what aspect of the world one is mostly likely to see always (Essien, Akpan & Obot, 2015). It could also be viewed as a condition in which an individual associates the essence of certain things or situation with his needs or wants.

However, interest is defined and whether it be described as a cause of attention, an aspect of attention or as identical with attention, its special significance lies in its intimate connection with the mental activity or attention. Interest is the focusing of the sense organs on or giving attention to some person, activity, situation or object.

Interest specifies the quality of personal significance. The content taught without relevance to everyday life lead to the lack of interest. The experiments might be a significant tool for the development of more stable interests, which later influence the choices of courses, higher studies, and careers (Krapp & Prenzel, 2011). Students bring curiosity with them when they take their secondary school science (chemistry) courses. The delay or absence of fulfillment of curiosity may lead to decline in interest. It has been reported that male students' liking for chemistry laboratory work declines when they advance towards higher-grade levels (Tayyaba, Ayesha & Hamid, 2017).

Interest is the feeling that prompts one to spontaneous activity. Aggrawal (2010) stated that interest is a powerful dictator and motivator in the learning process. The implication is that, students are likely to pay attention to learn, remember, imagine and read more readily when their interest and emotions are positively provoked. Interest as a human sentiment, goes along with values, attitudes and other forms of human preferences. This means that interest

motivates and compels attention (Kundu & Tutoo, 2007), operating at the realm of affective domain. Factors that affect interest include personal and socioeconomic/environmental factors. Personal factors, according to Aggrawal (2010) include students' physical, health and physical development, mental health and development, age, sex, pattern of instinctive behaviour, emotions and sentiments. The socio-economic status includes rearing practices in the family, cultural status, education, among other aspects. Interest therefore makes the students to feel alert, awake and excited at the delivery of learning instructions in the chemistry class.

Interest aroused to learn a particular subject should be sustained for more enduring learning. Mazer, (2012), students' interest can be triggered in the moment by certain environmental factors such as teacher behaviours. Chang, Yeung & Cheng (2009) studied ninth graders' learning interests, life experiences and attitudes towards science (chemistry). A total of 942 urban ninth graders in Taiwan were involved in the study. Pearson correlation was used for data analysis. The results indicated that boys showed higher learning interests in sustainability issues and scientific topics than girls. However, girls recalled more life experiences about science (chemistry) than boys. The results also showed that there was high correlation between learning interests and life experiences related to chemistry, and in the perspective on attitudes towards chemistry. Researches focused on Sex studies have indicated that attitudes toward science (chemistry) education differ between Sex .

A declining interest in Chemistry and the under representation of females in the chemical science was found (Bitok, Lusweti & Waswa, 2017). Self-confidence toward Chemistry, the influence of role models, and knowledge about the usefulness of chemistry affect the decision of young female students about the study of chemistry. In the event of young female students finding difficulty in constructing knowledge of chemistry, self-confidence is lowered with subsequent alternation of attitudes toward chemistry as attitudes predict behaviours (Bitok et al., 2017).

Research has revealed that students show different attitudes to chemistry in school (Spaull, Dickson & Boyes, 2013). Anxiety about chemistry laboratory influences students' performance. It has been observed that so many students fear chemistry laboratory activities, and such fear is characterized by disappointment among the students towards the subject (Jegede, 2007). Owojaiye & Zuya (2016) investigated the influence of some factors on the perceptions of secondary school students of chemistry on the basis of Sex difference. The design was a survey approach. The sample size was 600 SSS1-SSS3 students, comprising of 300 male and female students each. This sample was drawn from central and western senatorial districts of Kogi State, Nigeria. The instrument used was a set of statements that sought the responses of the students about chemistry as a subject in school. The findings indicated psychological factors, motivational factors, teachers' teaching techniques and parental background significantly influenced students on Sex basis. The male students showed much more positive attitudes than their female counter parts towards chemistry.

Factors Influencing Students' Attitude towards Learning of Chemistry in Secondary Schools

Positive attitude towards science can be promoted by instructional congruence specifically in chemistry practical work (MdZain,Samsudin, Rohandi & Jusoh, 2010). At the meantime, several studies indicated that secondary school students show positive attitudes towards chemistry (Sarjou, Soltani, Afsaneh & Mahmoudi, 2012; Yunus and Ali, 2013; Sakariyau, Taiwoand Ajagbe, 2016). However, Mavrikaki, Koumparou, Kyriakoudi, Papacharalampous & Trimandili (2012) revealed that secondary school students have neutral views about science (chemistry). On the other hand, the study of White and Harrison (2012) suggested that secondary school students see science (chemistry) as uncreative, and difficult. They do not recognize its study as important for developing transferrable skills such as technical competence, numeracy, analytical and problem-solving.

Study skills are those skills which are required for understanding and retrieving information; particular they are the link between comprehension and memorization (Al- Hilawani & Sartawi, 2013). Specific competencies of study skills include acquiring information, recording information, recording appropriate responses to the presented information, locating the required information, organizing and managing activities efficiently, synthesizing information to create meaningful patterns of responses, and memorizing and retrieving information on demand.

While positive study behaviors are important to student achievement, knowledge of the actual study behaviors and techniques utilized is rather limited (Elliot, Foster & Stinson, 2013).

Scholars do however agree that students typically utilize a variety of studying techniques, while the actual techniques utilized are rarely documented. Self-regulated learners' proactive qualities and self-motivating abilities help to distinguish them from their peers. Research shows that self-regulated students are more engaged in their learning. These learners commonly seat themselves toward the front of the classroom (Labuhn, Zimmerman & Hasselhorn, 2010), voluntarily offer answers to questions (Elstad & Turmo, 2010), and seek out additional resources when needed to master content (Clarebout, Horz & Schnotz, 2010). Most importantly, selfregulated learners also manipulate their learning environments to meet their needs (Kolovelonis, Goudas & Dermitzaki, 2011).

Salta & Koulougliotis (2011) identified the factors that could positively influence (female) students'

attitude to learn chemistry; these factors could be organized into three main categories: teaching approaches, educational tools, non-formal educational material and activities. The truth is that teachers' attitude and motivation towards chemistry play a critical role in the teaching and learning process and generally influence students' attitudes towards the subject; they play a major role in shaping the classroom environment which has an impact on a student's self-efficacy which in turn influences a student's behavior (Ogembol, Otanga and Yaki, 2015).Teachers' attitude also influence the ways they organize the content to teach and the teaching approaches they use in the classroom, but students' attitude towards chemistry is

by far one of the most influential variables that determine achievement (Azuka, Durujaiye, Okwuoza & Jekayinka, 2013).

Students who have a strong belief that they can succeed in chemistry-related tasks and activities will be more likely to select such tasks and activities, and work hard to complete them successfully (Kurbanoglu, 2010). Alternatively, students who do not believe that they can succeed in chemistry-related activities will avoid them if they can and will put forth minimal effort if they cannot. When confronted with the typical challenges that science involves, they will be more likely to give up and to experience the stresses and anxieties that help ensure the erosion of their efforts (Kurbanoglu, 2010). Thus, self-efficacy is proposed to be an important factor influencing attitudes toward chemistry and chemistry laboratory anxiety.

Sex and Academic Achievement in Chemistry

The influence of Sex on learning and Achievement has remained a controversial and topical issue amongst educationists and psychologists. Freud, cited in Okorie (2014) suggested that the difference in male and female anatomy has bearing and indeed account for the difference observed between the personalities of men and women. It is from this Freudian theory that several Sex related studies have taken their roots. Ssempala (2005) carried out a study to determine if there were Sex differences in the performance of practical skills on quantitative analysis, an aspect of Chemistry, among senior secondary school boys and girls in selected

coeducational schools in Kampala District. Fifty students, twenty-five boys and twenty-five girls took part in the study. The result of the study showed that:

1. There were no statistical differences between girls and boys in their ability to manipulate the apparatus/equipment, take observation, report/record results correctly, and compute/interpret/analyse results during chemistry practical;
2. Both male and female students perceived interpreting/analyzing results to be the most difficult skill to perform, whereas manipulation of apparatus/equipment was perceived to be the easy skill to perform during chemistry practical by both Sex s.
3. Girls had a poor self-confidence in their ability to perform chemistry practical, as most of them (90%) believed that boys were better than them;
4. Girls performed slightly better than boys overall, boys performed slightly better than the girls in the following skills; recording/reporting results and computing/interpreting/analysing results.

Adesoji and Babatunde (2008) investigated male and female chemistry students' difficulties and misconceptions in inorganic chemistry. Result of their study showed that:

1. Both male and female chemistry students held misconceptions in inorganic chemistry;
2. Female students had more problem-solving difficulties than their male counterparts in inorganic chemistry;
3. Female students held more misconceptions than their male counterparts in inorganic chemistry.

Eze (2008) studied the effect of two questioning techniques on students' achievement, retention and interest in chemistry and found that:

1. Sex had significant effects on students' achievement;
2. Male students achieved higher than their female counterparts

Ojo (2015) showed that girls performed better than boys in chemistry and that the difference between their mean achievement score was significant. Adesoji and Babatunde (2008) showed that the difference between the mean achievement scores of female and male students was not statistically significant in chemistry. Agbir (2004) found that Sex was not a significant factor in the overall mean achievement rating of students in practical skills on acid-base titration. Ifeakor (2005) showed a significant Sex related difference in students' cognitive achievement in favour of male students over their female counterparts.

It would appear from the above studies that Sex as an influencing factor in learning and achievement remains important but controversial.

Interest and Academic Achievement in Chemistry

Interest is the feeling one has in the cause or process of wanting to know or learn about something or someone. It is an activity which someone enjoys and spends free time in studying or doing (Ifeakor, 2005). Gana (2013) asserts that sustenance of a person's interest in an object or activity depends on what the person stands to derive from the object or activity. In this case, there is value judgment on the part of the individual. If people in their judgment feel there is something to gain or lose from an object or activity, the tendency is for them to show interest or aversion to the object or activity. It implies therefore that the degree of

interest one has in a subject or activity is determined by the level of value placed on the expected something derivable from the object or activity. Value judgment is usually a function of the knowledge the person who is carrying out the judgment has about the activity or object. This knowledge is acquired through encounter or interaction with the object or involvement in the activities of interest. This is very fundamental and enables individuals to increase their primary knowledge about the object or activities of interest to them, which in this situation remain their primary source of knowledge.

Agbi (2006) opined that students' achievement in chemistry is influenced by their interest in the subject. The author asserts that interest engenders motivation and effort, which together interact, resulting in achievement and success in chemistry. It was observed that students' interest in chemistry is diminished and dampened by use of ineffective teaching methods. Teachers should therefore always make conscious effort to identify and use teaching methods that are appropriate and suitable for the level of their students. This way, students' interest in chemistry could be arousef, sustained and enhanced. It is under this condition that students' achievement in chemistry is made possible.

Okorie (2014) observed that strategies in pedagogy impact on students' interest in science. One strategy that is recommended in secondary schools' chemistry curriculum for 21st century learning is e-learning, defined as a kind of teaching that uses computers (Hartman, 2004). In e-learning, educational software packages serve as multimedia platform for communication and interaction between the learning material and students. It us expected that

this strategy will sustain students' interest in learning and improve their achievement in chemistry.

Summary of Literature Review

Chemistry and/or knowledge of chemistry is very important in all spheres of human life and contributes to the improvement of the quality of life. Such areas of application include the home, industry, agriculture and in medicine etc. For instance, toothpaste, tissue paper are all produced using knowledge of chemistry. Soap production, cooking and separation techniques all use principles gained from chemistry. In addition, fire extinguishing and prevention, slicing yam before cooking or slicing cassava before fermenting, all involve knowledge of chemistry. Ibe (2017) agrees with the foregoing and adds that slicing of cassava before fermenting and using warm water together with ashes or local leaves to hasten fermentation can only be explained using knowledge of chemistry.

One of the goals of science is to contribute to the preparation of students and lead them to full and satisfying lives and to produce a sufficient number of scientists to meet the needs of a science and technology dependent society. Generally speaking, chemistry concepts are perceived by students as abstract and difficult to understand. Efforts have been made by science educators to make the concepts as simple and friendly as possible. In view of this, researchers have contributed to search for the reasons for low performance of secondary school Chemistry students in External Examinations such as WAEC.

Literature was reviewed under The Concepts in Chemistry, Teaching of Chemistry in Secondary Schools, Sex and Academic Achievement, Interest as a Factor in Learning chemistry, The Concept of Attitude, Students' Disposition and Learning of Chemistry in Secondary Schools, Students' Perception and Learning of Chemistry in Secondary Schools, Students' Interest and Learning of Chemistry in Secondary Schools, Factors Influencing Students' Attitude towards Learning of Chemistry in Secondary Schools, Sex and Academic Achievement in Chemistry, Interest and Academic Achievement in Chemistry

The reviewed studies showed that even though related works have been done using innovative

Instructional strategies, it appears that such studies have not been done in Secondary schools in Egor LGA, of Edo state. This gap is what the present study seeks to fill, thus the study seeks to determine the Sex and Attitude on secondary school students' learning of chemistry in Egor LGA of Edo State.

CHAPTER THREE

METHODOLOGY

This chapter is a detailed explanation of information about the research methodology adopted for the study. They are discussed under the following sub-headings:

- Research Design
- Population of the Study
- Sample and Sampling Techniques
- Research Instrument
- Validity of the Instrument
- Reliability of the Instrument
- Method of Data Collection
- Method of Data Analysis

Research Design

The research design adopted for this study is the descriptive survey research design. This method was adopted because it proved to be the most appropriate for the research. A descriptive survey is a design that collects data and information on a given population, and further describes the data in an organized manner pointing out the characteristic features or facts about that population understudy.

Population of the Study

The population for this study will consist of Senior Secondary School students in the thirteen (13) public secondary schools in Egor Local Government Area of Edo state, in the 2023/2024 academic session (Source: Edo State Ministry of Education, 2023).

Sample and Sampling Technique

The sample size for the study comprises hundred (100) respondents which will be selected using the simple random sampling technique. Hundred (100) students will be drawn from five (5) public schools and five (5) private schools in Egor, each of which will avail fifty (50) respondents giving the total sample size of hundred (100).

Research Instrument.

The study utilizes a questionnaire research instrument for data collection. The questionnaire titled: Sex and Attitude on secondary school students' learning of chemistry in Egor LGA of Edo State, is intended for students to ascertain gender Attitude on secondary school students' learning of chemistry in Egor LGA of Edo State The questionnaire comprises of two parts; Section A and Section B. Section A contains three (3) questions that seek to obtain information on the background of respondents. Section B, on the other hand, consists of twenty (17) items which seek to obtain information on gender attitude on students learning of chemistry in Egor LGA of Edo state. In this final section, the respondents are expected to check their responses based on four rating scales of Strongly Agree (SA); Agree (A), Disagreed (D) and Strongly Disagreed (SD).

Validity of the Instrument

The designed questionnaire for the study was validated by two lecturers in Education. Correction was made, and then confirmed adequate enough to be administered to the respondents.

Reliability of the Instrument

The test re-test method was used to determine the reliability of the instrument. This was be done by administering the questionnaire to a group of ten (20) respondents which were not part of the study. The results of their responses was correlated and it was gotten to be 0.752.

Method of Data Collection

The questionnaire will be administered by the researcher to the respondents in the areas understudy. The researcher will offer necessary information to the respondents on how they should fill their questionnaires, thereafter the researcher collects back the filled questionnaires from the respondents.

Method of Data Analysis

To analyze the collected data, the researcher will make use of frequency count and simple percentage to compute the findings from the research. This would be shown in detail in chapter four of the research.

CHAPTER FOUR

PRESENTATION OF RESULT AND DISCUSSION OF FINDINGS

This chapter focuses on presentation of results and discussion of findings.

Presentation of Data

This chapter presents the result obtained from the analysis of data for answering the research questions formulated and testing the hypotheses for the study through structured interview, checklist and observation schedule. The data are presented in tables and are arranged according to research questions.

Research Question one: What are the Sex and attitudes of Secondary school Chemistry students in Egor LGA?

Table 1: Percentage Analysis of the Sex and attitude of secondary school chemistry students in Egor LGA (Male)

S/N	ITEAM	STRONGLY AGREE	AGREE	STRONGLY DISAGREE	DISAGREE	TOTAL
1	I like learning about chemistry.	20 **(40%)**	10 **20%**	14 **28%**	6 **12%**	50 **100%**
2	I am confident in my ability to do well in chemistry	15 **(30%)**	18 **36%**	7 **14%**	10 **20%**	50 **100%**
3	I am interested in learning about chemistry.	26 **(52%)**	20 **40%**	3 **6%**	1 **2%**	50 **100%**
4	I enjoy learning about chemistry.	30 **(60%)**	15 **(30%)**	2 **(4%)**	3 **(6%)**	50 **100%**
5	Chemistry is an important subject to me .	15 **(30%)**	17 **(34%)**	2 **(4%)**	15 **(30%)**	50 **100%**
6	I feel discouraged to pursue a career in chemistry	18 **(36%)**	17 **(34%)**	7 **(14%)**	8 **(16%)**	50 **100%**

From the analysis above it shows that majority of the male students from the sample population have positive attitudes towards the learning of chemistry. The difference is percentage level of interest varies amongst students.

Table 2: Percentage Analysis of the Sex and attitude of secondary school chemistry students in Egor LGA (Female)

S/N	ITEAM	STRONGLY AGREE	AGREE	STRONGLY DISAGREE	DISAGREE	TOTAL
1	I like learning about chemistry.	30 **(60%)**	5 **(10%)**	8 **(16%)**	7 **(14%)**	50 **(100%)**
2	I am confident in my ability to do well in chemistry	26 **(52%)**	14 **(28%)**	8 **(16%)**	2 **(4%)**	50 **(100%)**
3	I am interested in learning about chemistry.	26 **(52%)**	15 **(30%)**	4 **(8%)**	5 **(10%)**	50 **(100%)**
4	I enjoy learning about chemistry.	21 **(42%)**	25 **(50%)**	4 **(8%)**	- **(-%)**	50 **(100%)**
5	Chemistry is an important subject to me .	30 **(60%)**	15 **(30%)**	- **(-%)**	5 **(10%)**	50 **(100%)**
6	I feel discouraged to pursue a career in chemistry	35 **(70%)**	7 **(14%)**	- **(-%)**	8 **(16%)**	50 **(100%)**

From the analysis above it shows that not all female students have positive attitudes towards the learning of chemistry, most of them are highly interested in chemistry but don't enjoy studying chemistry.

Research Question two: Is there a difference in attitude of secondary school chemistry students based on Sex??

Table 3: Percentage Analysis of the difference in attitude of secondary school chemistry students based on sex

Variables	**N**	**% Attitude**	**Remark**
Male Students	50	74	High
Female Students	50	76	High

Table 3 above shows that 74% of the male student-respondents indicated that there is high positive attitude among male chemistry students while 76% of female student-respondents indicated that there is positive attitude towards chemistry among female Chemistry students. The result signifies that there is no difference in the attitude of chemistry students between male and female students.

Research Question three: Is there a difference in attitude of secondary school chemistry students based on parents' socioeconomic status??

Table 4: Percentage Analysis of the difference in attitude of secondary school chemistry students based on Parents socioeconomic status

Variables	**N**	**% Attitude**	**Remark**
High Class	50	74	Positive
Middle Class	50	83	Positive

From the analysis above it shows that the attitude of chemistry students is not influenced by the socioeconomic status of their parents, as both High and Middle class shows positive attitude despite the difference in their socioeconomic status.

Research Question four: Is there a difference in attitude of secondary school chemistry students based on School ownership??

Table 5: Percentage Analysis of the difference in attitude of secondary school chemistry students based on school ownership.

Variables	**N**	**% Attitude**	**Remark**
Public School	50	48	Very Low
Private School	50	64	Low

The response obtained from table 2 shows that 48% of the student - respondents in School 1 which is a public school agreed that there are enough chemistry instructional materials in their schools, students' access to chemistry laboratories and more practical activities while only 64% of the student - respondents in School 2 which is a private school agreed that their schools have enough chemistry instructional materials and carries out practical activities after each chemistry lesson. This result signifies that there is a difference in the attitude of chemistry students based on school ownership. Although, the availability of instructional material is low in both schools.

Discussion of Findings

From research question one the study revealed that majority of the male students from the sample population have positive attitudes towards the learning of chemistry. The difference is percentage level of interest varies amongst students, also not all female students have positive attitudes towards the learning of chemistry, most of them are highly interested in chemistry but don't enjoy studying chemistry but the difference in both the male and female attitude is quite similar.

From research question two they is no much difference in the attitude of chemistry students based on sex, both male and female students show similar attitude toward chemistry, thou some students attitude towards chemistry is negative but it was not as a result of sex.

From the research question three it shows that the attitude of chemistry students is not influenced by the socioeconomic status of their parents, as both male and female shows positive attitude despite the difference in the family socioeconomic status.

From the fourth research question it shows that school ownership affects the attitude of chemistry students. From the school visited it was discovered that most schools lack instructional materials, chemistry laboratory and qualified chemistry teaches.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

Chemistry is one of the compulsory science subjects for whoever wants to study science and technology courses in tertiary institutions. It is the natural basis of technology disciplines and natural sciences.

Chemistry education plays a significant role in scientific, technological and national development. However, there is ample evidence in literature that students' achievement and interest in the subject is very poor. The poor achievements in chemistry may be as a result of gender or attitudes of the students or teachers' use of ineffective teacher-centred methods which make students passive in the teaching/learning process. The use of teacher-centered methods may be due to large class size and teachers' inability to use some of the innovative learners' centered techniques for effective learning of chemistry. These current classroom situations is characterized with the inability of the students to actively participate in the teaching and learning process which advertently affect effective learning of chemistry concepts. The students are mostly passive in the classrooms where these teacher-centered methods are employed. These results to the inability of the students to internalize, remember easily, transfer what is learnt to new situations and hence achieve poorly and lack interest

The importance of Chemistry in our everyday life, in the society and industry cannot be over-emphasized. These are in line with the general objectives of Chemistry curriculum at the senior secondary school level. The revised edition of the Senior Secondary School Chemistry curriculum is expected among other things to enable students to:

i. Develop interest in the subject of chemistry;
ii. Acquire basic theoretical and practical knowledge and skills;
iii. Develop interest in science, technology and mathematics;
iv. Acquire basic STM knowledge and skills;
v. Develop reasonable level of competence in ICT application that will enSex entrepreneurial skills;
vi. Apply skills to meet societal needs of creating employment and wealth;
vii. Be positioned to take advantage of the numerous career opportunities offered by chemistry;
viii. Be adequately prepared for further studies in chemistry.

In spite of the importance of chemistry in science and technological development, students' academic performance in the subject at Senior School Certificate Examination (SSCE) has been consistently poor (Giginna, 2013). In support of this statement Ibe, Igboejesi and Okoro (2012) noted that against the backdrop of the importance of chemistry in the home, society and industry coupled with the fact that it is a requirement for students' admissions into higher education in the physical sciences and science-related disciplines, it is very surprising that

students do not show much seriousness in the subject as the learning outcomes have been worrisome.

Sex has been identified as one of the factors influencing students' interest and achievement in chemistry (Nworgu, 2015). Sex issues as a factor or variable are not yet skewed to any direction. There are different findings on Sex matters, some in favour of males, others in favour of females and sometimes no Sex differences are found. Giginna (2013) remarked that chemistry is traditionally taught and reflected in a masculine approach to the world that tends to marginalize women. According to Gordon Allport, "An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related." Frank Freeman said, "An attitude is a dispositional readiness to respond to certain institutions, persons or objects in a consistent manner which has been learned and has become one's typical mode of response."

Thurstone said, "An attitude denotes the total of man's inclinations and feelings, prejudice or bias, preconceived notions, ideas, fears, threats, and other any specific topic.

The primary goal of the current study was to assess sex and attitudes of students towards the learning of chemistry and determine whether or not there was a connection between that knowledge and their sex.

The purpose of this study was to determine the Gender Attitude on secondary school students' learning of chemistry in Egor LGA of Edo State, Is there a difference in attitude of secondary school chemistry students based on Sex, Is there a difference in attitude of secondary school chemistry students based on Socio-ecomonic status of parents? Is there a difference in attitude of secondary school chemistry students based on School ownership (Private and Public)? in Egor LGA of Edo state.

Conclusion

Based on the findings of this study, the following conclusions are made male students from the sample population have positive attitudes towards the learning of chemistry. The difference is percentage level of interest varies amongst students, also not all female students have positive attitudes towards the learning of chemistry, most of them are highly interested in chemistry but don't enjoy studying chemistry but the difference in both the male and female attitude is quite similar, they is no much difference in the attitude of chemistry students based on sex, both male and female students show similar attitude toward chemistry, thou some students attitude towards chemistry is negative but it was not as a result of sex, the attitude of chemistry students is not influenced by the socioeconomic status of their parents, as both male and female shows positive attitude despite the difference in the family socioeconomic status, school ownership affects the attitude of chemistry students. From the school visited it was discovered that most schools lack instructional materials, chemistry laboratory and qualified chemistry teaches.

RECOMMENDATIONS

1. Government should ensure that there is adequate availability of well-equipped Laboratories in learning Chemistry

2. Teachers should employ the use of teaching aids so as to arouse the interest of the students in learning Chemistry.

3. Government should employ professional and experienced teachers who have a vast understanding of Chemistry.

4 Both public and private schools should ensure that the learning environment is conducive for the learners

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