

**FACTORS INFLUENCING PERFORMANCE OF STUDENTS IN  
CHEMISTRY IN PUBLIC SECONDARY SCHOOLS IN KAJIADO  
NORTH DISTRICT, KENYA**

**BY  
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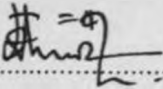
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**A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL FULFILMENT  
OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF A MASTER OF  
ARTS IN PROJECT PLANNING AND MANAGEMENT  
UNIVERSITY OF NAIROBI**

**2011**

## DECLARATION


This research project report is my original work and to my knowledge, has not been presented for the award of a degree in any other University

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## DEDICATION

This research project report is dedicated to my loving daughter Amanda, beloved wife Christine and my dear parents Lewnida and John for standing by me as I spent time away from them while pursuing my studies

## ACKNOWLEDGEMENT

There are many people who have made this humble effort to be accomplished. Thus I owe them lots of gratitude. I am particularly grateful to my supervisor Mrs. Juliana Munialo for her constant guidance and contribution to this Project report. She remained committed to preparing me towards accomplishing this piece of research work.

Special thanks to my beloved wife Christine, daughter Amanda, mum Lewnida and dad John who gave me chance to study during these hard economic times.

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## LIST OF ABBREVIATIONS AND ACRONYMS

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
MoE	Ministry of Education
MoEST	Ministry of Education Science and Technology
MoHERD	Ministry of Higher Education Research and Development
SbTD	School-based Teacher Development
SMASSE	Strengthening of Mathematics and Sciences in Secondary Education

## ABSTRACT

This study aimed at investigating factors that influence performance of Chemistry in public secondary schools in Kajiado North District. The objectives of the study were: To establish the attitude of students toward Chemistry, To investigate the professional qualification of Chemistry teachers, To investigate staff development of teachers teaching Chemistry, 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. The descriptive survey design was used to investigate factors that influence performance of students in Chemistry in public secondary schools in Kajiado North District. Data was collected using three sets of questionnaires; teachers' questionnaire, students' questionnaire and class observation schedule. These instruments were piloted and tested for validity and reliability. Descriptive and inferential statistics were used in the data analysis. Findings of the study, indicated that factors that influence performance of chemistry in public secondary schools in Kajiado North District were attitude of students' towards chemistry, Professional qualification of Chemistry teachers, Staff development 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 staff development amongst 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 districts adjacent to Kajiado North District and the results be compared for generalization purposes.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background information to the Study

Adesoji and Olanubosun (2008) observed that within the context of science education, chemistry has been identified as a very important school subject and its importance in scientific and technological development of any nation has been widely reported. They further argued that the effective teaching of science can further lead to the attainment of Scientific and technological greatness. According to Ndemo (2007), the Kenya Government has put a lot of emphasis on science education within the 8.4.4 curriculum, as this is a way of preparing pupils for the world of science and technology.

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. 1 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 report further observed that adequate skills are not developed. In Chemistry, balancing chemical equations and taking precautions during experiment is a challenge to most students.

Attending Secondary school may be viewed as a step in the right direction by most of the students. However majority of them face unique challenges in pursuit of science education, especially in Chemistry. This is evidence in KCSE Chemistry results for the last four years whereby the performance had been quite low nationwide.

**Table 1.1: National KNEC Candidates overall performance in Chemistry, 2006 to 2009**

YEAR	OVERALL MAXIMUM SCORE FOR PAPERS 1,2 & 3	MEAN SCORE
2006	200	49.82
2007	200	50.78
2008	200	45.48
2009	200	38.23

*Source KNEC2009, Examination Reports*

Kenya as a country need well educated and highly skilled man power trained in the disciplines of sciences. Seemingly Chemistry as a subject, which deals with the study of matter, cut across all the other branches of sciences. Emavon (1985) stated that Chemistry can exert a dominant if not decisive influence on the life of individuals as well as on the development effort of a nation. According to Wachanga and Mwangi (2004) Chemistry enhances student's learning of Biology, Physics and Agriculture on which Kenya industries and prosperity depend, though most secondary school students perform poorly in the subject.

In Kenya Chemistry is taught at secondary school level from form 1 to form 4. At form 3-4 level the subject is normally optional, but in most cases it is taken by majority of the students due to its importance in most of career courses especially those which are science oriented. A student has to score highly in Chemistry to undertake careers such as engineering, medicine, pharmacy etc at the university education level. But as has been noted the overall performance of Chemistry all over the nation has been very low. In Kajiado North District, the performance of students in Chemistry has been very wanting. The table 1.2 shows the Kajiado North District National overall performance of students in Chemistry over the last five years. The performance for the year 2009 could not be traced from the source of this information.

**Table 1.2: Kajiado North District KNEC candidates overall performance Chemistry means score 2005 – 2010**

YEAR	ENTRY	GRADES					MEAN SCORE
		A TO B+	B TO C+	C TO D+	D TO E	X	
2010	1865	82	215	397	1269	98	3.936
2009	RESULTS NOT AVAILABLE						
2008	2651	82	227	532	1818	8	3.462
2007	2871	138	316	673	1693	14	3.744
2006	2436	125	199	466	1605	12	3.053
2005	2416	144	244	507	1462	14	3.850
<b>Mean score (2005-2010)</b>							<b>3.609</b>

*Source: District Education office Kajiado North District (2010)*

The table 1.2 above indicates that the average mean score in Chemistry for Kajiado North District in the period 2005-2010 is 3.609. This is an equivalent of a mean grade D<sup>+</sup> which is far below the expected grade C<sup>+</sup>, a requirement that one need to achieve to be able to pursue a career course in sciences. The implication is that majority of students from Kajiado North District are greatly disadvantaged when it comes to choice of career courses which are science oriented. The sharp drop of students' enrolment in Chemistry in the year 2010 was due to creation of Isinya District which was curved from Kajiado North District. The KCSE results for Chemistry subject in Kajiado North District, between 2005 and 2010 shows a dark future for the district concerning students' performance in Chemistry. Therefore there is need to investigate the factors contributing



to the poor performance of students in Chemistry in the District. It seems that there is no known research having been done in this area in Kajiado North District, though similar studies have been carried in other districts, the solutions may not be directly applied in similar ways to Kajiado North District since regions differ in various context from each other.

## **1.2 Statement of the Problem**

The importance of science, especially Chemistry in transforming Kenya into an industrial country in line with vision 2030 cannot be over emphasized. The Government, donors, NGOs, and the entire stakeholder with interest in education spend quite large sum of money in enhancement of education all in pursuit for economic growth and development. But from table 1.2, it is clear that performance of students in Chemistry in Kajiado North District is very worrying. This implies that corrective measures need to be undertaken to enable students to be in a competitive position in choice of careers which are science oriented. To successfully compete in science courses and to maintain sustainability in this field, Kenya need highly skilled manpower trained in the discipline of science and technology.

This study, therefore, sought to investigate factors influencing performance of students in Chemistry in public secondary schools in Kajiado North District. The researcher would investigate the underlying factors so as to understand the state of performance of students in Chemistry in public secondary schools with view to identify possible causes, suggest

solutions and make further recommendations for the finding to be applied in similar regions.

### **1.3 Purpose of the Study.**

The purpose of the study was to investigate factors influencing performance of students in Chemistry in public secondary schools in Kajiado North District, Kenya.

### **1.4 The Objectives of the Study**

The objectives of the study were:

- a) To establish the attitude of students in public secondary schools towards Chemistry in Kajiado North District.
- b) To investigate the professional qualification of Chemistry teachers in public secondary schools in Kajiado North District.
- c) To investigate staff development of teachers teaching Chemistry in public secondary schools in Kajiado North District.
- d) To investigate evaluation of Chemistry in public secondary schools in Kajiado North District.
- e) To establish the teaching and learning methods used in teaching Chemistry in public secondary schools in Kajiado North District.
- f) To establish the adequacy of teaching and learning resource needed in teaching Chemistry in public secondary school in Kajiado North District.

## 1.5 Research Questions

The research questions for the study were:

- a) What is the attitude of the students towards Chemistry in public secondary schools in Kajiado North District?
- b) What are the professional qualifications of Chemistry teachers in public secondary schools in Kajiado North District?
- c) How is the staff development of teachers teaching Chemistry in public secondary schools in Kajiado North District?
- d) How is the evaluation of Chemistry in public secondary schools in Kajiado North District carried out?
- e) To what extent are the teaching and learning methods used in teaching Chemistry subject in public secondary schools in Kajiado North District relevant?
- f) To what extent are the teaching and learning resources adequate for the teaching of Chemistry in public secondary schools in Kajiado North District?

## 1.6 Significance of the Study

The data obtained in this study would be useful to all the education stake holders in Kajiado North District and the Ministry of Education in tackling challenges experienced when teaching and learning Chemistry. From the findings the stakeholders would be able to review the teaching and learning of Chemistry and make necessary adjustments

towards enhancing performance in the Chemistry. Chemistry as a subject would widen and open up more chances to students from the district to pursue some of the most competitive careers in the world of science. Kenway et al. (2007) argued that the high status subjects are “hard” sciences, Physics and Chemistry, and a higher level of mathematic, including calculus which are regarded as pre – requisite for entry into tertiary education for training related to high status careers, like medicine, engineering and some sciences. Thus the finding would act as a basis of further research to ensure that secondary schools within Kajiado North District compete equally with the rest of the schools for vacancies at the tertiary colleges and the universities.

### **1.7 Delimitation of the Study**

The study only covered the 17 public secondary schools in Kajiado North District with a population of 2054 four form 4 students. The District is located in the Rift valley Province of Kenya. Kajiado North District is cosmopolitan, though most of it is occupied by the Masaai pastoralist. It borders Kajiado central in the Southeast, Machakos to the North East, Nairobi, Kiambu and Nakuru East to the North and Narok to the west.

The respondents involved in the study were drawn from public secondary schools since they were the majority of the most established schools within the District. A few private schools which are established offer varied curriculum including IGCE and GCE which is not in tandem with KIE curriculum being offered in the public secondary schools. Despite the fact that there may be poor performance existing in other science subjects,

this study only investigated the performance of Chemistry in public secondary schools in Kajiado North District.

### **1.8 Limitation of the Study**

The study was confined only to public secondary schools in Kajiado North District and therefore its finding would not be applied to all the secondary schools in Kenya. The finding would only be generalized to secondary schools within similar regions in term of climatic conditions, culture and socio-economic factors. There were high chances of some element of dishonesty from some respondents by providing unreliable information resulting into distortion of the outcomes hence restricting generalization of the finding. However, cost implication for the requirements, resources and travelling expenses were also challenges the researcher faced when undertaking the study.

### **1.9 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 Kenya. It was also considered 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 Kajiado North District.

## **1.10 Definitions of Significant Terms as used in the study**

<b>Attitude</b>	Refers to the feeling a student or teacher has toward a subject.
<b>Evaluation of Chemistry</b>	Refers to systematic determination of merit, worth, and significance of performance in Chemistry subject.
<b>In-service training</b>	Refers to short term courses offered to already practicing teachers on difference of curriculum like content, teaching strategies, preparation and use of teaching resources
<b>Laboratory:</b>	Refers to a special room in a school equipped with apparatus and chemicals, where experiments are carried out
<b>Performance</b>	The act of learner achievement as examined in Chemistry subject examination.
<b>Practical</b>	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.
<b>Professional qualification</b>	Is a designation earned by a person to assure

qualification to perform a teaching task in a school  
e.g. Bachelors in Education, Masters in Education  
etc

**Staff development**

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 resources**

Refer to the requirements needed to assist in delivery of knowledge to students'

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## **1.11 Organization of the Study**

This study has five chapters; chapter one comprises of the background information to the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, delimitation and limitation, basic assumptions, definition of significance terms and finally the organization of the study.

Chapter two reviews related literature that deals with factors that influence performance of students in Chemistry in public secondary schools in Kajiado North District. Chapter three, the research methodology which describes the research design, target population, sample & sampling procedures, research instrument, validity and reliability of instruments, data collection procedures and data analysis while chapter four; data analysis, presentation and interpretation. Finally, Chapter five contain the summary of the findings, discussion, conclusions, recommendations and suggestions for further study.



## 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, staff development of Chemistry teachers, evaluation of Chemistry in public secondary schools, 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 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 Kenya, specifically in Kajiado North District. 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 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. However relevant this study may be, its finding may not directly be generalized to Kenya more especially Kajiado North District as they are under different environment.

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 Kenya the science subject have not been performed well for a long time. This means that there is a need to look at the reasons or factors that lead to these poor performances in Kenyan schools.

This survey study looked at the factors 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 Kenyan society at large. This was done by using the survey method where by three secondary schools were randomly sampled. In each school 6/20 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, this 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 factors influencing performance of Chemistry in public secondary schools in order to fill the knowledge gap where information remained elusive.

### **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 Osun 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. It is in this perspective that this studies to tries to determine whether the same applies to situation in Kenya more especially in Kajiado North Distict.

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

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 qualifications of Chemistry teachers in public secondary, influences performance of students achievement Chemistry.

#### **2.4 Staff development for Chemistry Teachers**

Reimmers (2003) quoting Glatthorn (1995), defined teacher development as the professional growth a teacher achieves as a result of gaining increased experience and examining his or her systematically. Quality of teaching and teachers is considered to be one of the principal causes for student achievements. This call for minimal set based requirement to be met for one to be considered a qualified teacher at whatever level of education. There is further need for a teacher to undergo further training to develop new skills in line with the changing environmental circumstances.

In most cases teachers want the best for their students in particular; they want their students to have the best possible outcomes. In this pursuit teachers seek new teaching ideas, skills and the right knowledge about the subject they are teaching. Currently Kenya's need for trained Chemistry teachers is being met mainly by her public universities while private universities contribute a very small fraction. Wachanga and Mwangi (2004) quoted Mullei (2001) that trained teachers however does not necessarily

improve the quality of education. The Government of Kenya through the Ministry of Education considered evolving appropriate pre- and in-service training so as to raise relevance and quality in secondary education MoHERD (1997). Indeed, MoEST (2003) considered developing and operationalising focused in-service programs as one of the indicators for attainment of enhanced quality of education.

Oduor (2009) carried out a study on Strengthening of Mathematics and Sciences in Secondary Education (SMASSE). Oduor noted that SMASSE training is an educational innovation and an initiative of the Government of Kenya with support of the Japanese International Cooperation Agency (JICA). Oduor further stated that JICA was launched in 1998 out of the need to improve performance in the crucial Mathematics and science subjects that had been hitherto unimpressive.

The purpose of this study was to find out the effect of SMASSE training of teachers on performance of students in Chemistry. The study was carried out in Uasin-Gishu District secondary schools. Survey research design was adopted. To obtain the study sample, proportionate stratified random sampling was used.

The independent variables were classification of schools and attendance of SMASSE training. Dependent variables on the other hand were KCSE Chemistry mean scores, attitude of students towards Chemistry, attitude of teachers towards teaching Chemistry and attitude of teachers towards the organization of SMASSE training. Data was collected using questionnaires, interviews and document analysis. Respondents were; Chemistry teachers, Head teachers and students. Data was analyzed using both



descriptive and inferential statistics.

The study found out that there was a slight improvement in KCSE Chemistry performance and a positive attitude of both students and teachers towards Chemistry. However the attitude of students was weak. The study recommended SMASSE training of teachers who did not attend the full training and promotion of favorable attitudes of students towards Chemistry.

It should be noted that the study by Oduor mainly looked at the influence of SMASSE on students and teachers attitude on Chemistry. While it should be observed that there are other factors which may determine both the attitude of students and teachers toward Chemistry as a subject. However this study aims at determining factors influencing performance of student in Chemistry in public secondary schools in Kajiado North District.

Ochieng (2007) examined the effect of school factors on academic achievement in Physics amongst form fours in Bureti District, the case of girls' performance. He observed that teachers' qualification significantly contributes to girl child academic achievement. This study however only considered girl students. It is therefore prudent to find out whether the same factors influences performance in Chemistry of both boys and girls in Kajiado North District.

Sifuna and Kaime, (2007) studied The effect of in-service education and training (INSET) programmes in mathematics in Secondary Education (SMASSE) and the

School-based Teacher Development (SbTD) programmes on classroom interaction in secondary and primary schools in Kenya. They established that, teachers who had undergone evaluation in the two INSET programmes and were effectively exposed to a student-centered approach, did not apply the same in their classroom practices which were largely teacher dominated. They attributed this to large classes, the use of English as a second language and pressure to cover the syllabuses in preparation of the national examinations. They recommended that the Ministry of Education mainstream INSET programmes in its policy for teacher development in the country.

## **2.5 The Evaluation of Chemistry**

Kenya 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, low 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 ineffectiveness 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 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).

Adesaju 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.

Bilks 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 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 government's role to paying teachers' salaries only. They further observed that capital development and purchase of teaching materials has been left 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 set 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 seeks to explore on factors influencing performance of Chemistry in public secondary schools in Kajiado North District.

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. 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 influencing performance of Chemistry in public secondary schools in Kajiado North District.

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.

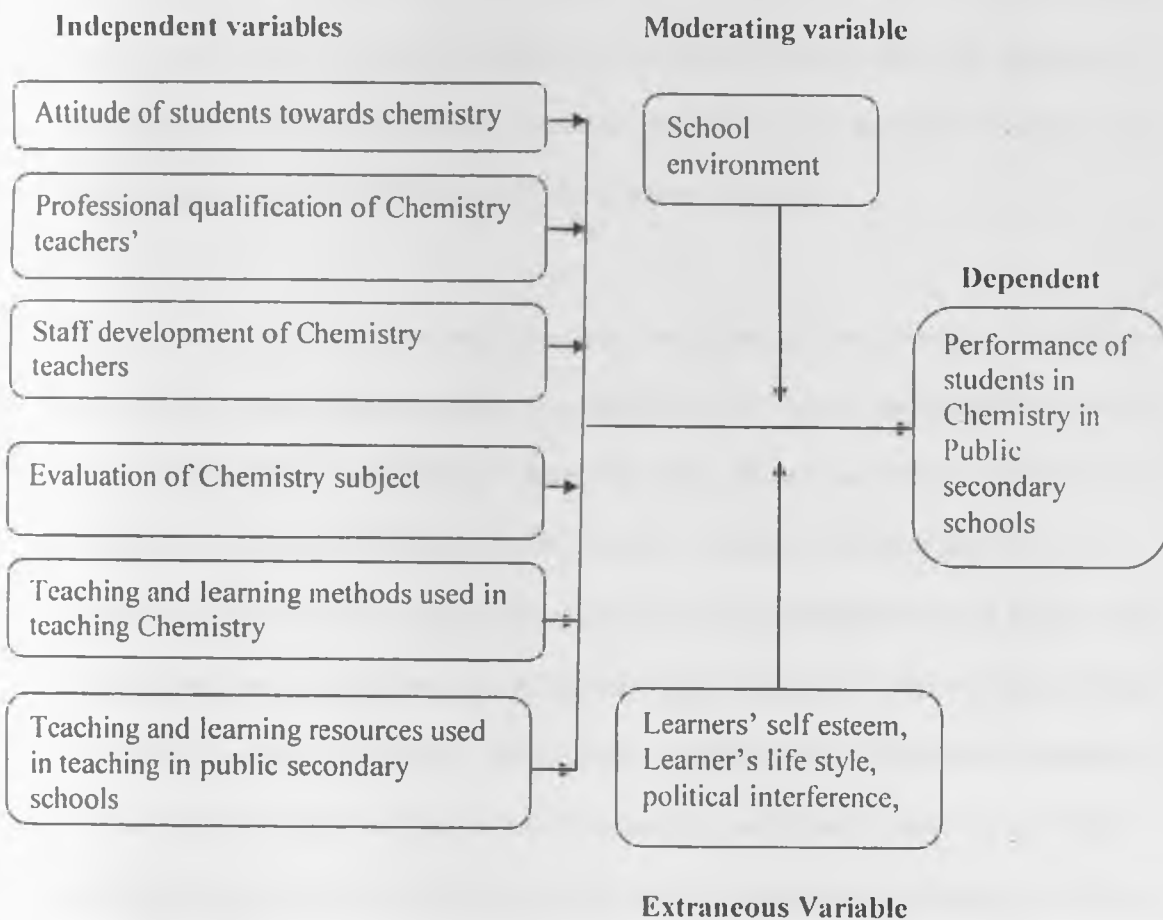
Karue (2008) examined factors affecting performance in Kenya Secondary Education in day secondary schools in Embu District. The researcher used stratified random sampling covering each division. Data was analyzed using descriptive statistics, multiple correlation and regression analysis. He observed 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 attitude of students towards Chemistry, professional qualification of teachers, staff development of Chemistry 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 performance 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

Based on the literature review in this study, the researcher concluded that varied factors influences performance of students in chemistry in public 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' attitude, 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 factors and their relationship to academic achievement in Chemistry with particular reference to Kajiado North District.

Therefore to fill in the above gaps, the researcher collected sufficient data on factors that influence performance of Chemistry in Kajiado North District. This factors are: Attitude of students towards Chemistry, professional qualifications of Chemistry teachers, teachers', staff development, 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

### 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 performance of students in Chemistry in public secondary Schools in Kajiado North District. 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 influence performance of students in Chemistry in Public Secondary schools in Kajiado North District. 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.

Since there are seventeen public secondary schools in Kajiado North District that had presented candidates for KCSE examination, studying a representative sample and generalizing the results to cover a larger population that has the same characteristics like the sample will be sufficient enough.

### **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 Kajiado North District, Chemistry teachers' and form four students. According to the information obtained from the Kajiado North District education office, there are a total of 17 public Secondary schools with a population of 6027 students, and thirty five chemistry teachers. Besides, additional information obtained from the Education office in the District indicated that there 2054 form four students in the year 2011. Chemistry teachers were targeted as they were the major agents of curriculum implementation in their respective schools.

### **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 seven out of seventeen secondary schools in Kajiado North District. This gave 41.2% of the total number of public secondary schools in the district. 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 8-4-4 system. They follow a similar syllabus developed by KIE and students sit for a common examination KCSE at the end of form 4. These may not be the same to all

the private secondary schools. Some private schools have varied curriculum. They offer GCE, IGCE etc.

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 Mugenda, 2003).

Form four 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 44 respondents. Seventeen Chemistry teachers were purposively sampled from the participating schools. In schools with only one teacher teaching form four class, the teacher was automatically selected.

**Table 3.1 Table of Sample Size**

	<b>Sample size</b>
Schools	17
Chemistry Teacher	17
Students	306

### **3.5 Research instruments**

The research instruments used were questionnaires for teachers' and students' and class observation schedule. Questionnaire is a technique of data collection in which the respondent completes it at his/her convenience. The questionnaires targeted 306 students which was an equivalent of 14.9% of the target population. The number of teachers included in the study was 17.

#### **3.5.1 Questionnaire for Chemistry Teachers**

The purpose of the questionnaire was to establish the attitude of students toward chemistry, professional qualification and staff development of Chemistry teachers, 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/learning resources. The views would enable the researcher to find out the students attitude towards Chemistry and their teachers teaching techniques.

#### **3.5.3 Classroom Observation Schedule**

The purpose of this instrument was to find out teaching methods used by teachers; class room interaction and teaching resources. These would enable the researcher to find out whether the teachers were applying the appropriate techniques and using adequate resources.

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### **3.6 Validity & 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. 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 from one item to another. In this research study the pilot data was collected through personal 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. The split half method was used to establish



the consistency of the instruments. This involves splitting the statement (items) into two halves (odd and even) items. In this study all odd numbered items were placed in one subset while the even numbered items were placed in another subset. Each of the two subsets were treated separately and scored accordingly. The two subsets were correlated using Pearson's product moment correlation coefficient obtained from the two halves'. Spearman-Brown prophecy formula was used whose formula is indicated below:

$$\text{Reliability of scores on total test} = \frac{2 \text{ roe}}{1 + \text{roe}}$$

Where roe = reliability coefficient obtained by correlating the score of the odd numbered statements with the score of the even statements.

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, the DEO 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. Regression analysis was also used to come up with the model expressing the relationship between the dependent variable (Chemistry performance) and predictor variables (Teaching and learning resources used in teaching, Teaching and learning methods used in teaching Chemistry, Evaluation of Chemistry subject, Staff development of Chemistry teachers, Professional qualification of Chemistry teachers' and Attitude of students towards chemistry). Predictors variables are rated on likert scale of 1 to 5, a mean value of the statements relating to each predictor variable were computed. A multiple regression model was developed to describe the relationship between the dependent and independent variable. The regression equation assumed the following form:

$$Y = \beta_0 + \beta_1 X_1$$

More specifically:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6$$

Where Y= Chemistry performance of students in public secondary schools

$X_1$  = Attitude of students towards chemistry

$X_2$  = Professional qualification of Chemistry teachers'

$X_3$  = Staff development of Chemistry teachers

$X_4$  = Evaluation of Chemistry subject

$X_5$  = Teaching and learning methods used in teaching Chemistry

$X_6$  = Teaching and learning resources used in teaching

Correlation analysis was used to check on the overall strength of the established regression model and also the individual significance of the predictor variables.

### **3.9 Operationalization of the Variables**

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

**Table 3.2 Operationalization of the Variables**

Objective	Variable	Indicator(s)	Measurement(s)	Scale	Data Collection Method	Data Analysis
To establish the attitude of students in public secondary schools towards Chemistry in Kajiado North District	<u>Independent variable</u> Attitude of students toward Chemistry	<ul style="list-style-type: none"> <li>Choice of Chemistry</li> </ul>	a) No. of students who like or dislike Chemistry	Nominal	Questionnaire	Descriptive and inferential statistics
To investigate the professional qualification of Chemistry teachers in public secondary schools in Kajiado North District	<u>Independent variable</u> Professional qualification of Chemistry teachers	<ul style="list-style-type: none"> <li>Academic qualification</li> </ul>	M. Ed B. Ed Dip. Ed	Ordinal	Questionnaire	Descriptive and inferential statistics
To investigate staff development	<u>Independent variable</u> Staff	<ul style="list-style-type: none"> <li>Seminars attendance</li> </ul>	Frequency of attendance a) Once b) Twice	Nominal, ordinal	Questionnaire	Descriptive and inferential

ment of teachers teaching Chemistry in public secondary schools in Kajiado North District.	development of teachers teaching Chemistry	<ul style="list-style-type: none"> <li>• Further training</li> </ul>	<p>c) Thrice</p> <p>a) Level of professional qualification</p>			tial statistical
To investigate evaluation of Chemistry in public secondary schools in Kajiado North District.	<b><u>Independent variable</u></b> Evaluation of Chemistry	<ul style="list-style-type: none"> <li>• Frequency of evaluating students</li> </ul>	<p>Occurrence within a term</p> <p>a) Monthly</p> <p>b) Twice</p> <p>c) Once</p>	Nominal, and ratio	Questionnaire	Descriptive and inferential statistical
To establish the teaching and learning methods used in teaching Chemistry in Public secondary	<b><u>Independent variable</u></b> Teaching and learning methods used in teaching Chemistry	<ul style="list-style-type: none"> <li>• Teaching techniques</li> </ul>	<p>a) Lecture method</p> <p>b) Self directed/text books</p> <p>c) Drill and practices</p> <p>d) Class demonstration</p> <p>e) Homework/assignment</p> <p>f) Discussion groups</p> <p>g) Practical/class experiments</p> <p>h) projects</p>	Ordinal	Questionnaire and class observation schedule	Descriptive and inferential statistical

schools in Kajiado North District.						
To establish the adequacy of teaching and learning resource needed in teaching Chemistry in public secondary school in Kajiado North District.	<b><u>Independent variable</u></b> Adequacy of teaching and learning resource needed in teaching Chemistry	<ul style="list-style-type: none"> <li>Teaching/learning resources</li> </ul>	<ul style="list-style-type: none"> <li>Student/text book ration</li> <li>Laboratory</li> <li>Apparatus/reagents</li> <li>Charts</li> </ul>	Ordinal	Questionnaire and class observation schedule	Descriptive and inferential statistics
To investigate the Factors that Influence Performance of Chemistry in KCSE	<b><u>Dependent variable</u></b> Performance of Chemistry	<ul style="list-style-type: none"> <li>Students performance in Chemistry</li> </ul>	Grade scored/mean score	ordinal	Questionnaire	Descriptive and inferential statistics

### **3.10 Summary**

This chapter details 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

### DATA ANALYSIS, PRESENTATION AND INTERPRETATION

#### 4.1 Introduction

This chapter presents the results of analysis of the data collected from 17 public Secondary schools in Kajiado North District. 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 attitude of students towards Chemistry subject, professional qualification of Chemistry teachers, staff development 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 respondents included 10 COS, 17 Subject teachers and 306 students. The questionnaires were administered to COS, subject teachers and students, of the administered questionnaires, 10 COS responses were received representing (100%), 14 responses from subject teachers (82.3%) and 256 responses from the students were received (83.67%) which the researchers considered adequate for analysis.

#### 4.3 Demographic Data

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



### 4.3.1 Distribution of the respondents by category of schools

Table 4.1 below presents data on distribution of respondents by category of school. This data was obtained from both the COS and teachers questionnaire.

**Table 4.1 Distribution by categories of schools**

Categories	School category	Frequency	Percent
COS N=10	Boys boarding	4	40.0
	Girls boarding	2	20.0
	Mixed Day	4	40.0
Chemistry teachers N=14	Boys boarding	6	42.9
	Girls boarding	2	14.2
	Mixed Day	6	42.9

The findings presented in table 4.1 show that most of the respondents (COS and chemistry teachers) were from boys boarding and mixed day schools. From COS the percentage distribution of both boys and girls respondents were 40% and 20% respectively while that from mixed day schools was 40%. The distribution of Chemistry teachers was as follows: 42.9% each for both boys and girls boarding schools and 14.2% for mixed day schools. The above information portrayed a district where 40% of public secondary schools are boys and 20% are girls making a total of 60%, while 40% 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 Percent	Gender	Frequency	
COS N=10	Male	6	60.0
	Female	4	40.0
Chemistry Teacher N=17	Male	10	71.4
	Female	4	28.6
Students N=256	Male	133	52.0
	Female	123	48.0

Table 4.2 shows the distribution of respondents by gender. From COS it was observed that boys and girls schools respondents were 60% and 40% respectively. The distribution of male and female teachers was 71.4 and 28.6% respectively while that of male and female students was 52 and 48 percent respectively.

### 4.3.3 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.

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

**Table 4.3 Age distribution of Chemistry teachers**

Age	Frequency	Percent
Less than 30 Years	4	28.6
31 to 40 Years	6	42.9
41 to 50 Years	4	28.6
<b>Total</b>	<b>14</b>	<b>100.0</b>

The findings presented in table 4.3 show that, 42.9% of the chemistry teachers were of age 31 to 40 years, 28.6% were of age 41 to 50 years and the rest 28.6% were less than 30 years of age.

#### 4.3.4 Duration of Chemistry lesson

The study sought to establish the utilization of time scheduled for Chemistry lesson. The table 4.4 shows the distribution of respondents by duration of lesson

**Table 4.4 Distribution of respondents by duration of lesson (COS)**

Categories	Lesson Duration	Frequency	Percent
COS N=10	30 Min	2	20.0
	45 Min	8	80.0
<b>Total</b>		<b>10</b>	<b>100.0</b>

Table 4.4 presents the respondents distribution by duration of lessons. The result indicates that 80% of the lessons last 45 minutes while 20% last 30 minutes. This is taken with consideration that a chemistry class is allocated 40 minutes at secondary school level.

#### 4.4 Attitude of students towards chemistry

This section deals with findings which tend to establish student attitude towards chemistry in public secondary schools in Kajiado North district.

##### 4.4.1 Students who enjoy learning chemistry

The students respondents were asked to state whether they enjoy learning of Chemistry subject or not. The information from the analysis is presented on table 4.5

**Table 4.5 Students who enjoy learning chemistry**

Response	Opinion	Frequency	Percent
Do you enjoy learning chemistry	Yes	187	73.0
	No	69	27.0
Total		256	100.0

When asked to state whether or not they enjoyed chemistry 73.0% of the students said they enjoyed learning chemistry while a significant 27% did not enjoy chemistry.

##### 4.4.2 Rating the ability to pass KCSE 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 4.6

**Table 4.6: How do you rate your ability to pass KCSE chemistry**

Opinion	Frequency	Percent
Very confident	86	33.6
Confident	146	57.0
Not confident	24	9.4
Total	256	100.0

As indicated in the table 4.6, 57.0% of the students were confident that they would pass KCSE chemistry exam, 33.6% were very confident of passing while only 9.4% were not confident of passing.

#### 4.4.3 Pre – Mock Chemistry performance of students

The table 4.7 presents data on the distribution of the respondents by pre- mock chemistry examination in Kajiado North District in the year 2011.

**Table 4.7 Pre – Mock Chemistry performance of students**

Categories	Grade	Frequency	Percent
Students N=256	A to A-	6	2.4
	B+ to B-	32	12.4
	C+ to C-	108	42.2
	D+ to D-	98	38.3
	E	12	4.7
Total		256	100.0

The results presented in table 4.7 indicates that 2.4% of the students scored between grade A and A-, 12.4% scored between B+ and B-, 42.2% scored between C+ and C-, 38.3% scored between D+ and D- and 4.7% scored 4.7% in 2011 Pre – Mock examination.

#### 4.4.4 Career aspiration of students

The table 4.8 presents data on the distribution of the respondents by career aspiration of students in Kajiado North District.

**Table 4.8 Distribution of respondents by career aspiration (Students)**

Categories	Grade	Frequency	Percent
Students N=256	Teacher	25	9.8
	Lawyer	65	25.4
	Doctor	53	20.7
	Nursing	13	5.1
	Engineering	50	19.5
	Accounting	47	18.4
	Secretary	3	1.1
Total		256	100.0

The respondents were asked to state their most preferred career after school. As indicated in table 4.8, 25.4% of the students wanted to be lawyers followed by doctors (20.7%), engineers (19.5%) and accountants (18.4%) respectively. The least career aspired by student is secretarial at 1.1%. The percentage of students aspiring to be nurses was 5.5%.

#### **4.5 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 4.9.

**Table 4.9 Highest academic qualification of Chemistry teachers**

Level of education	Frequency	Percent
Masters in Education degree	1	7.1
Bachelors' in Education degree	10	71.4
Diploma in Education	1	7.1
Form 4 KCSE certificate	2	14.3
Total	14	100.0

The respondents were asked to state their highest level of qualification attained. The results are given in table 4.9 showing that 71.4% of the respondents had Bachelors' in Education degree, 14.3% were form four graduates and both the Masters in Education and Diploma in education qualifications had 7.1%.

#### 4.5.2 Highest professional qualification of Chemistry teachers

The respondents were asked to indicate their highest level of professional qualification.

The data obtained from the respondents is indicated in table 4.10

**Table 4.10 Highest professional qualification attained by Chemistry teachers**

Highest professional qualification	Frequency	Percent
Masters in education degree	1	7.1
Bachelors' in education degree	10	71.4
Diploma in education	1	14.3
Total	12	92.8

The respondents were asked to state their highest level of qualification attained. The results are given in table 4.10 showing that 71.4% of the respondents had Bachelors' degree in Education, 7.1% had a degree in Masters in Education while 14.3% had

diploma in Education qualifications. Total percentage of professional qualified teachers was 92.8%.

#### 4.6 Staff development of Chemistry teachers

To establish the staff development of Chemistry teachers in public secondary school in Kajiado North District, 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 4.11 presents data on the distribution of the respondents by work experience.

**Table 4.11 Working experience of Chemistry teachers**

Categories	Length of service	Frequency	Percent
COS N=14	1 to 5 Years	3	21.4
	6 to 10 Years	4	28.6
	11 to 15 Years	4	28.6
	16 to 20 Years	2	14.3
	21 to 25 years	1	7.1
Total		14	100.0

The results presented in table 4.11 indicates that 57.2% of the chemistry teachers had served for a period of 6 to 15 years, 14.3% had served for 16 to 20 years, 21.4% had work experience of less than 5 years and 7.1% had served for a period of 21 to 25 years of service.



#### 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 table 4.12

**Table 4.12: Frequency of seminars attended**

No. of seminars attended	Frequency	Percent
Once	4	23.5
Twice	5	29.4
Thrice	6	35.3
Four times	2	11.8
Total	17	100.0

The findings in table 4.12 indicates that all the teachers had at least attended a seminar, workshop or in service course for teaching of chemistry. More specific 35.3% of all the teachers had attended the seminars thrice, 29.4% had attended twice, and 23.5% had only attended one seminar while the rest (11.8%) had attended four seminars.

#### 4.6.3 Rating of seminars

Chemistry teachers were asked how often they have attended seminars on Chemistry in the last five years. Table 4.13 represents this information.

**Table 4.13: Rating of seminars**

Rating of seminars attended	Frequency	Percent
Very useful	6	35.3
Useful	6	35.3
Not useful	5	29.4
Total	17	100.0

When asked to rate the quality of seminar attended, 35.3% of the teachers rated seminars to be very useful and useful. Notable were 29.4% of the teachers who were of the opinion that the seminars and courses were not useful for teaching of chemistry.

#### 4.7 Evaluation of Chemistry subject

The study sought to establish evaluation technique commonly used to enhance students performance in Chemistry by Chemistry teachers. Table 4.14 present findings on techniques used to evaluate students' progress during chemistry lesson.

**Table 4.14 Techniques used to enhance performance of students in chemistry**

Statements	N	Mean	Std dev
Always the students do exercises from the class text books during each lesson	14	2.00	0.68
I give the same kind of work to all students in class	14	3.93	1.33
I mark, supervise work done by all student in class	14	3.71	1.44
I give extra work to weaker students	14	2.64	1.34
I provide feedback to students	14	4.00	1.30

The findings in table 4.14, indicates that teachers always/very often: provide feedback to students (mean of 4.00), give the same kind of work to all students in class (mean of 3.63), mark and supervise work done by all students in class (mean of 3.71) as techniques of enhancing performance in chemistry.

#### 4.8 Teaching and learning methods used in teaching of chemistry

To determine teaching and learning methods commonly used in teaching of Chemistry; students, teachers and COS respondents stated the most common teaching and learning methods used in public secondary schools in Kajiado North District.

##### 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 4.12.

**Table 4.15 Frequency of use of teaching methods**

Statements	N	Mean	Std dev
Lecture method	256	3.59	2.30
Self directed learning/ Text books	256	3.23	2.01
Class Demonstration	256	2.49	1.74
Homework drill and Practices	256	1.78	1.80
Assignment method	256	2.68	1.70
Discussion Method	256	2.34	1.74
Practical Work/ Class assignment	256	3.32	1.68

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, frequencies and percentages. The findings in table 4.15, indicates that, learners agreed that lecture method (mean of 3.59), practical work/class experiment (mean of 3.32) and self directed learning/text books (mean of 3.23) were used very often/often as means of teaching chemistry. On the other hand least used methods

were homework drill and practices (mean of 1.78). The rest of the methods were used on moderate extent.

#### 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 4.16.

**Table 4.16 Frequency of use of teaching methods used to present chemistry lesson**

<b>Statements Percentage</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
Lecture method	4	28.6	28.6
Self directed learning Method	3	21.4	50.0
Class demonstration	3	21.4	71.4
Homework assignment Method	1	7.1	78.6
Practical work /class Experiment	3	21.4	100.0
<b>Total</b>	<b>14</b>	<b>100.0</b>	

The findings in table 4.16, indicates that, most teachers (28.6%) agreed that lecture was used very often/often as means of teaching chemistry. On the other hand Self directed learning Method, Class demonstration, practical work/class Experiment was moderately used (21.4%) and the least used method was Homework assignment method (7.1%).

#### 4.8.3 COS Response

This section covers findings from teaching and learning methods, techniques used to assess students during the lesson which are likely to enhance performance in chemistry,

class interaction, classroom atmosphere and frequency of feedback provision by chemistry teachers. The findings have been presented in tables, frequencies, percentages, means and standard deviation.

#### 4.8.3.1 Methods commonly used in teaching of chemistry

Class observation schedule also sought to establish methods commonly used in teaching of Chemistry. The findings are represented in table 4.17.

**Table 4.17 Frequency of use of teaching methods used to teach chemistry lesson**

Statements	N	Mean	Std dev
Teacher assisting one students	10	1.70	0.48
Small Group Instruction	10	1.40	0.52
Whole group instruction	10	1.10	0.32
Student demonstration to others	10	1.70	0.67
Class experiment	10	1.50	0.71
Valid N (listwise)	10		

The findings in table 4.17 indicate that, COS respondents agreed that teacher assisting one student (mean 1.70), student demonstration to others (mean 1.70) were used very often/often as means of teaching chemistry. On the other hand least used methods were whole group discussion (Mean 1.10). The rest of the methods were used on moderate extent.

#### 4.8.3.2 Classroom interaction that encourages students participation in chemistry

The observation revealed that the following techniques were commonly used as a means of classroom interaction to encourage students' participation in chemistry, teacher-

student interactions, student-student interactions, variety of learning activities, students answering and asking questions in class and teachers reinforcement to student's attempts.

#### 4.8.3.3 Classroom atmosphere

Class observation schedule sought to find out the classroom atmosphere during teaching of the Chemistry lesson. From the finding the following data was obtained.

**Table 4.18 Classroom atmosphere**

Statements	N	Mean	Std. dev
Friendly and encouraging atmosphere in class (Teacher/Student)	10	1.50	0.71
Unfriendly atmosphere in class (criticism/ negative)	10	2.40	0.70
Pupil – pupil relationship	10	2.40	0.70
Noisy with chorus	10	2.30	0.50

The findings shows that in most schools; the atmosphere was conducive (a little or not at all) in terms of the following parameters; unfriendly atmosphere in class (mean of 2.40), pupil-pupil relationship (mean of 2.40) and noisy with chorus answers (mean of 2.30).

#### 4.8.3.4 Frequency of feedback provided by chemistry teachers

The findings in table 4.18 present data obtained from COS on frequency of feedback provided by chemistry teachers to students.

**Table 4.19 Frequency of feedback provided by chemistry teachers**

Statements	N	Mean	Std dev
Making correction of specific assignment	10	1.40	0.52
Work given, teacher moves around in class marking	10	1.50	0.53
Assignment given at the end of the lesson	10	1.50	0.53
Marking student assignment	10	1.70	0.48

The observation indicated that chemistry teachers normally provide feedbacks on regular basis, that is, marking correction of specific assignment (mean of 1.40), work given, teacher moves around in class marking (mean of 1.50) and assignment given at the end of the lesson (mean of 1.50).

#### 4.9 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 and whether the schools have trained laboratory technicians. Table 4.20 presents findings on availability of Chemistry laboratory in public secondary schools in Kajiado North District.

**Table 4.20 Frequency of availability of Chemistry laboratory**

Response	opinion	Frequency	Percent
Availability of Chemistry lab.	Yes	14	100
N=14	No	0	0

The finding in table 4.20 reveals that 100% of the Chemistry teachers agreed that there were operational Chemistry laboratory in public secondary schools in Kajiado North district

Table 4.21 presents findings on the level of equipment of the apparatus and Chemical reagents in Chemistry laboratory.

**Table 4.21 Frequency of level of equipment of apparatus and reagents in Chemistry laboratory**

Response	opinion	Frequency	Percent
Level of lab. equipment N=14	Enough	4	28.57
	Average	8	57.14
	poor	2	14.29

Table 4.21 reveals that 57.14% of the Chemistry laboratories were moderately equipped, 28.57 % were much better equipped and 14.29% 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 table 4.22.

**Table 4.22 Frequency of trained laboratory technicians**

Response	opinion	Frequency	Percent
Trained lab. technician N=14	Yes	10	71.43
	No	4	28.57



The findings from table 4.22 reveal that 71.43% public secondary schools had trained laboratory technicians while only 28.57% 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 staff development 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

### SUMMARY OF FINDINGS, DISCUSSIONS CONCLUSIONS AND RECOMMENDATIONS

#### **5.0: Introduction**

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

#### **5.1 Summary of the findings**

The objectives of this study were to establish the attitude of students in public secondary schools towards Chemistry in Kajiado North District, to investigate the professional qualification of Chemistry teachers in public secondary schools in Kajiado North District, to investigate staff development of teachers teaching Chemistry in public secondary schools in Kajiado North District, to investigate evaluation of Chemistry in public secondary schools in Kajiado North District and to establish the teaching and learning methods used in teaching Chemistry in Public secondary schools in Kajiado North District.

##### **5.1.1 Attitude of student in public secondary schools toward Chemistry**

The study found that majority of the students enjoyed chemistry that is 73.0% of the students said they enjoyed learning chemistry. This is also supported by career choice

amongst the student which requires Chemistry knowledge (doctors at 20.7%, engineers at 19.5% and nursing at 5.1%).

On rating the ability to pass chemistry majority of the students (57.9%) were confident that they would pass KCSE chemistry exam, 33.6% were very confident of passing while only 9.4% were not confident of passing.

### **5.1.2 Professional qualification of Chemistry teachers**

From the findings, 71.4 percent of the respondents had first degree (Bachelors), 14.3% were form four graduates and 7.1% had master and diploma in education qualifications at the same time 71.4 percent of the respondents had first degree, 23.7 percent had Masters Degree while 3.9 percent had diploma qualifications as professional qualifications. This shows that chemistry teachers had enough experience to teach the students.

### **5.1.3 Staff development of Chemistry teachers**

The study on staff development was based on the number of occasions Chemistry teachers have attended related workshops or seminars. The findings indicated that only 11.8 percent have attended at least four seminars in the last five years of their teaching career. This is quite a low percentage when compared to 29.4 percent who have attended to at least five times and 23.5 percent of teachers have attended to seminars once. Only 35.3 percent of the teachers managed to attend to at least three seminars. 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.

#### **5.14 Evaluation of Chemistry**

The findings indicated that, teachers always/very often provided feedback to students (mean of 4.000), give the same kind of work to all students in class (mean of 3.6286), mark and supervise work done by all students in class (mean of 3.7143) as techniques of enhancing performance in chemistry.

The COS respondents were of the opinion that techniques like classroom interaction, teacher-student interactions, student-student interactions, variety of learning activities, students answering and asking questions in class and teachers reinforcement to student's encourage students' participation in chemistry.

#### **5.15 Teaching and learning methods**

The study identified lecture method, self directed learning/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 Kajiado North District. From the methods identified, the most often used means of teaching chemistry were lecture method (mean of 3.5859) practical work/ class experiment (mean of 3.3231) and self directed learning/text books (mean of 3.2305).

## 5.16 Teaching and Learning resources

Teacher unanimously agreed that these schools had well equipped Chemistry laboratory with enough apparatus and reagent required for the experiments. It was also noted that the schools had 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 Attitude of students towards chemistry, Professional qualification of Chemistry teachers', Staff development 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 finding of the study indicated that the model was significant. This is demonstrated in the part of the analysis where  $R^2$  for the association between each of the independent variables and Students Chemistry Performance was 87.1%.

All the independent variables were also linearly related with the dependent variable thus a model of six predictor variables could be used to rate K Students Chemistry Performance in Kajiado North District.

## 5.2 Discussion of the findings

As highlighted in the background of the study, the government of Kenya has focused on improvement of education for the relevance of the nation. 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 attitude as one of the affecting student performance in Chemistry.

From the study majority of Chemistry teachers (71.4%) are qualified, though this does not translate into better performance in Chemistry by the students in Kajiado North District. 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 very few teachers (35.5%) in Kajiado North district rate seminars and workshops as very useful. This point is supported by the fact that only 11.8% of the Chemistry teachers have attended seminars for at least 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 Kajiado North District is the lecture method. 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.

Despite most of the schools in Kajiado North District 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.

### **5.3 Conclusion of the study**

From the findings of the study, it can be concluded that factors that influence Performance of Chemistry in Public Secondary Schools in Kajiado North District are;

1. Attitude of students towards chemistry.
2. Professional qualification of Chemistry teachers.
3. Staff development of Chemistry teachers.
4. Evaluation of Chemistry subject.
5. Teaching and learning methods used in teaching Chemistry.

## 6. Teaching and learning resources needed in teaching of Chemistry.

Majority of the students seems to be very positive toward Chemistry, though there performance is far below average. Majority of students seems to score low grade in Chemistry. After considering this aspect the researcher concluded that there may be other factors which have major influence on students Chemistry performance in Kajiado North District.

### 5.4 Recommendations

From research findings and conclusion made, the following recommendations were 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 staff development 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 ongoing information on direction of change, pace of change



and generation of appropriate results regarding Chemistry by students in Kajiado North District.

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 factors influencing performance of students in chemistry in public secondary schools in Kajiado North District in Kenya. It is therefore suggested that similar study should be carried out in districts adjacent to Kajiado North District 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 Kajiado North District.

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## APPENDICES

### APPENDIX A: INTRODUCTORY LETTER

Chrispine Odawa Ouma  
University of Nairobi  
School of Continuing & Distance  
Education  
NAIROBI.

The Head Teacher

Dear Sir/Madam,

#### **RE: COLLECTION OF DATA.**

I am a postgraduate student at the University of Nairobi, School of Continuing and Distance Learning. In order to fulfill the degree requirements I am undertaking a project on factors that influence performance of Chemistry in public secondary schools in Kajiado North District.

You have been selected to form part of this study. This is to kindly request you to assist me collect the data by filling out the accompanying questionnaire. The information data you provide will be used exclusively for academic purpose. I assure you that the information provided will be treated with utmost confidence. Your cooperation will be highly appreciated.

Thanking you in Advance.

Yours faithfully

CHRISPINE ODAWA OUMA



## 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 (✓) 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. Form 6 ( )

e. Form 4 ( )

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 ( )

7. 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. Co – educational ( )

9. What is the category of your school?

a. Provincial ( ) b. District ( ) c. Private

10. What is the category of your school?

a. Day ( ) b. Boarding ( ) c. Day and boarding ( )

#### SECTION (II): Teaching methodology

11. 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)

.....

12. Of the methods you have ticked in question 1 above, indicate how often you use them.

Teaching method	Very often	Often	Rarely	Very rarely
a) Lecture method				
b) Self directed learning/ text books				
c) Class demonstration				
d) Homework drill and practices				
e) Assignment method				
f) Discussion method				
g) Practical work/class experiment				

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 techniques	Never	Sometimes	Often	Very often	Always
Always the students do exercises from the class text books during each lesson					
I give the same kind of work to all students in class					
I mark, supervised I done by all the students in class					
I give extra work to weaker students					
I provide feedback to 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): Staff development of teachers teaching Chemistry in public secondary schools in Kajiado North District**

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 KCPE? .....
  
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 KCSE 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 than 7 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					
Homework drill and practices					
Assignment method					
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 ( )

Please explain?

.....

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

.....

## APPENDIX D

### CLASSROOM OBSERVATION SCHEDULE (COS)

The purpose of this instrument was to find out, whether teaching method/s teachers uses to present Chemistry lesson, classroom interaction, atmosphere and frequency of feedback provision enhanced students' performance in Chemistry.

#### SECTION A: General information about the School and the teacher

School type ..... No. of students .....

Gender of teacher: Male ( ) Female ( ) Duration of lesson .....

#### SECTION B: Teaching methods used to present Chemistry lesson

Rating scale is as follows: FU – frequently used -2, NFU- Not frequently used -1, NU – not used at all – 0

Teaching methods	FU	NFU	NU
a) Teacher assisting one student			
a) Small group instruction			
b) Whole group instruction			
c) Students demonstrating to others			
d) Class experiment			

**SECTION C: Class interaction that encourages students' participation in Chemistry lessons**

Classroom interactions	Present	Absent
Teacher – student interactions		
Student – student interactions		
Varieties of learning activities		
Students answering and asking questions in class		
Teachers' reinforcement to students attempts		

**SECTION D: Classroom atmosphere**

Rating scale is as follows: A – a lot – 2, L – little – 1, NA – not at all – 0

Classroom atmosphere	A	L	NA
a) Friendly and encouraging atmosphere in class (teacher/student)			
b) Unfriendly atmosphere in class ( criticism/negative)			
c) Pupil – pupil relationship ( unfriendly )			
d) Noisy with chorus answers			
e) Passive atmosphere			

**SECTION E: Frequency of feedback provision by Chemistry teachers**

Rating scale is as follows: RD – regularly done – 2, NRD – not regularly done – 1, NDA

– not done at all – 0

Feed back	RD	NRD	NDA
a) Marking correction of specific assignments			
b) Work given, teacher moves around in class marking			
c) Assignments given at the end of the lesson			
a) Marking students' assignments			

Any other observations made

.....

.....

.....