TEACHERS' AND STUDENTS' PERCEPTIONS OF THE PROBLEMS ASSOCIATED WITH EFFECTIVE TEACHING AND LEARNING OF CHEMISTRY IN PUBLIC SENIOR SECONDARY SCHOOLS IN MINNA METROPOLIS NIGERSTATE

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2016/3/64468BE

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FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

NOVEMBER, 2019

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A PROJECT SUBMITTED TO THE DEPARTMENT OF SCIENCE EDUCATION FEDERAL UNIVERSITY OF TECHNOLOGY MINNA NIGER STATE NIGERIA IN PARTIAL FULFILMENT FOR THE REQUIREMENT FOR THE AWARD OF BACHELOR IN TECHNOLOGY (B TECH) IN SCIENCE EDUCATION

NOVEMBER, 2019

ABSTRACT

The tittle is teachers' and students' perceptions of the problems associated with effective teaching and learning of chemistry in public senior secondary schools Minna metropolis, Niger State.The descriptive survey design was used to investigate teachers' and students' perceptions of problems associated with effective teaching and learning of Chemistry in public secondary school in Minna metropolis, Niger State. The research questions developed are; what are the perceptions of chemistry teachers, what are the perception of student towards chemistry, whatare the professional qualification of chemistry teachers, how is the evaluation of chemistry subject, to what extend are the teaching methods used in teaching chemistry, to what extent are the teaching of chemistry adequate for teaching of chemistry in public senior secondary schools minna metropolis, Niger State. This study aimed at investigating teachers' and students' perceptions of problems associated with effective teaching and learning of Chemistry in public secondary senior school in Minna metropolis, Niger State. The objectives of the study were: To establish the perception of students toward Chemistry, to establish the perception of Chemistry teachers, to investigate the professional qualification of Chemistry teachers, to investigate evaluation of Chemistry, to establish the teaching and learning methods used and the adequacy of teaching and learning resource needed in teaching Chemistry. Data was collected using two sets of questionnaires; teachers' questionnaire and students. These instruments were piloted and tested for validity and reliability. Descriptive statistics were used in the data analysis. Findings of the study, indicated that teachers' and students perceptions of effective teaching and learning of Chemistry in public secondary schools in Minna metropolis, Niger State were; attitude of students' towards chemistry, perception of Chemistry teachers, Professional qualification of Chemistry teachers, evaluation of Chemistry subject, teaching and learning methods used in teaching Chemistry and teaching and learning resources needed in teaching Chemistry. The study recommended that school stakeholders should find out why the students performance in Chemistry is low despite most of the students having a positive attitude towards Chemistry subject. Further recommendation suggests the need of organizing more seminars, workshops and in service courses. This may enhance perception of Chemistry teachers. Chemistry teachers should also organize symposiums to sensitize students on the practical applications/careers related to chemistry and carrying out continuous evaluation tests. This would enhance understanding of chemistry subjects amongst students and help them to choose careers which are chemistry oriented. The study suggested that similar study should be carried out in other Local Government in Niger State and the results be compared for generalization purposes.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

Science occupies a central position in the school curriculum. It is an important subjects from primary to senior secondary school levels of educational system (Hassan, Gimba & Chado, 2016). The important position occupied by science subjects in the school curricula is role out of Science in Scientific and Technological development, as a necessary condition or requirement in national building. However, the teaching of these relevant subjects is surrounded by problems; such as the problem of inadequate and substandard teaching materials, poor reading habit, class size, culture/belief, Science and Technology anxiety, and general attitudes of students (Hassan, 2016).

The major problem that Nigerian secondary education is facing is the student's poor performance in core subjects, especially English Language and Science. Researches of Kurumeh & Imoko (2008) revealed low academic achievement of students in Science at all levels of education in Nigeria from primary school (Basic education) to secondary school. Also, secondary school students complained about Science as being difficult. This entails that Science foundation in primary school level is very weak and is carried forward to Senior.

Secondary School levels which has contributed a lot to poor academic achievements of students at the Senior School Certificate Examination (SSCE). Science is not a single subject at any level of education. A student cannot be admitted into most science and technology courses at institutions of higher level in Nigeria, since Nigerians aiming of technological advancement and economic emancipation is being undermined by the continued poor Science achievement of secondary school students in both external and internal examinations.

It is a common knowledge that the economies of the industrialized nations are driven by Science and Technology. Hence, Nigeria's vision to be among the top 20 world largest economies by the year 2020 (Vision 2020) justifies the emphasis placed on "science, technical and vocational education" (FRN, 2004, p23). For the fact that students in Nigeria are advised to take science subjects, and one subject that cuts across all the sciences is Chemistry. For this reason, it is important to ensure that all factors associated with effective teaching of the subject are eliminated or reduced to minimum.

Chemistry is a branch of science; its genesis can be traced to certain practices, known as Alchemy, which had been practiced for several decades in various part of the world, particularly in Middle East. (Ancient Chemistry (2009), Chemistry is the scientific study of interaction of chemical substance that are constituted of atoms or sub-atomic particles – protons, electrons, and neutrons, chemistry Encyclopedia (2010), Iwuagu (2009), defined it as the science concerned with the composition, structure and properties of matter, as well as the changes it undergoes during chemical reaction. Our world is made up of matter; we study chemistry to acquire knowledge about matter. We perform **e**xperiment and learn to observe record and make intelligent inferences. Studying chemistry gives us training in scientific methods. Chemistry is one of the compulsory subjects for one to study science and technology related courses in tertiary institutions. It is the science that deals with the properties of different atoms, the ways in which they join together to form molecules, the interaction of various kinds of molecules with one another and the accompanying energy changes. It is the heart or nucleus of science (Adeyemo, 2005).

From the foregoing therefore, the major objective of teaching chemistry in our schools is to enable the students interpret the universe, since the great variety of materials in the universe can be classified into two great entities: energy and matter. Chemistry has developed knowledge in all

these areas of energy and matter which will significantly help in achieving the objective of interpreting the universe (Adeyemo, 2005). The significance of chemistry in all fields of science has made chemistry imperative to be included in the curriculum of senior secondary school to be offered by science oriented students. The Nigerian secondary school Chemistry curriculum has the following objectives:

i. Facilitate a transition in the use of scientific concepts and techniques acquired in Integrated Science with Chemistry.
ii. Provide the students with basic knowledge in chemical concepts and principles through efficient selection of content and sequencing.
iii. Show Chemistry in its inter-relationship with other subjects;
iv. Show Chemistry and its link with industry, everyday life, benefits and hazards;
v. Provide a course which is complete for students not proceeding to higher education while it is at the same time, a reasonably adequate foundation for post-secondary Chemistry courses. (FME & CESAC, 2009p).

Chemistry education is an important area of focus in national development all over the world. This is because chemistry education plays a vital role in the technological transformation of any nation. In Nigeria, there seems to be an increased awareness that chemistry education plays an important role in influencing the rate of economic and technological growth. It has equally been realised that chemistry education has the capacity to solve the age-long problems of increasing unemployment, high poverty rate and insufficient manpower. According to Ogbu, (2012) chemistry provides theoretical bases for synthesis of drugs which are used for medicine, textiles, shoes, plastics, soap and detergent. Contributing to the importance of chemistry in national development, Igbonugo (2014) pointed out that chemistry helps to ensure continuous availability of students in expected

number who take important professions such as medicine, pharmacy, dentistry, food science, agriculture, engineering, education, etc. In the same vein the Federal Ministry of Education (2007) on the objectives of Senior Secondary Education. Chemistry curriculum stated that students among other things are to:

- Develop interest in the subject of chemistry
- Acquire basic theoretical and practical knowledge and skills.
- Develop interest in STM.
- Acquire basic STM knowledge and skills
- Develop reasonable level of competence in ICT application that will engender entrepreneurial skills.
- Apply skills to meet societal needs of creating employment and wealth.
- Be positioned to take advantage of the numerous career opportunities offered by chemistry.

1.2 Statement of Problem

Chemistry as a science subject plays a vital role in transforming the environment and improving the general quality of life. It is essentially needed for a nation's technological development. As a core science subject, the proper teaching and learning of chemistry in secondary schools facilitates student's enrollment in many professional disciplines like Nursing, Medicine, Pharmacy, Agriculture, Engineering and Geology etc. Hence, there is the need for effective teaching and learning of Chemistry in Nigerian secondary schools. For teaching and learning of Chemistry to be effective, the classroom environment has to be conducive to both teachers and students. Chemistry as an important science subject is taught in many secondary schools in Nigeria as a single subject at senior secondary school level. Yet, inspite of all the benefits derived from Chemistry, students' performance in Chemistry at the senior secondary school certificate examination in the last few decades is still low.

1.3 Research Questions

1. What are the perceptions of teachers on the problem of effective teaching and learning of chemistry in public secondary school in Minna metropolis Niger State?
2. What are the perceptions of students on the problem of effective teaching and learning of chemistry in Public Secondary School in Minna Metropolis, Niger State?
3. What are the professional qualification of chemistry teachers in Public Secondary School in Minna Metropolis, Niger State?
4. How is the evaluation of chemistry in public secondary schools in Minna Metropolis, Niger State?
5. To what extent are the teaching methods used in teaching chemistry subject in Public Secondary Schools in Minna metropolis Niger State?
6. To what extent are the teaching resources adequate for the teaching of chemistry in Public Secondary School in Minna Metropolis Niger State.

1.4 Significance of the Study

The significance of this study is aimed at teachers' and students' perceptions of the problems associated with effective teaching and learning of chemistry in public senior secondary schools in Minna metropolis Niger State.

In addition, the teachers would identify their deficiencies and limitations as regards the teaching and learning of chemistry and make necessary adjustments where necessary.

More so, as chemistry becomes part of our daily life, the need for proper teaching of the subject has becomes extremely essential. Because of this increase in need demands have also been placed in school to educate students and make them "Chemistrically equipped" Additionally, perception are not only feeling that help prevent accesses but also place a limit on students learning. If a

person does not have a positive perception of chemistry, he/she may feel anxious when expected to utilize this, such a person is unlikely to want to learn and obtain skills or participate in assignment that require `the use of chemistry knowledge, on the other hand, students who exhibit positive perception towards a subject are more likely to actively engage during and after instruction. When students dislike chemistry, his/her perception is reflected in action resulting in limited engagement with chemistry. So in a sense the perception affect subsequent actions. It is acknowledge on the present study that there are many other factors that may be found to influence students perception towards chemistry.

Finally, the students would be alerted on both positive and negative effects their perceptions towards chemistry at their level will have on their present and future career.

1.5 Limitation of the Study

This study will be limited to Minna metropolis, Niger State. It deals specifically with the perception of students and teachers in teaching and learning of chemistry within the municipality. This restriction is necessary in order to carry research in within the relatively short period of time allowed.

1.6 Aim and Objective of the study

1. To change the perception of students towards chemistry in public senior secondary schools in Minna metropolis Niger State.
2. To change the perception of chemistry teachers in public senior secondary school in Minna metropolis Niger State.
3. To investigate the professional qualification of chemistry teachers in public senior secondary school in Minna metropolis Niger State.

4. To investigate the evaluation of chemistry in public senior secondary schools in Minna metropolis Niger State.
5. To establish the teaching and learning methods used in teaching chemistry in public senior secondary school in Minna metropolis Niger State.
6. To establish the adequacy of teaching and learning resources needed in teaching chemistry in public senior secondary school in Minna metropolis Niger State.

1.7 Definition of Terms

Chemistry: the study of the composition, properties and structure of matter and the changes it undergoes.

Effective: capable of producing an intended result or having a striking effect

Teaching: the process of showing somebody how to do something so that they will be able to do it themselves or to give lesson in a subject to a class or pupil.

Learning: the process of gaining knowledge or skill by study, experience or being taught or become aware of.

Perception: The ability to see, hear or understand things or attitude.

Evaluation of Chemistry: refers to the systematic determination of merit, worth and significance of performance in chemistry subject.

Professional Qualification: is a designation earned by a person to assure a qualification to perform teaching tasking schools e.g bachelors in education, masters in education.

Teacher: refers to a person employed for the purpose of guiding and directing learning experiences of students in an educational institution.

Teaching/Learning method: refers to various techniques used for teaching and learning purposes.

Teaaching/ Learning resources: refers to the requirement needed to assist in delivery of knowledge to the learners.

Practical: refers to teaching and learning approach that stresses the importance of observation and the uses of senses in obtaining scientific knowledge. In this method the learners are the active participant. They manipulate learning resources and the materials under the guidance of the subject teacher.

Syllabus; refers to a plan that states exactly what students at a school should learn in a particular subject as stipulated in the curriculum.

Problems: are factors.

1.8 Basic Assumption of the Study

The study was based on the following basic assumptions:

The sample population of the schools, students, and teachers would represent the entire population of all the teachers and students taking Chemistry in Minna Metropolis, Niger State. It was also consider that the respondents would give accurate and honest information and that the school administration would provide the necessary needed support for the teaching and learning of Chemistry within the public secondary schools in Minna metropolis, Niger State.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

According to Mugenda and Mugenda (2003), review of the literature involves systematic identification, location and analysis of documents containing information related to the research problem being investigated. This chapter highlights similar works carried out by other researchers elsewhere on problems of effective teaching and learning of chemistry. It consists of relevant themes which have been derived from the research objectives. Each research question has been thematically reviewed as follows; Teachers and students' perceptions of the problems of effective teaching and learning of chemistry in secondary schools in Minna Metropolis, Niger State.

2.2 Perception of Students Towards Learning Chemistry

A number of studies have been carried out on perception of students towards learning various subjects in different parts of the world. Attitude of students towards different subjects differ from one country to another even from one community to another. In Nigeria, this is very prevalent in many subjects. Some of the research that has been done in this area includes, Wong, Young, and Fraser (1997) who investigated on the influence of students' perceptions of chemistry classroom environment on their achievement and attitudes towards chemistry.

This study concluded that there is a positive association between the nature of the laboratory classroom environment and students' attitude. The ongoing study does not look at relationship between the nature of the laboratory classroom environment and students' attitude, but aims at determining problems that influence performance of chemistry at secondary school level.

Cousins (2007) carried out a study on gender inclusivity in secondary school Chemistry on male and female participation in the secondary schools in Australia. The study analyzed the

participations' rates in Chemistry by developing the "story" behind national trends and subject selection patterns within an independent school located in a large Australian city. It supplemented the documented quantitative data by presenting a case- study of 30 chemistry students who were interviewed about what motivated them to enroll in secondary school Chemistry. The students' comments indicated that, despite the quantitative transformations that demonstrate increasing female success over the past few decades, Chemistry is not totally gender inclusive.

Cousin further observed that secondary school Chemistry has not yet reached total gender inclusion due to the common gender differences that still occur in the students' motivation to select Chemistry and the influence that gender stereotypes still have on students' subject selection. Nevertheless, this study did not address the attitude issues and how attitude of students towards Chemistry as a subject in secondary schools in Niger State. In fact, this study by Cousins was engaged more on the gender perspective than on attitude. It was even carried out in Australia which is actually different in terms of context from this intended study. Moreover Cousins study used a case study methodological approach while in this study a quantitative approach that mainly involves a survey design approach has been used. Further. Cousins findings do not seem to be relevant in terms of addressing the student attitude towards performance of Chemistry in the district under focus. Information in this area is wanting and scanty which raises concern. This study therefore is an attempt to close this knowledge gap.

Okebukola (1986) examined factors affecting attitudes toward laboratory Chemistry. The study involved a sample population of 1638 of grade II Chemistry students in 78 schools in rural, suburb, and urban Oyo State, Nigeria. The finding of this study was that student's attitude toward Chemistry as a subject is the most important determinant of the attitude toward the laboratory. However this study mainly focused on factors affecting attitude towards laboratory Chemistry

other than Chemistry as a subject. The extent of this study therefore is meant to fill in the knowledge gap on problems influencing performance of Chemistry.

In another study Okebukola (1987) examined the influence of selected factors on secondary students' performance in practical Chemistry for a sample of students and teachers from 39 Nigerian schools. This study identified that participation in laboratory activities and students attitudes or perception to Chemistry are the most important factors affecting performance in Chemistry.

In another study carried out by Kamau (2006) on investigation of factors leading to poor performance in Chemistry in Kenya. The study involved three secondary schools in Naivasha Division. Kamau argued that one of major Millennium Goals of the Republic of Kenya is to be industrialized by year 2020. This can only be achieved by promoting science subjects in our schools. The three major science subjects taught in our secondary schools are Chemistry, Physics and Biology. The new move of science and technology has drawn a lot of attention to the performance of learners in the academic institutions especially on the performance of science. Unfortunately in Niger State the science subject have not been performed well for a long time. This means that there is a need to look at the reasons, problems or factors that lead to these poor performances in Niger State schools.

This survey study looked at the problems of effective teaching and learning chemistry, that lead to poor Chemistry performance in schools and hence tried to suggest the possible solution that can be used to benefit the students, parent and Niger State society at large. This was done by using the survey method where by three secondary schools were randomly sampled. In each school 20 of the form three students were sampled using the stratified random sampling technique from each school. The random sampling was then done to get the individual student respondents. The

questionnaires were used and dispatched to these students, two teachers from each school and the head teachers were interviewed. In the study the questionnaires contained questions which were answered by each of the groups of respondents to generate and extract more knowledge about the problems encountered in the subject.

However, the study by Kamau (2006) focused its attention on factors leading to poor performance in Chemistry as opposed to the factors influencing performance of Chemistry in secondary schools of Kajiado North district. This study engaged only three schools which is a relatively small sample size which is increasingly unrepresentative of the country's secondary schools and therefore cannot be generalized. This study focused on problems influencing performance of Chemistry in public secondary schools in order to fill the knowledge gap where information remained elusive. Perceptions of students to effective teaching and learning of chemistry, perceptions of teachers to effective teaching and learning of Chemistry, professional qualifications of Chemistry teachers, evaluation of Chemistry in public secondary schools, extent to which methods are used in teaching Chemistry subject and extent to which the teaching and learning resources available are used for teaching Chemistry.

2.3 Perception of Chemistry Teachers.

The examination of the characteristics of a good teacher dates back to Ancient Greece. At that time, good teachers were primarily described as mentors fulfilling career and psychosocial function of their "protégés" K.E Kram, (1984). The career oriented activities, help the protégés to "learn the rope". While psychosocial oriented activities based on trust, intimacy, and interpersonal bonds, facilitated the professional and personal growth, identity, self-worth and self-efficacy B. R Ragins, (2007). Thus, teachers maintained a balance between the academic and interpersonal dimensions of educational practice.

Research confirms that contemporary teachers, too influence both students' learning and their personal development. It has been suggested that students' personal relationship with their teachers are two fold; Professional level and personal level. On the professional level, teachersare important in the encouraging of interest, curiousity, and motivation D Raufelder (2016) as well as providing the learning support and feedback on the academic performance R.C Pianta (2003). While on personal level they affect students' sense of identity P.A Jenning (2009). Since teachers have impact on students' academic and personal development.

Research by P Mahffy (2004) shows that students have many difficulties in understanding the submicro and symbolic levels of chemical concepts. The difficulties in teaching and learning chemistry lies in the complexity of chemistry itself. Chemical concept can explained in three different levels; the microscopic (observable) and submicroscopic levels (particulate, the most abstract level) are real, but the symbolic level (symbols, formular and equations) concerns the representations of the reality. Representations of the submicro level (schematic representation of particles) are called the submicro-representations (SMRs) D. Gabel (1999). Teachers and authors should take the complexity of the Trauma Nursing Core Course (TNCC) into account and should develop educational strategies integrating the visualization method (SMRs) and the appropriate language use (strictly use the name of the particles when needed) in social situation e,g collaborative learning H. K Wu (2001). In this way, students are develop some mental models of chemical concepts with a low level of misconceptions of the macro, submicro amd symbolic levels A. G Harrison. TNCC helps students to their conceptual understanding of chemical phenomena A.H Johnstone (1982)

However, there are some specific attributes that influence TNCC learning. Students ability to interpret the TNCC rather complex system to representing the abstract chemical concepts is also

related to the students system thinking skill C. S Carter (1987). The skill should be developed and assessed during chemistry lesson as proposed by T.N Hrin (2016) who suggested the specific assessment tools using systematic synthetic question (SSynQs) in organic chemistry to evaluate the most complex dimension of the systems thinking amongst secondary school students.

The research in science education in the last two decades, has therefore emphasized the used of different educational strategies to overcome the gap between the three levels of chemical concepts V Ferk-Savec (2009), the basis of the correct comprehension of chemical concept is the understanding of the structure of matter. It is therefore recommended that that the teaching of science phenomena to students at the age of 10 – 12 years should originate in the macroscopic observations gradually continue to particle interaction explanations; finally, these explanation should be translated into symbolic representation P Johnson (2005).

2.4 Professional Qualification of Chemistry Teachers

Akinsolu. (2010) carried out a research study entitled Teachers and Students' Academic Performance in Nigerian Secondary Schools. This study examined the number of qualified teachers and their relationship to students' academic performance in public secondary schools in a sample of Local Government Areas (L.G.A) of Niger State. The Senior School Certificate Examination results from 2013/2014 to 2017/2018 were used to analyze students' academic performance and reflected some concerns in the school system. Findings of this study showed teachers' qualifications, experience and teacher- student ratio were significantly related to students' academic performance. These findings can be used to guide planners about the need for qualified teachers to facilitate effective teaching and learning in secondary schools in Nigeria. It is in this perspective that this studies to tries to determine whether the same applies to situation in Minna Metropolis, Niger State.

Ongubiyi (2004) in his study, “New challenges in the methodologies of teaching in Nigeria’’, stated that problems facing science teaching today is how current the teaching professional is as at present. He observed that majority of the teachers had been employed in the past decades and they have been doing the same thing, the same way all along. They have no knowledge of the current ideas and innovations that have taken place in the field in the past recent. He emphasized on the importance of the teachers attending training workshop in their areas of specialties. This study confirms that teacher qualification and development is an important factor in determining student academic achievement. But having been done in a different country there is need to find out whether the same influences performance of Chemistry in Nigeria public secondary schools in Niger State.

Grangeat and Gray (2007) investigated factors influencing teachers' professional competence development. This study aimed to increase understanding and knowledge concerning teachers' competence enhancement. The results of the study highlighted the effects of the organization of the collective work situations: spurring exchanges amongst teachers and school partners appears to be a main factor for improving teachers' conceptions about teaching. Some ideas are outlined for constructing new continuing professional development programs and studying their effects.

Sifuna (1989) in his study on Certificate of Primary Education Examination revealed that teacher expertise, facility condition, and instructional materials affect Kenyan primary school quality. This indication was by student performance in the Certificate of Primary Education (CPE). He further stated that higher score are only attainable whenever there are more qualified teachers and suitable facilities. This study mainly concentrated on primary school level. The study at hand tries to find out whether teachers' expertise influences performance of Chemistry in public secondary schools.

Mugambi (2006) carried out a study on factors that influence student's performance in the KCSE examination in South Meru district. Based on her enumerated findings she noted that academic qualification of teachers was significant in influencing performance in secondary schools and the MoE should organize in-service courses for teachers periodically to give them more professional experience. It is therefore in this lime light that this study investigates whether professional qualification of Chemistry teachers in public secondary, influences performance of students achievement Chemistry

2.5 The Evaluation of Chemistry

Nigeria Certificate of Secondary Education examination is a form of summative evaluation, which measures the outcome of achievement that fall below a certain set standard. All these evaluation

procedures should lead to better teaching and curriculum revision on the part of the teachers and the school.

Achievement level in chemistry is measured through presentation of examination to students. Wamai (1991) stated that examination results are taken as a valid measure of students' achievement and Kenya regards examinations as a trustworthy instrument of categorizing students into groups of achievers and non-achievers. Wamahiu (1994) observed that achievement in education refers to the degree of success obtained after input of a certain amount of effort. It is also an output and should reflect certain physical and intellectual abilities of an individual and indicate the effectiveness of the school curriculum and efficiency of school administration and teachers. Therefore achievement is always interpreted as referring to the level of academic performance. Performance is evaluated using examination as the yard stick. One's success or failure in examination is seen as a measure of pupils' achievement.

"Non achievement in education manifests itself in non-enrolment, how persistence, completion and progress rates. It leads to wastage of resources, human, materials and financial for the individuals, family and house hold community and nation and indicates inefficiency and infectiveness of education system (Wamahiu, 1994:17)"

According to Bishop (1995) appropriate techniques of evaluation should be used according to differing instructional objectives, they may, in science for instance, include the testing of practical skills, use of observation techniques, and evaluation of pupil's product and records. All these evaluation procedures should lead to better teaching and curriculum revision on the part of the teachers and the school.

2.6 The Teaching and Learning Methods used in teaching of Chemistry Subject

According to Wachanga and Mwangi (2004), successful teaching and learning of Chemistry depends partly on methods whose activities target most learning senses. This may imply that there is need for teachers to vary the teaching technique in their day to day teaching activity. Apart from the m ost commonly applied lecture method approach there is need to employ other teaching methodology such as class demonstrations, practical's and field excursions which are more students involving. The participation of students in the lecture method is less involving. The teaching approach that a teacher adopts is one factor that may affect students' performance, (Mills 1991).

Adesoju and Olantunbosun (2008) carried out a study on student, teacher and school environment factors as determinants of achievement in senior secondary school Chemistry in Oyo state. Nigeria. In this study they observed that Chemistry teaching can only be result- oriented when students are willing and teachers are well disposed using the appropriate methods. They further stated that there is much more demand and emphasis should be laid on the teacher, the learner, the curriculum and the environment in the whole process of teaching and learning of science.

Danili and Reid (2004) studied difficulties facing the majority of Greek pupils in understanding Chemistry concepts, and therefore performing well in the National Examinations. The aim was to explore the problems and to suggest ways in which the situation might be improved. They suggested that approaches to learning must take into account cognitive factors in the learners in the context of information processing and understandings. If this is done, learning is much more effective. Danili and Reid study was mainly on the students' difficulties in learning and understanding Chemistry concepts and their alternative conceptions in Chemistry.

Eilks and Byers (2009) carried out a study on the need for innovative teaching and learning Chemistry in higher education amongst European Union countries. The paper starts by identifying

and justifying the need for innovation in the methods used to teach Chemistry in higher education to deal with challenges arising from the rapidly changing nature ol higher education. They observed that innovation is considered to offer opportunities for enhancing the student learning experience in higher level Chemistry education. The importance of improved training in pedagogy and pedagogical content knowledge for new lecturers is also stressed.

This study by Eilks and Byers engaged more of teaching and learning in higher education in Europe. The researchers mainly concentrated on innovative teaching and learning of Chemistry at higher education. The study at hand aims at looking at the teaching and learning methodologies that suit the teaching of Chemistry in secondary school. It intends to find out whether these methodologies have any impact on performance of Chemistry in public secondary schools.

According to Eshiwani (1985) in his study entitled Research into methods of Teaching Mathematics, he noted that performance of mathematics in many countries in Africa has been on a down ward trend. He further observed that this is due to inappropriate teaching methods and a high turnover of mathematics teachers in the schools. Thus there is need to find out how teaching methods influence performance of Chemistry in public secondary schools. Ndambuki (2006) observed that lack of facilities or improvisation of learning resources makes chemistry an abstract subject.

2.7 The Teaching and Learning Resources available for Teaching Chemistry

Resources include print and non print materials such as related text books, syllabuses, charts, laboratory and equipments among others. Relevant resources that are provided to teachers enable them to teach better. This also enhances learning among student thus improving in their performance in examinations (Omao 2007). Pan, Rudo, Schneider and Smith-Hansen (2003) carried out a study on the relationship between resources availability and student performance.

The study examined district- level patterns of resource allocation, district and school resource practices implemented to improve student performance, and barriers and challenges to efficient resource allocation faced by schools. The findings from the research demonstrated that availability resources, enhances students' academic success. The study indicated that allocating resources within selected areas and for certain practices might make a significant impact on student. The study further observed that both the level of resources and their explicit allocation seemed to affect educational outcomes.

Ndirangu, Kathuri and Mungai (2001) examined improvisation as a strategy for providing science teaching resources. The researchers observed that in Kenya, performance in science subjects has often been very dismal. They further explained that poor performance is partly blamed on the increasing school enrolment, without corresponding increase in teaching resources. The study observes that cost sharing in secondary schools has limited the governments role to paying teachers' salaries only.

They further observed that capital development and purchase of teaching materials has been lelf to parents. Parents have been unable to carry out this role effectively because of increasing poverty level in the country. The focus of this study was on how improvised science resources may be used in teaching and learning of science. However the study did not reveal how resources influence the performance.

Omao (2007) investigated the Effectiveness of the implementation of secondary school Kiswahili. The researcher revealed that one of the challenges facing implementation of the Kiswahili curriculum in secondary schools was inadequate teaching and learning resources among others. This study recommended that the parents should supplement materials for the learners apart from the course books and text books. It was further recommended that planners need to plan on

different scenarios for each institution as regards resources, number of teachers and even climatic conditions. Choice and use of resources affect the teaching and learning process. The subject being taught determines the choice of the resources and material needed for effective learning process. The current study explore on problems of effective teaching and learning of chemistry in public senior secondary schools in Niger state educational zone.

Wachanga and Mwangi (2004) looked into Effects of the Cooperative Class Experiment teaching Method on Secondary School Students' Chemistry' Achievement in Kenya Kajiado North District. This study sought to examine how the co-operative class experiment (CCE) teaching methods affect students' achievement. The study found that CCE method facilitated students' chemistry learning more than regular methods. Gender did not affect achievement. Neither did school type significantly affect girls' achievement when CCE method was used but it significantly affected boys' achievement with boys in boys' schools attaining higher scores. Since CCE method benefited students irrespective of school type, education authorities should encourage chemistry teachers to use it and teacher educators to make it part of the teacher-training curriculum.

Wanjohi (2006) studied factors affecting teaching of mathematics in secondary schools in Kamwangi Division, Thika District. The researcher recommended the provision of text books and other aids to make the teaching of mathematics more effective. This study concentrated more on factors affecting teaching of Mathematics in secondary schools and not on factors or problems of effective teaching and learning of chemistry in public senior secondary schools in Minna Metropolis, Niger State.

Mwai (2007) carried out a study on factors that influences performance in English, in Kirinyaga District. On resources the study mainly looked at the library and class size. The study suggested that a properly stocked library will, in addition provide adequate reference books for teachers and

students. However this study did not look into other related resources necessary to influence performance of student. Neither did it reveal how the availability of other resources may affect students' achievement. Moreover the study was mainly targeting performance in English.

Karue (2008) examined factors affecting performance in Kenya Secondary Education in day secondary schools in Embu District. The researcher used stratified random sampling covering each division. Data was analyzed using descriptive statistics, multiple correlation and regression analysis. He observed that lack of reading and inadequate instructional materials, laboratory equipment and physical facilities are some of the factors that affect performance of students in day secondary schools. The study mainly is based on day secondary schools thus it is not fully inclusive as it does not consider the boarding schools. This being taken into consideration, it implies that most of the provincial schools were not catered for in this study as majority of the day schools are categorized as district school.

2.8 Conceptual Frame Work

The conceptual frame work in figure 2.1 shows the relationship between the independent variable and dependent variables. The independent variable include perception of students towards Chemistry, professional qualification of teachers, evaluation of Chemistry, teaching and learning methods used in teaching of Chemistry and the teaching and learning resources used in teaching of Chemistry. There are other variables that influence the effectiveness of Chemistry in public secondary schools. These include moderating variables that includes school environment and the extraneous variables that include the learners' life style, political interference and the learners self esteem.

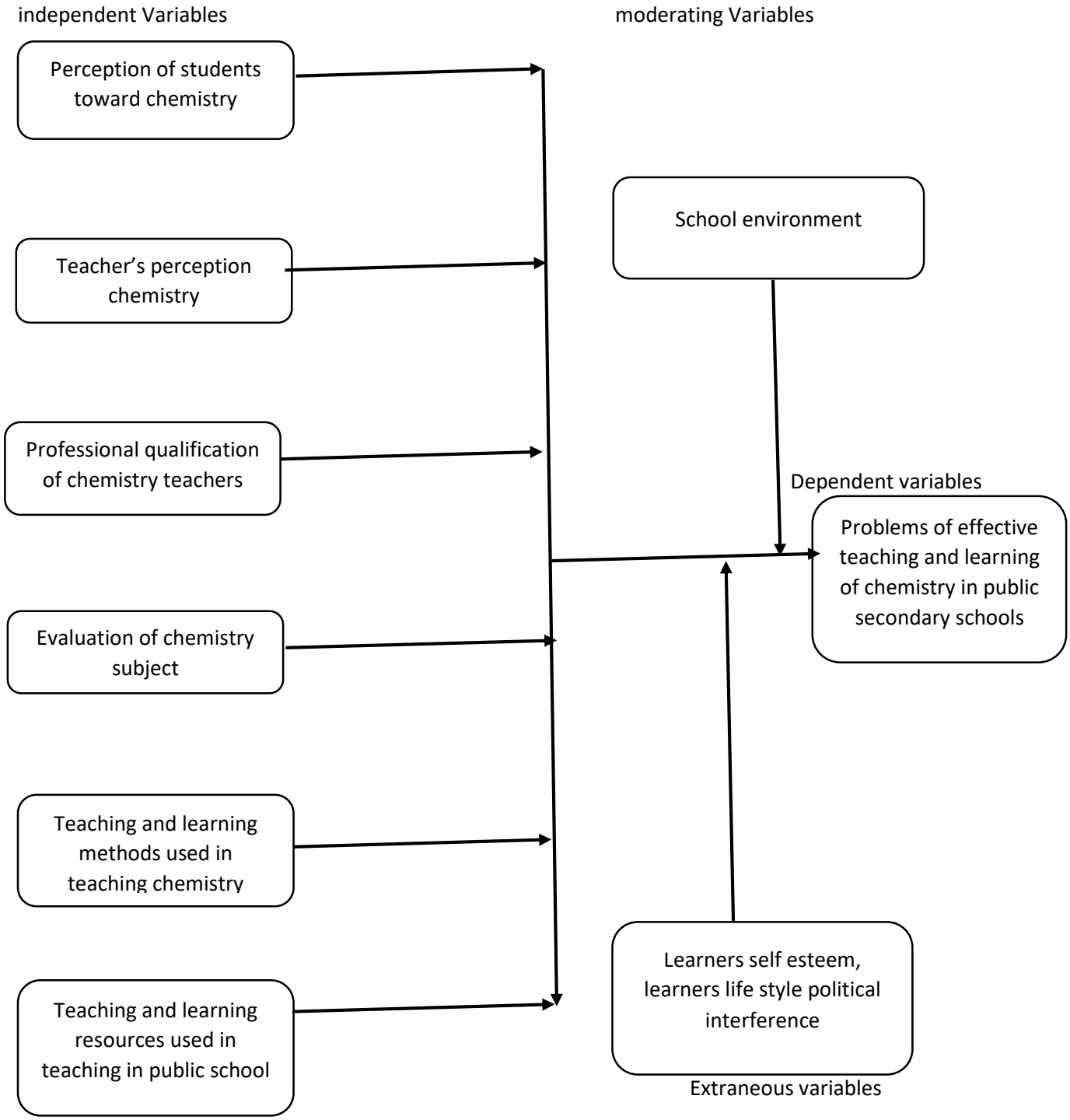

Figure 2.1: Conceptual frame work.

2.9 Summary

Eased on the literature review in this study, the researcher concluded that varied factors or problems influences effective teaching and learning of chemistry public senior secondary schools. The literature cited the need for effective utilization of teachers' qualification in the process of instruction so as to translate it into learning gains especially in the field of Chemistry.

The literature further revealed that there is need for efficient utilization of the Chemistry teachers for effective teaching and learning to achieve high standard of students' performance. Other factors such as students' perception, teaching and learning methods, teaching and learning resources contribute to effective learning and high standard of academic achievement thus enhancing students' performance in Chemistry. However, the following gaps were identified from the above literature review:

First a number of studies discussed above have been conducted out of context in relation to the study at hand. The researcher also established that there is no empirical research known to have been undertaken to study the above problems and their relationship to academic achievement in Chemistry with particular reference to Niger State Educational zone. Therefore to fill in the above gaps, the researcher collected sufficient data on problem of effective teaching and learning of Chemistry in public senior secondary schools in Niger State Educational zone. This problems are: perceptions of students towards Chemistry, perceptions of Chemistry teachers, professional qualifications of Chemistry teachers, teachers' evaluation, extent to which teaching and learning methods are used in teaching Chemistry subject and the extent to which the teaching and learning resources available are used for teaching Chemistry.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

The chapter outlines the research methodology that was used in the research. These included research design, target population, sample size and sampling procedure, validity of the instruments and the reliability of the instruments, data collection methods and data analysis procedures.

3.2 Research Design

The study was conducted using descriptive survey design to investigate factors that influence teachers' and students' perception of effective teaching and learning of Chemistry in public secondary Schools in Minna metropolis, Niger State. This design is used to assess attitudes and opinions about events, individuals or procedures (Gay 1992). In this regard it would enable the researcher to obtain opinions about factors that they think influence performance of students in Chemistry in Public Secondary schools in Minna metropolis, Niger state. Kerlinger (1973) recommended survey design as the best method to be used for collecting systematic factual data for decision making and efficient method of descriptive information regarding characteristics of population and the current practice and conditions.

There are twenty three public secondary schools in Minna metropolis. Minna metropolis is made up two Local Governments (Bosso and Chanchaga).

3.3 Target Population

Mugenda and Mugenda (2003), defines target population as that population to which the researcher wants to generalize the result of the study. The target population in this research study was public secondary schools in Minna metropolis, Chemistry teachers' and senior secondary students 3 (SSS 3). According to the information obtained from the Niger State ministry of education office, there

are a total of twenty three (23) public Secondary schools with a population of twenty six thousand nine hundred and seventy five (26,975) students, and fifty two (51) chemistry teachers. Besides, additional information obtained from the Minister of Education office in the District indicated that there are 3387 SSS 3 in the year 2019. Chemistry teachers were targeted as they were the major agents of curriculum implementation in their respective schools.

LGA	S/N	Name of Schools	Numbers of Chemistry teachers
Bosso	1	Bosso Secondary School Minna	2
-	2	Day Secondary School Chanchaga Minna B	2
-	3	Day Secondary School Maitumbi Minna	2
-	4	Day Secondary School Pyata Bosso	2
-	5	Federal government College Minna	5
-	6	Government Army Day Secondary School	2
-	7	Government Science College Chanchaga	2
-	8	Government Technical college minna	3
-	9	Maryam Babangida Girls Science college	3
-	10	Model science college tudun fulani	2
-	11	Niger state school for special Education minna	2
-	12	Sheikh Muhammad Sambo College of Art And Islamics studies Tudun Fulani Minna	
-	13	Sir Ahmadu Bello model Secondary School	3
Chanchaga	14	Ahmadu Bahago secondary School Minna	2
	15	Day secondary school Limawa Minna	2
-	16	Fr. O'connell science college Minna	2
-	17	Government day secondary school Bosso Road	2
-	18	Government Day science College Tunga	2
-	19	Government girls science college Bosso road	2
-	20	Government Girls secondary school Minna	2
-	21	Government Vocational centre	2

-	22	Women day college	2
-	23	Zarumai Mode school	2
Total			51

Table 3.1 Names of secondary schools in minna metropolis and the number of chemistry teacher

Source Niger State Ministry of Education, 2018-2019 ACS Report

3.4 Sample Size and Sampling Procedures

A sample is a smaller group obtained from the accessible population from which data is collected while sampling is the process of selecting a number of individual for a study in such a way that the individual selected represent the larger group from which they are selected, (Mugenda and Mugenda, 2003). The survey focused on eight out of twenty three secondary schools in Minna. This gave 37.5% of the total number of public secondary schools in the metropolis. According to Mugenda and Mugenda (2003), 20- 50 percent sample size of the target population is enough for descriptive survey. Public secondary schools were considered due to their similarities with respect to curriculum use that is the 6-3-3-4 system. They follow a similar syllabus developed by National Examination Council (NECO) and Weast Africa Examination Council (WAEC) and students sit for a common examination National Examination Council (NECO) and West Africa Secondary School Certificate Examination (WASSCE) at the end of SSS 3. This is all the same for private secondary schools.

Stratified random sampling technique was used to select the school type that is boys, girls and mixed (co-educational) schools. This involved dividing the population into number of groups or strata, where members of a group share a particular characteristic or characteristics (Robson 2002). The technique was chosen because it guaranteed desired representation thus increasing efficiency of the population estimate (Gay 1992). Schools were classified into mixed, boys and girls. Selection of sampled schools in each type was done using random sampling procedures. Simple

random sampling involved giving a number to every subject or member of the population, placing the number in a container and then picking any number at random, (Mugenda and Mugcnda, 2003). SSS 3 students both boys and girls were randomly selected from sampled schools in order to give each student an equal chance to participate in the study. Students from mixed schools were selected using stratified random techniques. Each school yielded approximately 40 respondents. Sixteen chemistry teachers were purposivcly sampled from the participating schools. In schools with only one teacher teaching chemistry, the teacher was automatically selected. The school with two or more chemistry teachers, two teachers was selected.

3.1 Table of Sample Size

Category	Sample size
Schools Chemistry teachers Students	8 16 320

3.5 Research Instruments

The research instruments used were questionnaires for chemistry teachers and students. Questionnaire is a technique of data collection in which the respondent completes it at his/her convenience. The questionnaires targeted 320 students which was an equivalent of 9.4% of the target population. The number of teachers included in the study was 16.

3.5.1 Questionnaire for Chemistry Teachers

The purpose of the questionnaire was to establish the perception of students toward chemistry, professional qualification and teaching and learning methods used in teaching Chemistry and teaching and learning resource used in teaching.

3.5.2 Chemistry Students' Questionnaire

The purpose of this questionnaire was to find out students' view about Chemistry and the evaluation of their teachers teaching methodologies/techniques and teaching/leaming resources. Their views would enable the researcher to find out the students attitude towards Chemistry and their teachers teaching techniques.

3.6 Validity and Reliability of the Research Instruments

3.6.1 Validity of the Research Instruments

Mugenda and Mugenda (2003) define validity as the accuracy and meaningfulness of inferences, which are based on research results. Validity is assessed depending on the purpose, population and environmental characteristics in which measurement takes place (Macmillan and Schumaker 2001). To ensure validity the researcher reviewed the instruments under the guidance of the supervisor and expert or professionals. Orodho (2005) recommends that questionnaires be piloted in schools outside the considered sample to establish whether the questions are measuring what they are intended, whether wording is clear, whether the questions are ambiguous and whether the questions provoke response. The research instruments were pretested with a selected pilot sample identical to the actual sample to be used. The results collected from pilot study would indicate whether the data collection instruments are valid.

3.6.2 Reliability of the Research Instruments

Reliability is the measure of the degree to which research instrument yield consistence results or data after repeated trials (Mugenda and Mugenda 2003). That is how consistent the score are for each individual from one administration of an instrument to another item to another. In this research study the pilot data was collected through physical contact, which would familiarize the researcher with problems likely to be encountered in the field during the main study.

After the pilot study, data was gathered and analyzed. The researcher then used the internal consistency method to test reliability.

However reliability in this research was influenced by random error. As random error increases, reliability decreases. Random error is the deviation from a true measurement due to factors that were effectively addressed by the researcher. This errors might arise from inaccurate coding, ambiguous instructions to the subjects, interviewer's fatigue and bias. Consequently, the researcher in the designing and administering of the instrument took care of these errors.

All the items in the instruments were related to the research topic. The reliability of the instruments was reflected on the items that were structured in simple English language, which the respondents may found easy to understand and internalize.

3.7 Data Collection Procedures

The researcher sort permission from the authority to conduct the research from the Ministry of Education, and the school heads to inform them on the proposed study. The researcher then set aside a week to visit the schools' sampled for research. The researcher administered questionnaires to the sampled students and subject teachers. The data that was collected from the study formed a basis for the research report.

3.8 Data Analysis Techniques

Quantitative analysis was used in the study. To allow for quantitative analysis, data was first to be converted into numerical codes representing measurements of variables in percentages and mean. Regression analysis was also used to come up with the model expressing the relationship between the dependent variable (Chemistry performance) and predictor variables (perception of students toward chemistry, teacher's perception of chemistry, professional qualification of chemistry teachers, evaluation of chemistry subject, teaching and learning methods used in teaching

chemistry and teaching and learning resources used in teaching). Predictors variables are rated on likert scale of I to 5, a mean value of the statements relating to each predictor variable were computed using Statistical Package for Social Science version 20.0 (SPSS)

3.9 Operationalization of the Variables

The operationalization framework in table 3.2 indicates how objectives were manifested m the study. In addition, it includes measurements of data collected and analyzed.

Table 3.2 Operationalization of variables

Objectives	Variable(s)	Indicator(s)	Measurement(s)	Scale	Data collection method	Data analysis
To establish students perception in public secondary school Minna metropolis	Independent variable Perception of students towards chemistry	Choice of chemistry	Number of students who like or dislike chemistry	Nominal	Questionnaire	Descriptive and inferential statistic
To investigate teacher's perception of chemistry in public secondary schools in Minna metropolis	Independent variable Teacher's perception of chemistry	a. Seminar attendance b. Further training i.e level of professional training	Frequency of attendance a. Once b. Twice c. Thrice	Nominal and ordinal	Questionnaire	Descriptive and inferential statistic
To investigate professional	Independent variable	• Academic qualif	• Master in Education	Ordinal	Questionnaire	Descriptive and inferential

qualification of chemistry teachers in public schools in Minna metropolis	Professional qualification of chemistry teachers	ication	• Bachelor in Education • Diploma in Education			
To investigate evaluative of chemistry in public secondary schools in Minna metropolis	Independent variable Evaluation of chemistry	• Frequency of evaluating students	Occurrence with a term a. Monthly b. Twice c. Once	Nominal and ratio	Questionnaire	Descriptive and inferential
To establish the teaching and learning methods used in teaching chemistry in public secondary schools	Independent variable Teaching and learning methods used in teaching chemistry	• Teaching technique	a. Lecture method b. Self directed of books c. Drill and practice d. Class demonstration e. Home work/asssignment f. Discussion group g. Practical/class experiment h. Projects	Ordinal	Questionnaire and class observation	Descriptive and inferential statistics
To establish the adequacy of teaching and learning resources	Independent variable Adequacy of teaching and learning resources needed in	• Teaching and learning resources	• Student/text book ration • Laboratory • Apparatus/ reagent • Charts	Ordinal	Questionnaire and class observation schedule	Descriptive and inferential statistic

needed in teaching chemistry in public secondary school in minna metropolis	teaching chemistry					
To investigate the factors that influence performance of chemistry in public secondary schools	Dependent variable Performance of chemistry	Student performance in chemistry	Grade scored/mean score	ordinal	Questionnaire	Descriptive and inferential

3.10 Summary

This chapter dwells on the research methodology of the study and covers research design used, target population, sampling technique applied, methods of data collection, research validity and reliability, operational definition of variables and lastly looks at data analysis procedure.

CHAPTER FOUR

4.0 DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents the results of analysis of the data collected from 8 public Senior Secondary schools in Minna metropolis. The chapter is divided into seven sections. The instruments' return rate is presented in section 4.2, Section 4.3 gives a summary of the respondents' findings on demographic data, while section 4.4 to 4.10 presents findings on perception of students towards Chemistry subject, professional qualification of Chemistry teachers, perception of Chemistry teachers, evaluation of Chemistry- subject, teaching and learning methods used in teaching of Chemistry, teaching and learning resources needed in teaching Chemistry subject and the summary.

4.2 Instruments' Return Rate

The sample population included, 16 Chemistry teachers and 320 students. The questionnaires were administered Chemistry teachers and students, of these numbers, 10 responses from subject teachers (62.5%) and 320 responses from the students were received (100%) which the researcher considered adequate for analysis.

4.3 Demographic Data

The demographic data considered in this study for the respondents included category of schools, gender, and age distribution of Chemistry teachers.

4.3.1 Distribution of the respondents by category of schools Table 4.1 below presents data on distribution of respondent by category of schools. This data was obtained from teachers responses.

Table 4.1 Distribution of chemistry teachers by type of schools (N=10)

School category	Frequency	Percentage
Boys day	1	10.0
Girls day	1	10.0
Girls boarding	1	10.0
Mixed day	7	70.0
Total	10	100

The findings presented in table 4.1 show that most of the chemistry teachers was from mixed day schools. The distribution of Chemistry teachers was as follows: 10.0% each for boys day, girls day and girls boarding and 70.0% mixed day schools. The above information portrayed that 20% of public secondary schools are girls and 10.0% are boys making a total of 30.0%, while 70.0% of secondary schools are mixed schools.

4.3.2 Distribution of the Respondents by Gender

The respondents were asked to state their gender: the findings are as shown in table 4.2 below.

Table 4.2 Distribution of Respondents by Gender

Categories	Gender	Frequency	Percentage
Chemistry teachers N=10	Male Female	8 2	80 20
Total		10	100
Students N=320	Male Female	140 180	43.75 56.25
Total		320	100

Table 4.2 shows the distribution of respondents by gender. From the respodents the distribution of male and female teachers was 80% and 20% respectively, while that of male and female students was 43.75% and 56.25% percent respectively.

4.3.3 Age distribution of Chemistry teacher

Chemistry teachers in public secondary schools were asked to indicate their age brackets in one of the items in the questionnaire.

The table 4.3 presents data on distribution of the respondents by age.

Table 4.3 Age distribution of Chemistry teachers

Age	Frequency	Percentage
Less than 30 years	3	30
31 to40 years	5	50
41 to 50 years	2	20
Total	10	100

The findings presented in table 4.3 show that. 30% of the chemistry teachers were less than 30 years of age, 50% were of age 31 to 40 years and the rest 20% were 41 to 50 years of age.

Answers to Research Questions

4.4 What are the Perceptions of Students Towards Chemistry?

This section deals with findings which tend to establish students attitudes towards Chemistry in Public Secondary Schools in Minna Metropolis, Niger State.

4.4.1 Students who enjoy learning chemistry

The student respondents were asked to state whether they enjoy learning of Chemistry subject or not. The information from the analysis is presented on table 4.4

Table 4.4 Students who Enjoy Learning Chemistry

Response	Opinion	Frequency	Percentage
Do you enjoy chemistry?	Yes No	301 19	94.1 5.9
Total		320	100

When the students were asked to state whether or not they enjoyed chemistry 94.1% of the students said they enjoyed learning chemistry while only 5.9% did not enjoy chemistry.

4.4.2 Rating the ability to pass WAEC/NECO chemistry

The student respondents were asked to state the level of confidence in passing of chemistry subject. The findings from the analysis is presented in the table 4.5

Table 4.5: How do you rate your ability' to pass WAEC/NECO chemistry

Opinion	Frequency	Percentage
Very confident	205	64.1
Confident	101	31.6
Not confident	14	4.3
Total	320	100

As indicated in the table 4.5, 64.1% of the students were very confident that they would pass WAEC/NECO chemistry exam, 31.6% were confident of passing while only 4.3% were not confident of passing.

4.4.3 Pre - Mock Chemistry' performance of students

The table 4.6 presents data on the distribution of the respondents by pre- mock chemistry examination in Minna metropolis in the year 2019.

Table 4.6 Pre - Mock Chemistry performance of students

Categories	Grade	Frequency	Percentage
Students	A1	117	36.6
N=320	B2 to B3	72	22.5
	C4 to C6	78	24.4
	D7	21	6.6

	E8	32	10.0
Total		320	100

The results presented in table 4.6 indicates that 36.6% of the students scored between grade A, 22.5% scored between B2 and B3, 24.4% scored between C4 and C6, 6.6% scored D7 and 10.0% scored E8 in 2019 Pre - Mock examination.

4.4.4 Career aspiration of students

The table 4.7 presents data on the distribution of the respondents by career aspiration of students in Minna metropolis.

Table 4.7 Distribution of students respondents by career aspiration (N=320)

Career	Frequency	Percentage
Teacher	8	2.5
Lawyer	44	13.8
Doctor	112	35.0
Nursing	101	31.6
Engineering	35	10.9
Accounting	2	0.6
Secretary	6	1.9
Others	12	3.8
Total	320	100

These students were asked to state their most preferred careers after secondary school. As indicated in table 4.7. 2.5% of the students wanted to be teachers, followed by lawyers (13.8%), doctors (35.5%), engineering (10.9%) and secretaries (1.9%%) respectively. The least career aspired by

student is accounting at 0.6%. The percentage of students aspiring to be nurses was 31.6% and others (3.8%).

4.5 What is the Professional Qualification of Chemistry Teachers?

The study also sought to determine the professional qualification of Chemistry teachers. This was based on highest academic and highest professional qualification of chemistry teachers.

4.5.1 Highest academic qualification of Chemistry teachers

The chemistry teachers were asked to indicate their highest level of academic qualifications. The response obtained is indicated in table 4.8.

Table 4.8 Highest academic qualification of Chemistry teachers

Level of Education	Frequency	Percentage
Masters' in Education	1	10
Bachelors' in Education	8	80
NCE	1	10
Total	10	100

The respondents were asked to state their highest level of qualification attained. T he results are given in table 4.8 showing that 10.0% of the respondents had Masters' in Education, 80.0% were Bachelor's Education degree and NCE holders 10%.

4.5.2 Highest Professional Qualification of Chemistry Teachers

The respondents were asked to indicate their highest level of professional qualification. The data obtained was same as highest academic qualification.

4.6 What are the Perceptions of Chemistry teachers?

To establish the perception of Chemistry teachers in Public Secondary School in Minna Metropolis, the study sought to determine work experience of Chemistry teachers, frequency of seminar attendance in the last five years and rating of the seminars attended.

4.6.1 Working experience of Chemistry teachers

The table 4.9 presents data on the distribution of the respondents by work experience.

Table 4.9 Working experience of Chemistry teachers

Years of teaching	Frequency	Percentage
1 to 5 years	1	10
6 to 10 years	5	50
11 to 15 years	3	30
16 to 20 years	1	10
Total	10	100

The results presented in table 4.9 indicates that only 10% of the chemistry teachers had served for a period of 1 to 5 years, 50% had served for 6 to 10 years, 30% had work experience of 11 t0 15 years and and another 10% for 16 to 20 years.

4.6.2 Frequency of Seminars Attended

Teacher respondents were requested in one of the items to indicate the frequencies of attended seminars in the last five years.

The finding of the study is presented in the table4.10

Table 4.10: Frequency of seminars attended (N=10)

No. of seminars attended	Frequency	Percentage
Four times	1	10
Thrice	1	10
Twice	2	20
Never	6	60
	10	100

The findings in table 4.10 indicates how many times teachers had attended a seminar, workshop or in service course for teaching of chemistry. More specific 10% of teachers had attended the seminars four times, 10% had attended three times, and 20% had attended two times while the rest (60%) had never attended a seminar.

4.6.3 Rating of Seminars

Chemistry teachers were asked to rate how useful attending seminars on Chemistry is to their subject areas.

Table 4.11 represents this information.

Table 4.11: Rating of seminars

Rating of seminar	Frequency	Percentage
Very useful Useful	6 4	60 40
Total	10	100

When asked the usefulness of seminar, 60% of the teachers rated seminars to be very useful and 40% rated it to be useful.

4.7 How is the Evaluation of Chemistry subject?

The study sought to establish evaluation technique commonly used to enhance students performance in Chemistry by Chemistry teachers, table 4.12 present findings on techniques used to evaluate students' progress during chemistry lesson.

Table 4.12 Techniques used to enhance performance of students in chemistry using five Likert Scale

Statements	N	Mean
The students do exercises from the class textbooks during each lesson	10	2.1
I give the same kind of work to all students in the class	10	3.2

I mark, supervise all work done by all the students in the class	10	3.6
I give extra work to weaker students	10	2.0
I provide feedback to the students	10	2.4

The findings in table 4.12, indicates that teachers; The students do exercises from the class textbooks during each lesson (mean of 2.1,) I give the same kind of work to all students in the class (mean of 3.2), I mark and supervise work done by all the students (mean of 3.6), i give extra work to weaker students (mean of 2.0), I provide feedback to the students (mean of 2.4}, as techniques of enhancing performance in chemistry.

4.8 To what extent are the Teaching and Learning Methods Used in Teaching of Chemistry?

To determine teaching and learning methods commonly used in teaching of Chemistry; students and teachers respondents methods were used in public secondary schools in Minna metropolis Niger State.

4.8.1 Students' Response

Student respondents were asked in one of the items to indicate the teaching method commonly used in teaching of Chemistry. The finding of the study is presented in table 4.13.

Table 4.13 Frequency of use of teaching methods using five Likert Scale

Teaching method	N	Mean
Lecture method	320	4.0
Self directed	320	3.8
learning/textbooks	320	3.8

Drill and practices	320	3.4
Class demonstration	320	3.5
Home work/ assignment	320	3.4
Discussion groups	320	3.8
Practical work/ Class experiments		

This section covers findings from the specific questions posed to the student respondents to determine methods used by chemistry teachers in teaching of chemistry. The findings have been presented in tables, and mean. The findings in table 4.15, indicates that, learners agreed that lecture method (mean of 4.0), self directed learning/textbooks (mean of 3.8), class demonstration (mean of 3.8), drill and practice (mean of 3.4),home work and assignment (mean of 3.5), discussion groups (mean of 3.4) practical work/class experiment (mean of 3.8).

4.8.2 Teachers Response

The study sought to establish the teaching methods commonly used to present Chemistry lesson from Chemistry teachers. The finding is presented in table 4.14

Table 4.14 Frequency of use of teaching methods used to present chemistry lesson

Teaching methods	Frequency	Percentage	Cumulative percentage
Lecture method	3	17.6	17.6
Self directed/ text book learning	2	11.8	29.4
Class demonstration	1	5.9	35.3

Home work and assignment Practical work	3 8	17.6 47.1	52.9 100
Total	17	100	

The findings in table 4.14, indicates that, most teachers (52.9%) agreed that practical work was used very often/often as means of teaching chemistry. On the other hand lecture method and home work and assignment was moderately used (17.6%), self directed/text book learning (11.8) and the least used is class demonstration (5.9%).

4.9 To what extent are the Teaching and learning resources adequate for teaching of Chemistry?

The study sought the opinion of the teachers on the availability of Chemistry laboratory in their respective schools, the level at which the Chemistry laboratory is equipped and whether the schools have trained laboratory technicians. Table 4.15 presents findings on availability of Chemistry laboratory in public secondary schools in Minna metropolis Niger State.

Table 4.15 Frequency of availability of Chemistry laboratory

Respond on availability of laboratory	Opinion	Frequency	Percentage
Chemistry laboratory	Yes No	8 0	100 0

The finding in table 4.15 reveals that 100% of the Chemistry teachers agreed that there were operational Chemistry laboratory in public secondary schools in Minna metropolis Niger State.

Table 4.16 presents findings on the level of equipment of the apparatus and Chemical reagents in Chemistry laboratory

Table 4.16 Frequency of level of equipment of apparatus and reagents in Chemistry laboratory

Response level of laboratory equipment	Opinion	Frequency	Percentage
N=10	Enough	3	30
	Average	4	40
	Poor	3	30

Table 4.16 reveals that 30% of the Chemistry laboratories were well equipped, 40 % were moderately equipped and 30% were poorly equipped.

The Chemistry teacher respondents were asked to state whether the public secondary schools had trained laboratory technicians or not. The findings are presented in the table below

Table 17. Frequency of trained laboratory technicians

Response of trained laboratory technicians	Opinion	Frequency	Percentage
N=10	Yes	4	40
	No	6	60

The findings from table 4.17 reveal that 40% public secondary schools had trained laboratory technicians while only 60% had laboratory technicians who were not trained.

4.10 Summary

This chapter concentrates on data analysis, presentation and interpretations of the findings. The analyses is build around the objectives of the study and the independent variables which are; to establish the attitude of students toward Chemistry, to investigate the professional qualification of Chemistry teachers, to investigate perception of teachers teaching Chemistry, to investigate

evaluation of Chemistry, establish the teaching and learning methods used and to establish the adequacy of teaching and learning resource needed in teaching Chemistry.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this section we will discuss the main findings, draw conclusions, make recommendations and suggest areas of further research.

5.1 Summary

The objectives of this study were to establish the right perception of students in public secondary schools towards Chemistry in Minna metropolis, Niger State, to investigate the professional qualification of Chemistry teachers in public secondary schools, to investigate perception of teachers teaching Chemistry in public secondary schools, to investigate evaluation of Chemistry in public secondary schools and to establish the teaching and learning methods used in teaching Chemistry in Public secondary schools in this geographical area.

5.1.1 Attitude of Student in Public Secondary Schools Toward Chemistry

The study found that majority of the students enjoyed chemistry that is 94.1% of the students said they enjoyed learning chemistry. This is also supported by career choice amongst the student which requires Chemistry knowledge (doctors at 35%, engineers at 10.9% and nursing at 31.6%).

On rating the ability to pass chemistry majority of the students (31.6%) were confident that they would pass WAEC/NECO chemistry examination, 64.1% were very confident of passing while only 4.3% were not confident of passing.

5.1.2 Professional qualification of Chemistry teachers

From the findings, 10 percent of the respondents had masters' degree, 80 percent had first degree (bachelors') and 10percent had NCE in education qualifications at the same time 10 percent of the respondents had masters' degree, 80 percent had first degree while 10 percent had NCE

professional qualifications. This shows that chemistry teachers had enough experience to teach the students.

5.1.3 Perception of Chemistry Teachers

The study on perception of chemistry teachers was based on the number of occasions Chemistry teachers have attended related workshops or seminars. The findings indicated that only 10 percent have attended at two seminars in the last five years of their teaching career. This is quite a low percentage when compared to 10 percent who have attended two times and 10 percent of teachers have attended to seminars three times.60 percent of the teachers have not attended seminars in the last five years. This shows that either the teachers have got a negative attitude towards attendance of seminars or they may not be getting enough opportunities from their schools to enable them attend the seminars.

5.1.4 Evaluation of Chemistry

The findings indicated that, teachers often/sometimes; mark and supervise work to all students in class (mean of 3.6), give the same kind of work to all students in class (mean of 3.2), as techniques of enhancing performance in chemistry.

5.1.5 Teaching and Learning Methods

The study identified lecture method, self directed leaming/text books, class demonstration, homework drill and practices, assignment method, discussion method and practical work/ class experiment as methods used in teaching of chemistry in public secondary schools in Minna metropolis Niger State. From the methods identified, the most often used means of teaching chemistry were lecture method (mean of 4.0), self directed learning/text books (mean of 3.8), class demonstration (mean of 3.8), drill and practices (mean of 3.4), home work/ assignment

(mean of 3.5), discussion group (mean of 3.4), and practical work/ class experiment (mean of 3.8).

5.1.6 Teaching and Learning Resources

Majority of the teachers agreed that there schools had well equipped Chemistry laboratory with enough apparatus and reagent required for the experiments (30% said enough and 40% said they have average). It was noted that the schools do not have well trained laboratory technician trained in laboratory management such as arranging of apparatus, setting up and operating laboratory equipment in preparation of specimen examination, maintaining simple laboratory records and inventory for supplies and reagents, carrying out analytical laboratory support activities, conducting non routine laboratory tests and procedures under the direction of the Chemistry teachers and maintaining of the records.

The study used regression analysis to find the association between perception of students towards chemistry, Professional qualification of Chemistry teachers, Perception of Chemistry teachers, Evaluation of Chemistry subject, Teaching and learning methods used in teaching Chemistry, Teaching and learning resources used in teaching chemistry in public secondary schools.

Forecasting model was developed and tested for accuracy in obtaining predictions. The findings of the study indicated that, the model was significant. This is demonstrated in the part where R^2 for association between each of the independent variables and students chemistry performance was 86.1

5.2 Discussion of the findings

The government of Nigeria has focused on improvement of education for the relevance of the nation by equipping the laboratories. Further it was noted that secondary education and training is one of the key factors for increased economic growth. Emavon (1985) observed that Chemistry can exert a dominant if not a decisive influence on the life of individuals as well as on the development of a nation.

Choice of careers especially those which are science oriented are all determined by students' performance in Chemistry subject. Hence the need for students who intend to pursue career courses in science to do well in the subject.

In this study it was found that majority of students enjoy learning Chemistry, though their performance in Chemistry is wanting. Okebukola (1987) identified perception as one of the factor affecting student performance in Chemistry.

From the study Chemistry teachers (100%) are qualified, though this does not translate into better performance in Chemistry by the students in Minna metropolis Niger State. Ongubiyi (2004) noted that though majority of the teachers are professionally trained, they do the same things the same way all along hence there is need for the teachers to attend training workshops in areas of their specialties. The study concluded that teachers (60%) in Minna metropolis Niger state rate seminars and workshops as very useful. This point is supported by the fact that only 20% of the Chemistry teachers have attended seminars for at least three four times within a period of five years. This point may be a contributory factor to the poor performance of Chemistry within the District.

In this study it was also observed that the most common teaching learning methodology employed in public secondary schools in Minna metropolis Niger State is the lecture method. According to Mills (1991) lecture method is less student participation process. It is therefore more prudent to employ other teaching methods such as practical approach, class demonstration and field excursions which are more student involving for better academic results to be achieved.

Despite most of the schools in Minna metropolis being well equipped in terms of Chemistry laboratory, apparatus and reagents, the performance of Chemistry subject by students in public secondary schools is far below average. The poor performance may be as a result of teaching and

learning methodology i.e. lecturing method which is the commonly used. This may imply that the laboratory resources are not fully utilized in teaching and learning of Chemistry. Okebukola (1987) identified that participation in laboratory activities is one of the factors affecting student performance in Chemistry. The study discovered the laboratory are not well trained. In WAEC/ NECO practical aspect take 50% mark while theory and objective cover 50% as well.

5.3 Conclusion of the study

From the findings of the study, it can be concluded that the teachers' and students' perception of problems associated with teaching and learning of chemistry in public senior secondary schools in Minna metropolis Niger State are;

1. Low perception of students towards chemistry due to lack of well trained laboratory technician.
2. Professional qualification of Chemistry teachers are not adequate to changing time.
3. Perception of Chemistry teachers, they feel its difficult and boring for lack of seminars and workshops
4. Evaluation of Chemistry subject, lecture method is a poor mode of teaching in secondary schools
5. 'Teaching and learning methods used in teaching Chemistry.

Majority of the students seems to be very positive toward Chemistry, though there some of them their performance is far below average. After considering this aspect the researcher concluded that there may be other factors which have major influence on students Chemistry performance in Minna metropolis Niger State.

5.4 Recommendations

From research findings and conclusion made so far, the following recommendations are therefore made:

1. The findings indicated some positive attitude towards chemistry by students. There should therefore be need to for education stake holders to find out why students performance is not congruent to their attitude.
2. From the study majority of the Chemistry teacher are well qualified but there was need for most of them to attend workshops and in service training. This may enhance perception of the Chemistry teachers.
3. Chemistry teachers should organize symposium to sensitize students on the practical applications/career related to chemistry and carrying out continuous evaluation test. This would enhance understanding of chemistry subjects amongst students and enable them to compete adequately in choosing careers which are chemistry oriented.
4. Monitoring and evaluation will be necessary to track students Chemistry performance, give on going information on direction of change, pace of change teaching and learning resources needed in teaching of this important subject so as obtain appropriate results regarding our students in Minna metropolis Niger State.
5. The schools should strive to provide adequate resources. Where schools are limited in ways of finances improvisation should be encouraged where possible. This should be immediate intervention to improve on performance.

5.5 Suggestions for Further Research

This study focused on Teachers' and Students' perceptions of problems associated with effective teaching of chemistry in Minna metropolis Niger State. It is therefore suggested that similar study should be carried out in districts adjacent to Minna metropolis Niger State and the results be compared for generalization purposes. The results of the study also found out that respondents rating were low on teaching and learning resources used in teaching chemistry. Hence there is need

to carry out a study on the influence of the teaching and learning resources on the implementation of the curriculum for Chemistry in secondary schools in Minna Metropolis, Niger state.

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APPENDIX A

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

Dear Sir/Madam,

Instrument Validation Form

The bearer is a student of the above named University and Department. He/She is conducting research and you have been selected as one of those with requisite expertise to validate his/h instrument. Kindly grant him/her all necessary assistance to make the exercise a success.

Your competency and expertise was considered as factors that will serve to improve the quality o his/her research instrument. We therefore crave for your assistance in validating the instrument. Th completion of the form serves as evidence that the student actually validated the instrument.

Thanks for your anticipated assistance.

Dr (mrs) R. Ld Gimba 02 OCT 2019
Head of Department (Signature, Date & Official Stamp

Student's Surname: TAGABA Other Names: ZACHARIA

Registration Number: 2016/3/64468BE Programme:

Title of the Instrument: Questionnaire for Chemistry teachers and students

ATTESTATION SECTION

Summary of the Remark on the Instrument:

If all corrections are made the instrument are logical and appropriate.

I hereby attest that the above named student brought his instrument for validation

Name of Attester: Prof Adai S. Ibrahim.

Designation: Professor.

Name and Address of Institution: Fed. Univ. of Tech. Minna.

Phone No: +234 708 077 7785 E-mail: profasi'd@gmail.com

Signature, Date and Stamp

4/11/2019

Please Turn Over

Please comment on the following:

1. Appropriateness of the instrument for the purpose it's designed for: V. Good

2. Clarity and simplicity of the language used: Good

3. Suitability for the level of the targeted audience: Good

4. The extent in which the items cover the topic it meant to cover: V. Good.

5. The structuring of the Questionnaire: Fine

6. Others (grammatical errors, spelling errors and others): Standard Grammar Used.

7. General overview of the instrument: Good.

Suggestions for improving the quality of the instrument

1.

2.

3. Good for the purpose

4.

5.

Name of Validator: Adgi S. Ibrahim

Areas of Specialization: Instructional Leadership Sys. Higher

Name of Institution: FUT Minna Designation: Professor

Signature: [signature] Date: 4/11/2019

Thank You

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

Dear Sir/Madam,

Instrument Validation Form

The bearer is a student of the above named University and Department. He/She is conducting a research and you have been selected as one of those with requisite expertise to validate his/her instrument. Kindly grant him/her all necessary assistance to make the exercise a success.

Your competency and expertise was considered as factors that will serve to improve the quality of his/her research instrument. We therefore crave for your assistance in validating the instrument. The completion of the form serves as evidence that the student actually validated the instrument.

Thanks for your anticipated assistance.

Dr (Mrs) R. [illegible] 07 OCT 2019
Head of Department (Signature, Date & Official Stamp)

Student's Surname: TAGABA Other Names: ZACHARIA

Registration Number: 2016/3164468E Programme: CHEMISTRY EDUCATION

Title of the Instrument: Questionnaire for chemistry teachers and students.

ATTESTATION SECTION

Summary of the Remark on the Instrument: This instrument is well designed based on the subject matter content & the title.

I hereby attest that the above named student brought his instrument for validation

Name of Attester: DR. I. I. Kuta

Designation: S/L

Name and Address of Institution: FUT, Minna

Phone No: 08035837865 E-mail: —

Signature, Date and Stamp 7/10/19

Please Turn Over

Please comment on the following:

1. Appropriateness of the instrument for the purpose it's designed for: Adequate for the purpose for which it is designed
2. Clarity and simplicity of the language used: Clear, Simple and unambiguous
3. Suitability for the level of the targeted audience: Adequate for the subjects of the study
4. The extent in which the items cover the topic it meant to cover: Maximum coverage of the major constructs
5. The structuring of the Questionnaire: Good, based on the Research Questions
6. Others (grammatical errors, spelling errors and others): Very minimal
7. General overview of the instrument: The instrument is okay

Suggestions for improving the quality of the instrument

1. All necessary corrections pointed out should
2. be effected accordingly
3.
4.
5.

Name of Validator: DR. I. I. Kuta

Areas of Specialization: Edutech (BIO)

Name of Institution: FUT, Minna Designation: S/L

Signature: Amaile Date: 7/10/19

Thank You

APPENDIX B

QUESTIONNAIRE FOR CHEMISTRY TEACHERS

You are kindly requested to complete all the items in this questionnaire by either ticking *(√* or filling in the appropriate answer in the spaces provided. Your responses will be kept strictly and confidential. This is not a test. The responses given shall be used for research only.

SECTION I: General information

This section seeks information about you and your school. Kindly fill the space provided or tick (V) the box in front of the alternative response that relates to you in each of the following.

1. School type.....Class.....
2. Gender (a) Male ( ) (b) Female ( )
3. In which of the following age categories are you?

a. Less than 30 yrs ( )
b. 31 - 40 yrs ( )
c. 41-50 yrs ( )
d. Over 50 yrs ( )

4. What is your highest level of academic qualification?

a. Masters' degree ( )
b. Bachelors' degrees ( )
d. NCE ( )
e. Diploma ( )

5. What is your level of professional qualification?

a. Masters in Education degree ( )
b. Bachelors' in Education degree ( )
c. Diploma in Education ( )
d. Any other (specify)

6. For how long have you been teaching?

a. 1 - 5 yrs ( )
b. 6 - 10 yrs ( )
c. 11 - 15 yrs ( )
d. 16 - 20 yrs ( )
e. 21 - 25 yrs ( )
f. Over 30 yrs ( )

Do you enjoy teaching chemistry? Yes ( )No ( )

If yes give reasons for your answer

……
……..

If no give reason for your answer

……
……

8. What type is your school?
a. Boys only ( ) b. Girls only ( ) c. Mixed ( )
9. What is the category of your school?
a. Day ( ) b. Boarding ( ) c. Day and boarding ( )

SECTION (II): Teaching methodology

10. The following are some of the methods used by chemistry teachers in the teaching of Chemistry. Please indicate the method that you commonly use in the teaching of Chemistry.

i. Lecture method ( )
ii. Self-directed learning/ text books ( )
iii. Drill and practices **( )**
iv. Class demonstration **( )**
v. Homework assignment method ( )
vi. Discussion groups ( )
vii. Practical work/class experiments ( )
viii. Projects ( )
Any other (specify)

11. Of the methods you have ticked in question 1 above, indicate how often you use them.
Any other (specify) …….

SECTION (III): Evaluation of Chemistry
13. The following are different techniques used to evaluate students during the lesson which are likely to enhance performance in Chemistry. Indicate against each technique how frequent you use them:
Rating scale is as follows; 1 - Never 2 - Sometimes 3 - often 4 - Very often 5 – Always

Assessment technigues	Never	Sometimes	Often	Very often	Always
The students do exercises from the class textbooks during each lesson					
I give the same kind of work to all students in the class					
I mark, supervise all work done by all the students in the class					
I give extra work to weaker students					
I provide feedback to the students					

14. How often do you test your students after every topic?
I. Fortnight ( ) II. Monthly ( ) III. Twice a term ( ) IV. Once a term ( )

SECTION (IV): Teaching/learning resources

15. What is the ratio of Chemistry text - books per student? .....
16. Do you have a chemistry laboratory in your school?
Yes ( ) No ( )
17. In terms of apparatus and reagents required for experiments, how is the laboratory equipped?
Enough ( ) Average ( ) poorly ( )
18. Do you have a laboratory technician? Yes ( ) No ( )
19. If yes is the laboratory technician trained in laboratory management?
……

SECTION (V): Attitude of students towards Chemistry

20. How do students respond to chemistry in your school?
I) Positive ( ) II) Negative ( )
21. If negative what attempt do you make to encourage them?
……
22. How do you rate the attitude of your students toward Chemistry?
Very negative ( ) Negative ( ) Positive ( ) Very positive ( )
23. Suggest possible measures which would be taken to improve the performance of Chemistry in your school?
……
….....

SECTION (VI): Teachers development/perceptive in teaching Chemistry

24. How many times in the last 5 years have you attended a seminar, workshop or an in service course for teaching of Chemistry?
Once ( ) Twice ( ) Thrice ( ) Four times ( ) Not at all ( ) other (specify)
……..
25. How do you rate the course(s)? Very useful ( ) Useful ( ) Not useful ( )
26. What are the challenges you face as a chemistry teacher?
……
27. Suggest some possible solutions to these challenges?
……
…….

APPENDIX C

QUESTIONNAIRE FOR STUDENTS

The questionnaire seeks information about factors that influence performance of Chemistry. You are kindly requested to complete all the items in this questionnaire by either ticking (√) or filling in the appropriate answer in the spaces provided. Your responses will be kept strictly confidential. This is not a test. The responses given shall be used for research only.

Name of the school.....

1. Gender: Male ( ) Female ( ) Tick appropriately
2. What grade did you score in your exam? .....
3. Which grade did you score in your Pre-mock exams? .....
4. What is your career aspiration? Teacher ( ) Lawyer ( ) Doctor ( ) Nursing ( ) Engineering ( ) Accounting ( ) Secretary ( ) others (specify).....
5. Do you enjoy learning Chemistry? Yes ( ) No ( )

i. If yes give reasons as how you enjoy learning chemistry?

ii. If no give reason as how you do not enjoy learning Chemistry?

6. Chemistry is a hard subject? Agree ( ) Disagree ( )
7. How do you rate your ability to pass WAEC/NECO Chemistry?

i. Very confident ( ) ii. Confident ( ) iii. Not confident ( )

8. How often are you assigned homework in Chemistry by your teachers?

a) Once a week ( ) b) 2 - 3 times per week ( ) c) 4 - 5 times per week d) More than7 times per week ( ) e) Not at all ( )

(Tick appropriately)

9. Does your Chemistry teacher gives you any extra coaching in Chemistry?

Yes ( ) No ( ).

If yes how often? a) Very often ( )b) often ( ) c) Not very often ( )

10. How often are you tested in Chemistry?

Fortnight ( ) Monthly ( ) Twice a term ( ) Once a term ( )

11. Rank the following instructional techniques from 1 to 5 in the order of merit that you would prefer your chemistry teacher to use when teaching Chemistry. Note that number 1 represent method most commonly used and number 5 represent the method least used.

Teaching method	1	2	3	4	5
Lecture method					
Self directed/learning method					
Class demonstration					
Drill and practice					
Home work/assignment					
Discussion groups					
Practical work/class experiment					

12. Do you have personal text books for Chemistry? Yes ( ) No ( )

i) If yes how many? .....

ii) If no why? .....

13. Apart from class text books, are there any other reference books in Chemistry either in the library or supplied to you? Yes ( ) No ( )

14. Suggest other ways as how the teaching of Chemistry can be improved on?

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