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DEPARMENT OF CHEMISTRY

FACTORS AFFECTING 10TH GRADE STUDENT ACEDAMIC PREFORMANCE IN CHEMISTRY: THE CASE OF FINCHA PUBLIC SECONDARY SCHOOL IN ABAY CHOMEN DISTRICT, HORO GUDURU WOLLEGA ZONE, ETHIOPIA.

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Factors Affecting 10th Grade Student Academic Performance in Chemistry: The Case of Fincha Public Secondary School in Abay Chomen District, Horo Guduru Wollega Zone, Ethiopia

A Thesis Submitted to College of Natural and Computational Science Department of Chemistryin Partial Fulfillment of the Requirement for Degree of Masters of Sciencein Chemistry

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Wolkite, Ethiopia

September 2024

DEDICATION

I dedicate this thesis manuscript to my families for their continuous contribution throughout my life.

STATEMENT OF THE AUTHOR

First, I declare that this thesis is my solely work and that all sources of materials used for this thesis have been duly acknowledged. This thesis has been submitted in partial fulfillment of the requirements for an advanced MSc degree at the Walkite University and is deposited at the University Library to be available to borrowers under rules of the library. I solemnly declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma, or certificate.

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APPROVAL SHEET-1

This is to certify that this thesis entitled Factors Affecting 10th Grade Student Academic Performance in Chemistry: The Case of Fincha Public Secondary School in Abay Chomen District, Horo Guduru Wollega Zone, Ethiopia submitted in partial fulfillment of the requirements for the degree of Master of Science with specialization of the requirements for the Chemistry, College of Natural and Computational Science, is a record of original research carried out by Urgessa Olana, under my supervision, and no part of the thesis has been submitted for any other degree or diploma.

The assistance and help received during the course of this investigation have been duly acknowledged. Therefore, I recommend that it be accepted as fulfilling the thesis requirements.

Tesfalem Fikresillasie (MSc) _____ _____

Name of Major Advisor Signature Date

APPROVAL SHEET FOR SUBMITTING RESEARCH

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We, the undersigned, members of the Board of Examiners of the final open defense by Urgessa Olana have read and evaluated his thesis entitled "**Factors Affecting 10th Grade Student Academic Performance in Chemistry: The Case of Fincha Public Secondary School in Abay Chomen District, Horo Guduru Wollega Zone, Ethiopia**" and examined the candidate. This is therefore, to certify that the thesis has been accepted in partial fulfillment for the degree of Master of Science in Chemistry.

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LISTS OF ABBREVATIONS

ACDEB	Abay Chomen District Education Bureau
CCE	Co-operative Class Experiment
COS	Class Observation Schedule
CPE	Certificate of Primary Education
GCE	General Certificate of Education
IGCE	International General Certificate of Secondary Education
INSET	In-service Education and Training
JICA	Japanese International Cooperation Agency
KCSE	Kenya Certificate of Secondary Education
KIE	Kenya Institute of Education
LGA	Local Government Areas
MODEST	Ministry of Education Science and Technology
MOE	Ministry of Education
MOHERD	Ministry of Higher Education Research and Development
NGO	Non-Government organization
SBTD	School-based Teacher Development
SMASSE	Strengthening of Mathematics and Sciences in Secondary Education

ABSTRACT

Chemistry has been identified as a very important school subject and its importance in scientific and technological development of any nation within the context of science education. This study aims at investigating factors that influence performance of Chemistry in Fincha secondary schools in Abay Chomen District of Oromia regional state, Ethiopia. The data was collected using questionnaires to both students and teachers; class observation schedule and interview to principal. Descriptive and inferential statistics was used to analyze the collected data. The descriptive survey was employed to identify students attitude, assess the professional qualification of teachers; and analyze the teaching and learning methods used and learning resource needed in teaching the subject. The inferential statistics was used to support these descriptive survey of the study. The finding of the result revealed that, attitude of students towards chemistry; professional qualification of Chemistry teachers; teaching and learning methods used in teaching Chemistry subject and teaching and learning resources needed in teaching of Chemistry subject were the factors identified that hinders the students' performance toward the subject. Moreover, the result indicate that, eventhough majority of the students were very positive toward learning Chemistry subject, their performance is far below average and they seem to score low grade in Chemistry subject. Therefore, chemistry teachers should use student centered method of teaching, the school should strive to provide adequate resources to increase students' performance in chemistry subject in the study area and teachers should organize symposium to sensitize students on the practical applications related to the subject and carrying out continuous evaluation test were recommended.

Keywords: Factors Affecting; Academic Performance; Chemistry; Fincha Public School

CHAPTER ONE: INTRODUCTION

1.1 Background information to the Study

Chemistry has been identified as a very important school subject within the context of science education and its importance in scientific and technological development of any nation has been widely reported (Adesoji and Olantubosun, 2008). They further argued that the effective teaching of science can further lead to the attainment of Scientific and technological greatness. Chemistry offers the opportunity of being studies as discipline and as a central component of other tertiary institution degree programmers. Chemistry is also a highly conceptual discipline, requiring an ability to deal with phenomena at both a macroscopic and microscopic level, and to connect with symbolic representations used at each of these levels. Aregawi & Meressa (2017) asserted that chemistry students may experience difficulties with their learning if the symbolic language is taken for granted, and there is a risk that connections between the material world and theoretical constructs may be misunderstood.

The Republic of Kenya (1988) report focused on improving education, financing, quality and relevance for the nation. From the recommendation the government produced session paper No. 6 on education training which led to policy of cost sharing between government, parents and communities. According to session paper no. I of 2005, Education is an investment in human capital and a key determinant of economic growth. It further states that sustainable development is only possible if there is a critical mass of skilled labor. World Bank working paper No. 101 (2007), further observed that Secondary education and training will be one of the key factors for increased economic growth and social development. It is a tool for economic growth. Ibrahim (2005) noted that despite efforts made at national level by the Kenya Government to encourage students to study science, there is still poor performance, more especially in Chemistry. According to Kenya National Examination Council (2009), KCSE Report, practical exams are major contributing factor to poor performance in sciences since students are not exposed to them as required.

The social and economic development of the country is directly linked with students' performance. The students' performance (academic achievement) plays an important role in producing the best quality graduates who will become great leader and manpower for the country thus responsible for the country's economic and social development (Ali et al, 2009).

1.2 Statement of the Problem

The importance of science, particularly chemistry, is crucial for the development of a country in various sectors such as industry and agriculture. To transform Ethiopia into an industrial led nation, it is essential to improve students' performance in chemistry. However, over the past decade, student performance in chemistry has been declining. Despite significant investments from the government, donors, NGOs, and other stakeholders in education to foster economic growth and development, the desired improvements have not been realized.

In Abbay chomen district of Fincha secondary school students academic performance in sciences in geneneral and in Chemistry subject in particular is declining from time to time. On the other hand there is no studies done before to show the factors affecting the academic performance of students in Chemistry subject in the zone which may varies across the areas.

According to secondary data from the Abay chomen district education bureau (ACDEB, 2023), the performance of students in chemistry has been decreasing from time to time over the past ten years. This trend indicates the need for corrective measures to help students become competitive in science-oriented careers. This study investigates the factors influencing the performance of 10^{th} grade students in chemistry, focusing on public secondary schools in the Abay Chomen district, specifically Fincha Secondary School.

Therefore, it is critically vital to generate up to date empirical evidences and fills the gap by identiftying the major factor that causes the academic performance of students in Chemistry subject in the study area.

1.3. Objectives of the Study

1.3.1. General objective

- ❖ To investigate the determining factors to students' academic performance in chemistry; The case of public secondary School in Abay Chomen district in Fincha secondary school'

1.3.2. Specific objectives

- To identify the professional qualification of Chemistry teachers the case ofFincha public secondary school inAbayChomen district.
- To assess students' academic performance in chemistry subject the case of Fincha public secondary school in Abay Chomen district
- To analyze the teaching and learning methods used in teaching Chemistry the case of Fincha public secondary school in AbayChomen district.
- To assess teaching and learning resource needed in teaching Chemistry the case of Fincha public secondary school in AbayChomen district.

1.4. Research Questions

The study aimed to tackle the following research question:

- ✓ What are the professional qualifications of Chemistry teachers in Fincha public secondary schoolin AbayChomen district?
- ✓ What is the academic performance of the students towards Chemistry subject in Fincha public secondary school in Abay Chomen district?
- ✓ To what extent are the teaching and learning methods used in teaching Chemistry subject in Fincha public secondary school in AbayChomen district?
- ✓ To what extent are the teaching and learning resources adequate for the teaching of Chemistry in Fincha public secondary school in AbayChomen district?

1.5. Significance of the Study

This study is significant as it addresses the declining performance of students in chemistry, a subject crucial for the scientific and technological advancement of Ethiopia. By identifying the factors influencing grade 10 students' performance in chemistry at Fincha Secondary School, this research fills a gap in the existing literature and provides insights that can inform educational practices and policies.

Practically, the findings of this study can help educators and policymakers develop targeted interventions to improve chemistry education, thereby enhancing students' academic outcomes and future career prospects in science-related fields. Theoretically, this research contributes to our understanding of the challenges faced by students in learning chemistry. Moreover, the study has broader social and economic implications. Improving chemistry education can lead to a more skilled workforce, which is essential for Ethiopia's industrial and agricultural development. Finally, this research lays the groundwork for future studies to explore additional factors affecting student performance and to develop innovative teaching strategies.

1.6. Delimitation of the Study

The study would limit one of public secondary schools in Abay Chomen District with a sample of 225 from a total population of 540 students. Abay Chomen District is cosmopolitan, though most of it is occupied by the Misaim pastoralist.

The respondents involved in the study were draw from public secondary schools since they were the majority of the most established schools within the district. This study only investigated the performance of Chemistry in public secondary schools in Abay Chomen district.

1.7. Limitation of the Study

The study was confined only Fincha secondary school of Abay Chomen District. The finding would only be generalized to secondary schools within Abay Chomen District which have similar climatic conditions, culture and socio-economic factors. Due to cost implication for the

requirements, resources and travelling expenses challenges, the study only undertaken in Fincha secondary school of Abbay chomen district.

1.8 Definitions of Significant Terms as used in the study

Attitude	Refers to the feeling a student or teacher has toward a subject.
Laboratory:	Refers to a special room in a school equipped with apparatus and chemicals, where experiments are carried out Performance The act of learner achievement as examined in Chemistry subject examination.
Practical	Refers to teaching/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 participants. They manipulate the learning resources and the materials under the guidance of the subject teacher.
Professional qualification	Is a designation earned by a person to assure Staff development qualification to perform a teaching task in a school e.g., Bachelors in Education, Masters in Education etc.The professional growth that a teacher achieves as a result of gaining increased experience from seminars, in- service training or workshops attended.
Syllabus	A plan that states exactly what students at a school should learn in a particular subject as stipulated curriculum.
Teacher	Refers to the person employed for the purpose of guiding and directing learning experiences of students in an educational institution Teaching/learning methods Refers to various techniques used for teaching/learning purpose.
Teaching/learning methods	Refers to various techniques used for teaching/learning purpose.
Teaching/learning resources	Refer to the requirements needed to assist in delivery of knowledge to students'

CHAPTER TWO: 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 factors that influence performance of Chemistry. It consists of relevant themes which have been derived from the research objectives. Each research question has been thematically reviewed as follows; attitude of students towards Chemistry, professional qualifications of Chemistry teachers, extent to which teaching and learning methods are used in teaching Chemistry subject and extent to which the teaching and learning resources available are used for teaching Chemistry.

2.2 Attitude of Students towards Chemistry

A number of studies have been carried out on attitude of students towards 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 Kenya 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 relationships between students' attitudes toward chemistry and their perceived laboratory environments in Singapore high schools .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 factors 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 will 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.

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.

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 factors 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 to Chemistry are the most important factors affecting performance in Chemistry. Inanumberofstudies have been carried out on attitude of students towards 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.

Some of the research that has been done in this area includes, Wong, Young and Fraser (1997) who investigated relationships between students' attitudes toward chemistry and their However, this study by Kamau (2006) focused its attention on factors leading to poor performance in

Chemistry as opposed to the factors influencing performance perceived laboratory environments in Singapore high schools.

2.3 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 (LGA) of Onus State. The Senior School Certificate Examination results from 2000/2001 to 2004/2005 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.

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 was need to find out whether the same influences performance of Chemistry in public secondary schools in Kenya.

Grange at 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 qualifications of Chemistry teachers in public secondary, influences performance of students

2.4 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 most 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. Theaim 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 of 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 Elks 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 tell 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.

2.5 The teaching and Learning Resources available for Teaching Chemistry

Resources include print and none print materials such as related text books, syllabuses, charts, laboratory and equipment’s 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, Redo, 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.

Wachanga and Mwangi (2004) looked into Effects of the Cooperative Class Experiment teaching Method on Secondary School Students' Chemistry' Achievement in Kenya's Nakuru 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

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology proposed to be followed in carrying out this study. The chapter is arranged in the following subheadings: Research design, location of the study area , target population, sampling techniques and sample size, research instruments,validity of instruments, reliability of instruments , data collection procedure, data analysis, logistical and ethical considerations.

3.2 Research Design

This study utilized descriptive survey design. According to Best and Khan (1993), the descriptive survey design is concerned with conditions of relationships that exists, practices that prevail, beliefs, points of views or attitudes that are held, processes that are going on, effects that are being felt or trends that are developing. Kilemi and Wamahiu(1995) argue that, any researcher who adopts this descriptive survey design attempts to produce data that is holistic, contextual, descriptive in depth and rich in details. The research design was applied since it is the best suited to establish the students teachers and principal's perception on the performance in Chemistry in Abaychomen district . Descriptive research design is the best method of social scientists and educators who are interested in collecting original data for the purpose of describing a population (Mugenda and Mugenda, 2003

Since there are four public secondary schools in Abay Chomen district that had presented candidates for ESLCE examination, studying a representative sample and generalizing the results to cover a larger population that has the same characteristics the sample was sufficient enough.

3.3 Description of the Study Area

The study was conducted at Abay chomen district in Horo Guduru wallaga Zone. It is 302 KM far from Addis Ababa which is capital city of Ethiopia. The district has estimated total population of 50,564 of whom 25,017 are male with estimated area of 791.26 km² (CSA, 2005). It has four secondary public schools. Fincha is one of the four secondary schools located in the

district which has inrollment of 1,540 students in 2023. The district's capital which Fincha town is 50 KM far from capital of the zone Shambu town.

3.4 Target Population

Target population also known as universe population is a group of elements such individuals, objects or items from sample are taken for measurement. A population refers to the group of individuals from which sample are taken for measurement. A population should have at least one thing in common (Kombo etal, 2006).

However, a sample is a subset of people, items, or events from a larger population that you collect and analyze to make inferences. This study used the experience of 3 school principals , 7 teachers, and 225 students that made a total of 235 respondents. This number of respondents was enough for a researcher to generate findings (Patton et al., 2002). It is from this population that sample of study was drawn from deep investigation on the teaching/learning material and students attitudes towards the subject factors affected students' academic performance among ordinary secondary schools in abaychomen district.

As one can observe that the sample of 235 respondents were selected on the basis of the fact that the current researcher sough that they would provide experience on the factors that hinder the academic performance in Fincha secondary schools; then were selected randomly,

3.5 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 one out of four secondary schools in AbayChomen District. Random sampling technique was used to select the school. The sample size was determined using Kothari (2004) formula due to the simplicity and assumption it follows as follow:

$$n = \frac{z2\ pqN}{e2(N-1) + z2pq} = \frac{(1.96)^2 * 0.5)(0.5)(540)}{(0.05)^2(540-1)+(1.96)^2(0.5)(0.5)} \approx 225$$

Where: N= Total number of grade10 students in abay chomen secondary public schools

n=sample of respondent

e =marginal error

Z= 1.96, p= 0.5,q= 0.5 and e= 0.05

A total of 225 sample respondents from students were selected using probability sampling technique and 7 chemistry teachers using purposive sampling technique for the study.

3.6 Data Collection Methods

Researchers prefer using methods that provide high accuracy, generalizability and explanatory power, with low cost, rapid speed and maximum management demands and administrative convenience (Mugenda and Mugenda, 2003). Basing on this fact, a combination of the Questionnaires and interview schedules and class roomobservations were used for this study.

3.6.1 Questionnaires

A questionnaire is a research instrument that gathers data over a large sample (Kombo & Tromp, 2006) and is one way to elicit self-values. According to Zikmund, Babin, Carr, and Griffin (2012), a questionnaire can be used to reach out to a large number of respondents unlike other methods of collecting data.

Further the questionnaire is relatively cheap and cost effective. A questionnaire was used to collect data from students and teachers since they are the major targeted group in this study. This was done independently to avoid the chances of manipulation from the researcher and Population. The questionnaire consisted of both open-ended and closed questions which have been designed specifically for teachers and students in line with the research objectives.

3.6.2 Interview

Bogdan and Bicklen (1998) hold that the interview uses oral method to collect data between the interviewers and the interviewees. The interview can be open or structured. The interview usually has power to use the probes to allow the interviewer to get more depth information than any other method like questionnaire. The interview can inform other information the current researcher may have not planned to investigate but they are useful in the study as the respondent is seen how he feels about the issues; unlike the questionnaire where the information is filled by

the distinct respondent. The current researcher prepared the interview questions by using the guideline of the research objective. So, nine questions (appendix 5) with sub questions were developed to guide the investigation of this study. Interview schedules was used to collected data from the principals in the selected school.

3.6.3 Classroom observation

Observation helps researchers to obtain a valid and credible picture of phenomena being studied (Kothari C., 2004). The class observation in addition to questionnaire and interview was used as a tool to gather information since it enabled the researcher to capture information from the actual settings. Classroom observations as an instrument for the data collection for the study was used to observe teaching resources used by the teachers during their lesson delivery and observe the teaching methodolgy and its effects in teaching chemistry. During observation the researcher assumed the role of non-participant observer, using eyes to observe and record events of relevance to the study

3.6.4 Document analysis

For the purpose of cross checking and supplementing data obtained through document were examined relevant data of students for the past three years from (2012-2014 E.C) exam result in chemistry subjects of grade ten students' performance. The document assessing enabled the researcher to triangulate the data collected through the other tools.

3.7. Validity and Reliability

Validity is the accuracy and meaningfulness of inference which were based on research results (Mugenda and Mugenda 1999). In this study, the validity of the research results was increased by applying more than one method. This involved employing the interviews, questionairs ,classroom observations and the documents. The results obtained from the interview were therefore cross checked with questionaire method and then the class room observations. The items which appeared unclear were dropped or rephrased.

According to Mulusa (1990), reliability is a measure of accuracy of the findings and suggests the truthfulness of the collected data whereas validity is the measure of acceptability that outcomes

are likely to be adopted for similar cases or areas covering same domains.The researcher used questionnaires method to enhance instrument reliability. The same instrument was given to another group of people. The reliability was the correlation between the scores of the two instruments.

3.8 Data Collection Techniques

Permission to carry out research was obtained from Abbay Chomen education office as required by the law. A transmittal letter and pre-notice letter was sent to the Principals . The researcher sought permission from the school administration to carry out research in the sampled school. A preliminary visit was made to each of the schools to inform the principals of the intended research and a date to administer the questionnaire was arranged. The researcher pre-visited the sampled school to establish rapport with respondents. Consent for participation was sought before administering the questionnaires. The questionnaires were personally administered by the researcher during the data collection. Arrangements for filling in the questionnaires within three days was made. At the end of the three days completed questionnaires were personally collected by the researcher ready for data analysis.

3.9 Data Analysis Techniques

This study employed descriptive analysis method. This involved cleaning the data through sorting out the questionnaires that have been filled properly then data was coded according to the variables that are being investigated. Data was entered in the computer and the researcher used statistical package for social sciences (SPSS) version 20 software and Microsoft excel to organize the data.

In this study quantitative data which was collected using questionnaires was analyzed and descriptive statistics were used. Descriptive statistics such as means and percentages were obtained. Data was presented in frequency tables and histogram charts. This was followed by explanations .

The response of the interviewees was transcribed, coded and the data were categorized under specific themes and analyzed using content analysis technique. This approach essentially involves a thorough and repeated reading of all the responses of each respondent, underlying the

main ideas and then extracting the core meaning under each theme. The data were presented by using summaries, explanations, descriptions and deductively interpreted based on research objectives

3.10 Ethical conasideration

According to Mcmiolian and schmacher (1993:183), information obtained about the subjects must be held confidential unless other wise agreed on ,inadvance, through informed consent . This means that in this study, no one has access to individual data or the name of participants except the researcher, and the subjects were informed prior to their participation on who will access the data . Confidentiality was ensured by making certain that the data can not be linked to individual subjects by name. Inaddition, all participants signed a consent form for their participation which also ensured willingness to participate.

CHAPTER FOUR: RESULT AND DISCUSSIONS

4.1 Introduction

This chapter presents the results of analysis of the data collected from one Fincha public secondary school in Abay Chomen district. The chapter is divided into five 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 4.8 presents findings on attitude of students towards Chemistry subject, professional qualification of Chemistry teachers, teaching and learning methods used in teaching of Chemistry, teaching and learning resources needed in teaching Chemistry subject and the summary.

4.2. Trend of student performance

The trend of student performance in chemistry subject in Fincha public secondary school for the past six years shows the declining pattern in their score (Figure 1). According to the figure 1 below, in 2010 academic year 60.4% of the student scored greater above average while 39.6% scored less than average. In 2011, 51.4% of students scored greater than 50% and 48.6% scored below average in Fincha public secondary school. In general, the score of students in chemistry subject declined from 2010 to 2015 academic year with only 31.6% score above average and most (68.4%) scored below average in 2015 (Figure 1).

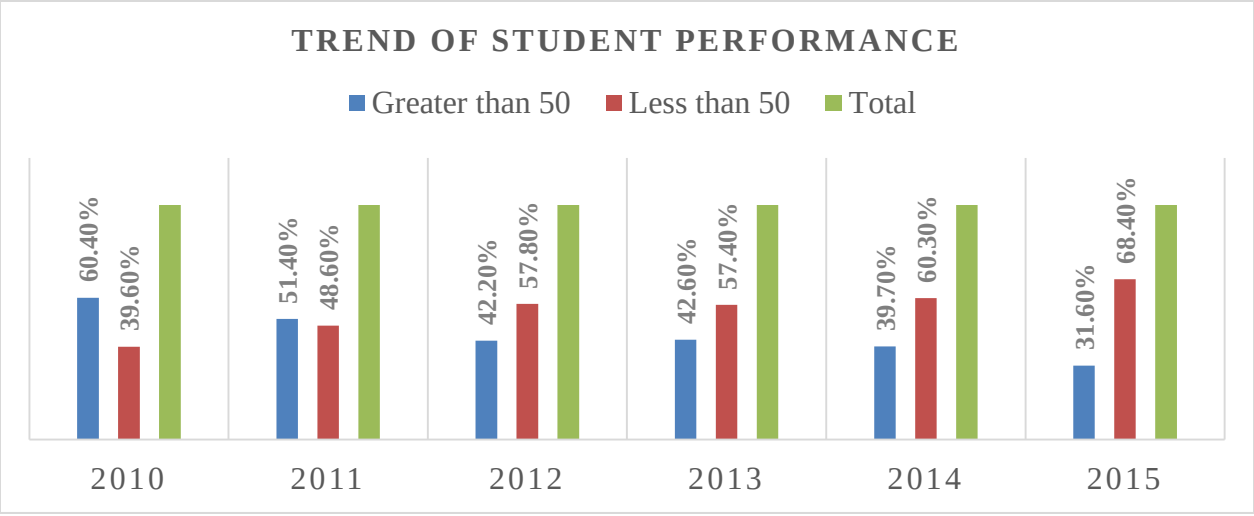

Figure 4-1: Trend of student performance in chemistry

Source: Fincha secondary school, 2023

4.3 Instruments' Return Rate

The respondents included 7 Subject teachers and 225 students. The questionnaires were administered to COS, subject teachers and students of the administered questionnaires, 5 COS responses were received representing (71.42%), 6 responses from subject teachers (85.3%) and 217 responses from the students were received (96.44%) which the researchers considered adequate for analysis.

4.4 Demographic Data

The demographic data considered in this study for the respondents included category of Gender, Age, Marital status, Education level and Experience distribution of Chemistry teachers.

4.4.1 Distribution of the respondents by gender

Table 4.1 below indicated the gender distribution of sample respondents. The result showed that all (100%) of the school CSO respondents and chemistry subject teachers were male headed. Regarding the sample respondent of the 217 students, 176 (81.1%) of them were male while only 941(18.89%) of the sample students were female respondents (Table 4.1).

Table 4-1: Distribution of respondents by gender

Categories	Gender	Frequency	Percent
COS	Male	5	100
N=5	Female	-	-
Chemistry Teacher	Male	6	100
N=6	Female	-	-
Students	Male	176	81.1
N=217	Female	41	18.9

Source: Computation from survey, 2023

4.4.2 Age distribution of Chemistry teachers

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

Table 4-2: Distribution of the respondents by age

Age	Frequency	Percent
30-40	5	71.42
41-50	1	14.28
51-60	1	14.28
Total	7	100

Source: Computation from survey, 2023

Theresult presented in table 4.2 show that,most of (71.42%) the chemistry teachers' agewas between 30 to 40 years, while 14.28% were of age 41 to 50 years and 14.28 % were of age51 to 60 years.

4.5 Attitude of students towards chemistry

This section deals with findings which tend to assess student attitude towards chemistry in Fincha public secondary school in Abay Chomen district.

4.5.1 Students who enjoy learning chemistry

The students respondents were asked to state whether they enjoy learning of Chemistry subject or not. The analysis of the information received from students were presented in Table 3.

Table 4-3: Students who enjoy learning chemistry'

Response	**Opinion**	**Frequency**	**Percent**
Do you enjoy *learning* chemistry	YES	182	83.87
	NO	35	16.12
Total		217	100

Source: Computation from survey, 2023

The result from Table 3 above indicated that, 83.87% of the sample students responded that they have enjoyed from learning chemistry subject while 16.12% of them did not enjoy from learning the subject. The result indicated that even though students' motivation toward chemistry subject is high, their performance is low as compared to their attitude. This may be due to the fact that

other constraints can hinder their performance. The finding is in line with study by Okebukola (1987) who identified attitude as one of the factor affecting student performances in Chemistry.

The result from interview with teachers and researcher classroom observation also confirms that the students motivation in classroom while chemistry teacher teach them was high and attrtactive.

4.5.2 Rating the ability to pass EGSECE 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.

Table 4-4: How do you rate your ability' to pass EGSECE chemistry

Opinion	Frequency	Percent
Very confident	20	9.21
Confident	60	27.64
Not confident	137	63.13
Total	217	100

Source: Computation from survey, 2023

As indicated in the table 4, most (63.13%) of the students were not confident that they would pass EGSECE chemistry national exam, while 27.64% were confident of passing and only 9.21% were very confident of passing. The result indicated that, most of sample students were not confident in passing EGSECE national exam implies that it is the result for the failures in performance of chemistry. According to the study by Okebukola (1987), students attitude and perception towards their achievement in Chemistry subject is very crucial and should able to confident to achieve their goals.

The interview schedule result as well as classroom observation by the researcher also supports that the students confidence to pass the exam was relatively high even though the rate of passing in this exam were low.

4.6 Professional qualification of Chemistry teacher

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.

4.6.1 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 5.

Table 4-5: Highest academic qualification of Chemistry teachers

Level of education	Frequency	Percent
Diploma in Education	1	14.28
Bachelors' in Education degree	5	71.42
Master's in Education degree	1	14.28
Total	7	100

Source: Computation from survey, 2023

The respondents were asked to state their highest level of qualification attained. The results are given in table 5 showing that 71.42% of the respondents had Bachelors' in Education degree, 14.28% were diploma in education and 14.28% were Masters in Education qualifications. The result confirms that most of chemistry teachers are Bachelor degree holders which is sufficient to teach secondary schools.

Different studies indicated that professional qualification of teacher has effect to the performance of students in teaching sciences. This is due to the fact that updated and qualified teachers can improve the performance of students (Okebukola, 1987).

4.6.2 Working experience of Chemistry teachers

The teaching experience of chemistry teachers were analyzed and the result were presented in table 6. According to the indicated result, 71.42% of the chemistry teachers had served for a period of 15 to 20 years, while 14.28% had served for 21 to 25 years and 14.28% served for a period of 31 to 35 years of teaching service. As discussed in the table 4.6, most of chemistry subject teachers have better years of teaching and they are experienced teachers. Teachers having

teaching experience will enables students to understand the subject matter in detailed way and that they are elders. Elders, on the other hand, are unfamiliar with cutting-edge technology, which can have a negative impact on students' academic performance. Ongubiyi (2004) noted that though majority of the teachers are professionally trained and experienced, 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.

Table 4-6: Working experience of Chemistry teachers

Categories	Length of service(in years)	Frequency	Percent
Chemistry	15 to 20	5	71.42
teachers N=7	21 to 25	1	14.28
	26 to 30	-	-
	31 to 35	1	14.28
Total		7	99.98

Source: Computation from survey, 2024

4.7 Teaching and learning methods used in teaching of chemistry

To assess the teaching and learning methods used in teaching Chemistry subject, students, teachers and COS respondents were stated the most common teaching and learning methods used in Fincha public secondary schools in Abay Chomen district. The result was discussed in following section.

4.7.1: Students' Response

Student respondents were asked in one of the items to indicate the teaching method commonly used in teaching of Chemistry. The result was presented in table 7. As discussed in table 7 below, most (56.2%) the students responded that, chemistry teachers use both student and teacher centered method to teach the subject, while 34.6% and 9.2% of them agreed that the teacher used teacher centered and student-centered method of teaching while teaching the subject respectively. The result confirms the teacher's response as they have agreed to use both student centered and teacher centered teaching method. Most of the time, teacher centered method of

teaching was not recommended but they use in order to cover the portion of the text and they are forced to use it as a method of teaching the subject.

Table 4-7: Frequency of use of teaching methods

Statements	Frequency	Percentage
Student centered	20	**9.2**
Teacher centered	75	**34.6**
Both	122	**56.2**
Total	217	**100**

Source: Computation from survey, 2023

The classroom observation and interviews with the principal and teacher also indicates that the most widely used teaching method was teacher centered. This is inorder to cover the portion of the contents in textbook.

4.7.2 Teachers Response

The study sought toassess the teaching methods commonly used to present Chemistry lesson from Chemistry teachers. The finding is presented in table 8.

Table 4-8: Frequency of use of teaching methods used to present chemistry lesson

Statement	Frequency	Percent
Student centered	1	14.28
Teacher centered	3	42.86
Both	3	42.86

Source: Computation from survey, 2023

The findings in table 8, indicates that, most teachers (42.86%) agreed that lecture /teacher centered and both (student and teacher centered) teaching method was used very often as means of teaching chemistry subject. Only 14.3% of the teacher's response toward teaching method was student centered. The reason behind not using student centered method of teaching chemistry subject was identified as the vast portion of the subject and unable to cover all contents using this method of teaching on the time frame. According to Mills (1991) lecture method is less students involving in the learning 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.

4.8 Teaching and learning resources needed in 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, the level of student text book the school contained and whether the schools have trained laboratory technicians or not. Table 9 presents findings on availability of Chemistry laboratory Chemistry equipped and reagent, student text book and laboratory technician in Fincha public secondary schools Abay Chomen District.

Table 4-9: Frequency of availability of resources

Variables	Options	Response (N = 7)	Percentage
Text books	Enough	2	28.57
	Medium	5	71.42
	Poor	-	-
Laboratory facilities (apparatus, equipment, chemicals & reagents)	Enough	-	-
	Medium	2	28.57
	Poor	5	71.42
Laboratory room/s	YES	7	100
	NO	-	-
Laboratory technician	YES	-	-
	NO	7	100

Source: Computation from survey, 2023

Table 9 above indicated that, availability of chemistry test book for both students and teachers are medium (71.4%) and enough (28.6%). Regarding laboratory facilities like apparatus, equipment, chemicals and reagents revealed that, most (71.42%) chemistry teachers agreed that poor laboratory facilities in the school. Regarding laboratory room/s, the finding revealed that, all (100%) chemistry teachers agreed that there were a class for chemistry laboratory. Unfortunately, it was not functioning/ working in the school. There were no laboratory technician as a whole (100%) indicating the absence of trained laboratory technician to teach the

practical session of the text. In Fincha public secondary school, there are generally very few resources available to support teaching and improve student performance. Additionally, there are no laboratory technicians and the laboratory classroom is not operational. This was the identified causes for decreasing the student's performance in subject area. Okebukola (1987) identified that participation in laboratory activities is one of the factors affecting student performance in Chemistry.

Researcher observation and interviews with school principal and teachers also supports that there is a shortage of resource to teach the subject which is a challenge and a cause for the decline in performance of the students in subject matter.

5. SUMMARY CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

The objective of this study was to assess the factor affecting Grade 10 students' academic performance in chemistry subject in Fincha public secondary schools of Abay Chomen district. Specifically, to identify the professional qualification of Chemistry teachers; assess students' performance in chemistry subject; analyze the teaching and learning methods used in teaching Chemistry and to assess teaching and learning resource needed in teaching Chemistry in public secondary school in Abay Chomen district, Fincha secondary school.

The study found that most (83.9%) of the students enjoyed in learning chemistry subject. On rating the ability to pass chemistry majority of the students (63.13%) were not confident that they would pass EGSECE chemistry exam, 27.64% were confident of passing while only 9.21% were confident of passing.

From the findings, 71.42 percent of the respondents had first degree (Bachelors), 14.28% weremasters and 14.28% had diploma in education as professional qualifications. This shows that chemistry teachers had enoughprofessional qualificationto teach the students.

The study identified teachers centered method, student centered method and both methods used in teaching of chemistry in Fincha public secondary schools in Abay Chomen district. According to the methods found, the two most popular teaching methods used to present chemistry lesson in the study area were lecture and student-centered methods; of these, 42.86% were lecture methods and 14.28% were student-centered with 42.86% used both method of teaching the subject.

Regarding teaching-learning resources, teacher unanimously agreed that the school had poor equipped, Chemistry laboratory with poor apparatus and reagent required for the experiments. It was also noted that the school had no trained laboratory technician 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.

5.2 Conclusions

From the findings of the study, it can be concluded that factors that influence performance of Chemistry subject in Fincha public secondary school in Abay Chomen district are; Attitude of students towards chemistry; teaching and learning methods used in teaching Chemistry subject and teaching and learning resources needed in teaching of Chemistry subject.

Majority of the students seems to be very positive toward learning Chemistry subject, though their performance is far below average and they seem to score low grade in Chemistry. After considering this aspect the researcher concluded that the aforementioned factors are the major influence on students Chemistry performance in Abay Chomen district.

5.3 Recommendation

From the research findings and conclusion made, the following recommendations were made:

- ✓ The on job taining should be given for teachers on how to improve students performance in the subject and improve teachers teaching skills.
- ✓ Chemistry teachers should use student centered method of teaching to increase students' motivation toward learning the subject and increase their performance.
- ✓ 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.
- ✓ Real life experiment demonstration, video simulation, animation, uses of model for teaching, analogy type examples should be arranged for the students in order to improve their performance and make the subject practical.
- ✓ The school should strive to provide adequate resources. Where schools are limited in ways of finances improvisation should be encouraged if possible. This should be immediate intervention to improve on performance.
- ✓ There should be close relationship and discussion between education stakeholders and secondary schools to improve students'attitude in order to increase their performance in Chemistry subject.

In general, this study focused on factors influencing performance of students in chemistry in public secondary schools in Abay Chomen district in Ethiopia. It is therefore suggested that similar study should be carried out in districts to identify the root causes for failures in students' performance and the influence of the teaching and learning resources on the implementation of the curriculum for Chemistry subject in the study area.

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APPENDICES

Appendix 1: 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/Demography

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

1. Name of School_____
2. Gender: A. Male ( ) B. Female ( )
3. Age_____
4. What is your highest level of academic qualification?
   A .Diploma ( ) B. BA/BSC/BED ( ) C. MA/MSC/MED ( )
5. For how long have you been teaching? _____
6. What is your marital status? A .Single ( ) B .Married ( ) C .Divorce ( ) D .Widow ( )

SECTION (II): Teaching methodology

7. Please indicate the method that you commonly use in the teaching of Chemistry.
   A .Student centered. ( )
   B .Teacher centered ( )
   C. Both. ( ) Why?_____

SECTION (III): Teaching/learning resources

8. What is the availably of chemistry text book for students? A. enough ( ) B. Medium () C. Poor ()
9. Do you have a chemistry laboratory in your schools? Yes ( ) No ( )
10. In terms of apparatus and reagents required for experiments, how is the laboratory equipped?
    Enough ( ) Average ( ) poorly ( )
11. Do you have a laboratory technician? Yes ( ) No ( )

SECTION (IV): Attitude of students towards Chemistry

12. How do you describe attitude of your student's forward chemistry subject in your school?
    I) Positive ( ) II) Negative ( ) III) undetermined ( )
    Why? _____
13. What is the performance of your students in chemistry subject?

A. Excellent ( ) B. very good ( ) C. good ( ) D. satisfactory ( ) E. poor ( )

14 .what measures have you taken to improve your students' performance in chemistry subject?

_____

15. Suggest possible measures which should be taken to improve the performance of Chemistry in your school? _____

Appendix 2: 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 fillingin 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 ( )
2. What is your age category? _____ 15-20 year ( ) 21-30 year ( )
3. Chemistry is a hard subject? Agree ( ) Disagree ( )
4. 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?

_____

5. How do you rate your ability to pass EGSECE Chemistry?

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

6. What methodology does your chemistry teacher uses to teach you the subject?

A. student centered ( ) B. Teacher centered ( ) C. Both ( )

7. Does your Chemistry teacher give you any extra coaching (training) in Chemistry?

A. always B. sometimes C. rarely

8. How often are you tested in Chemistry? Fortnight ( ) Monthly ( )

Twice a term ( ) Once a term ( )

9. Rank the following instructional techniques from 1 to 2 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 2 represent the method least used.

Teaching method	**1**	**2**
Lecture method		
Class demonstration		
Homework drill and practices		
Assignment method		
Discussion groups		

10. Does all of the students in your own chemistry text book? Yes ( ) No ( )
11. Is there enough reference book of chemistry subject in your school? Yes ( ) No ( )
12. Availability of chemistry laboratory? A. Available ( ) B. Not available ( )
13 .If chemistry laboratories is available in your school, is it have enough chemicals' and apparatus?

A. Yes ( ) B. No ( )

Appendix 3: Classroom Observation Schedule (Cos)

This check list was prepared for the conformity of student's response to the questionnaire. The researcher observes class room and check for the following question.

1. Is chemistry subject difficult to the students during chemistry class?

Yes () No ()

2.A number of students who are do assignments, home works and class works are: High () Medium () Low ()

3. What about students interest to learn chemistry rather than other subject?

High () medium () low ()

4. The student's participation in chemistry class to ask and response questions are:

High () Medium () Low ()

5. For the participation of students in learning chemistry, do teachers encourage them in class? Yes No

6. Do chemistry teachers use teaching aid during chemistry class? YES No

7. The method of teaching chemistry teachers use mostly student center? Yes No

8. Is the class room is suitable for learning teaching process? Yes () No ()

9. Are students have text books in the class? Yes () No ()

10. Is their laboratory, chemicals and apparatus in the school? Yes () No ()

Appendix 4: Interview Schedul for School Principals

1 .Name of school_____

2 .position_____

3. Is your school conducive for teaching/learning?

4. Is your school having enough teaching/learning resource?

5. Is your school having enough teachers for all subjects?

6. Is your school having enough reference material?

7. Regarding chemistry subject:

A. is your school have enough subject teacher?

B. is your school has enough reference packages?

C. is your school has enough text books?

D. is your school has enough laboratories?

E. is your school has enough equipment's?

F. is your school has enough lab technicians?

G. what is the ratio of students per teachers?

H. what is the ratio of students per text book?

8. What measures should be taken to improve teaching learning as a whole and chemistry in specific?

9. What are strength, weakness, opportunity and target of teaching learning in school?