TEACHERS' CHARACTERISTICS AND THEIR EFFECTS ON STUDENTS' ACHIEVEMENTS IN CHEMISTRY: A CASE STUDY OF BUNGOMA NORTH DISTRICT.

BY

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DECLARATIONS

DECLARATION BY THE CANDIDATE

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ABSTRACT

Research focusing on the effect of teacher characteristics on students' performance has been popular in recent years. This has revitalized interest in the subject of teacher characteristics and their effects on students' performance. Most studies tend to show that teacher characteristics have a positive effect on students' performance. There, however, lacks sufficient data to support this assertion in Kenya. This study, therefore, focused on teacher characteristics and their effects on students' achievement in chemistry in Bungoma North District. The purpose of the study was to investigate the effect of teacher qualification, experience and attitude on students' performance in chemistry. The theoretical framework in the study was based on the heuristic learning theory as advanced by Henry Edward Armstrong. In this perspective, the student is viewed as one who actively contacts concepts by a process of guided discovery. The research design used to carry out the study was descriptive survey. This was because it was best suited in the study of individual characteristics and would help present responses by respondents in a clearer manner. The target population comprised of students and teachers in a total sample of 42 secondary schools where stratified random sampling was employed to select 13 schools, which represented 30% of the total number of schools. The district was chosen because it had varied performance in national examinations, especially in chemistry. Questionnaire for teachers to investigate teacher qualification, experience and attitude was administered. Another questionnaire to investigate students' attitude towards chemistry and their teachers was also given. The questionnaire had both structured and unstructured items. The data was collected and analyzed using descriptive statistics, including frequency graphs; mean, mode median, standard deviation and percentages while for inferential statistics, correlation and regression were employed. A statistical program, SPSS was used in data analysis. The findings of the study showed that teacher characteristics were more influential in predicting student performance than school factors. The findings of this study added value to the expanding research studies on the effects of teacher characteristics on students' performance. The study recommended the strengthening of internal inspection in schools to mitigate against some of the negative characteristics exhibited by teachers.

DEDICATION

To my dear parents Peter Kilaha Mboli and Esther Kilaha for their encouragement, prayers and guidance.

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ABBREVIATIONS AND ACRONYMS

DEO	District Education Officer
EFA	Education for All.
FM	Financial Management
FPE	Free Primary Education
FSE	Free Secondary Education
GDP	Gross Domestic Product
ICT	Information Communication Technology
KENAO	Kenya National Audit Office
KESI	Kenya Education Staff Institute
KESSP	Kenya Education Sector Support Program
LSO	Local Service Order
MOE	Ministry of Education
PPDA	Public Procurement and Disposal Act
PTA	Parents Teachers Association
QASO	Quality Assurance and Standards Officer
QE	Quality of Education
SMASSE	Strengthening Mathematics and Science Subjects in Education
TSC	Teachers Service Commission

CHAPTER ONE

1.0 INTRODUCTION

This chapter presents the background of the study, statement of the problem, objectives of the study, research questions, hypotheses, significance of the study, limitations, assumptions theoretical and the conceptual framework.

1.1 Background to the Study

Mathematics and Sciences are critical to industrial and technological development. The history of developed nations attests to this. Developing nations aspiring to realize the same status have to put a premium on these subjects. However, in many countries of Africa this area still faces serious challenges in many aspects, and particularly in terms of the quality of teaching. The trend over the past several years has been for Governments of developing countries and their development partners to focus more or less on initiatives in basic or tertiary education thus leaving secondary level education generally unattended to.

For many years, educators and researchers have debated on which school variables influence student achievement. Some research has suggested that schools bring little influence to bear upon a child's achievement that is independent on his or her background and general social context (Coleman et al., 1960). Other evidence suggests that factors like class size (Glass et al., 1982; Mosteller, 1995), teacher qualification (Ferguson, 1991), school size and other school variables may play an important role on how students learn.

Many African countries have put effort into ensuring adequate qualified mathematics and science teachers from Universities and Colleges and in the provision of equipment and materials

(SMASSE, 1996-2006).These, however, are still inadequate; the effort not withstanding.

What is even more intriguing is the situation where qualified teachers, equipment and materials are adequate yet the quality of student achievement in the subjects is not necessarily high. The root causes of the under performance of students thus seems to be deeper than lack of teachers' materials and equipment; it points to what goes on in the class room; what the teacher does with the learner and available equipment and materials. Huron (1977) in a study of 89 schools in Malaysia found a notable correlation between the length of teachers training and student achievement. This factor retained its significance when entered into a multivariate model, which controlled for the effects of pupil's family background and other elements of quality. In its report (SMASSE, 1996-2006), the following were identified as some of the challenges facing teachers' training and development particularly in African countries including Kenya:

1. Weak capacity of existing teacher training institutions to impact positively on initial and continuous teacher training and development.
2. Shortage of trained and qualified teachers
3. Lack of opportunities for continuous professional growth for teachers
4. Teachers' attitude towards their classroom work in terms of lesson preparation and delivery.
5. Lack of teacher centers and of institutional partnerships

Kathuri (1986) in his study on factors that affect pupil academic achievement, found a significant relationship between performance in the certificate of primary education (CPE) score and quality of teachers as measured by their level of education and training, frequency of attendance of in-service courses and their use of modern teaching methods. The study however,

used simple correlation method, which did not take into account the interactive effects of other school inputs on pupil's performance. Hence, the need to establish the effect of teachers' characteristics on students' performance in chemistry under the same parameters, putting into accounts other school factors.

Studies of teacher effects at the classroom level using the Tennessee Value- Added Assessment System and similar data base in Dallas, Texas, have found that differential teacher effectiveness is a strong determinant of differences in student learning, far out weighing the effect of differences in class size and heterogeneity (Sanders and Rivers, 1996; Wright et al., 1997, Jordan et al., 1997). Thus, an effective teacher would be one who consistently obtained high learning growth for students, while an ineffective teacher would be one who consistently produced low learning growth. (Hanushek et al.,2004), Stronge (2002) defined the qualities of an effective teacher as the characteristics of the teacher as an individual, teacher preparation, classroom management, and the way a teacher plans, teaches and monitors students progress.

1.2 Statement of the Problem

The government has in the past few years put a lot of effort in hiring of teachers in secondary schools. In addition to this, it has instituted the SMASSE program to address pedagogical issues regarding the teaching and learning process. However, the government and other stakeholders are getting increasingly concerned about the teacher as an input, hence the talk about performance contracts. The first concern for the school is in its effectiveness in producing academic achievements (Sifuna, 2003). Developing countries have been quite successful at

expanding enrolments in education, especially at the secondary school level. But, for schools to produce all round students, increased enrolments require increased resources like adequate teaching staff, instructional materials among others. If these resources are not forthcoming, the increase in educational quantity may come at the expense of quality.

The schools have been overwhelmed by the large numbers since inception of Free Primary and Secondary Education and the classrooms have not expanded or added. Teachers are few and there are inadequate desks, chairs, laboratories for the enrolled students. Therefore, performance in science subjects has been on decline in these secondary schools in Bungoma North District. Since chemistry subject is compulsory in most of these schools, students' achievements in chemistry have been wanting. These explain why the study was carried out on teachers' characteristics, identified as teacher qualification, teacher experience and teacher attitude on students' performance in chemistry. The study also investigated the effect of school factors, such as laboratories, distance of teacher from his house, workload and class size on students' performance.

This study, it is hoped, will attempt to highlight the role played by teachers in the poor performance in chemistry. This in turn will assist in determining how best teachers can improve performance in the said subject for the welfare of the learners. To the best knowledge of the researcher, this has so far not been done.

1.3 Objectives of the study

The objectives of the study were:-

1. To establish the relationship between teacher qualification and student's performance.
2. To determine the effect of teacher experience on student's performance.
3. To examine the impact of teacher attitude on student's performance in chemistry.
4. To find out the relationship between school factors and student's performance in Chemistry.
5. To examine the impact of school factors on teacher characteristics.

1.4 Research questions

The study's main aim was to provide an answer to the question: To what extent do teacher's attitudes affect student's performance in chemistry? Other subsidiary research questions were as follows:

1. What is the relationship between teacher qualification and students performance in Chemistry?
2. What is the effect of teacher experience on student's performance in Chemistry?
3. What is the impact of teacher attitude and student's performance in Chemistry?
4. What is the impact of school factors on teacher characteristics?

1.5 Hypotheses.

Five hypotheses were tested. They were as follows:

Ho_1: There is no significant relationship between teachers qualification and student performance.

Ho_2: There is no significant relationship between teacher experience and students performance.

Ho_3: There is no significant relationship between teacher attitude and students performance.

Ho_4: There is no significant relationship between school factors and students performance.

Ho5: There is no significant relationship between school factors and teacher characteristics.

1.6 Significance of the study

This section highlights the importance the study has on the educators in general and science educators in particular, future researchers and academicians.

This study will be significant in several ways.

1. The results of the study will help to keep track of trends in teacher preparation. For example, researchers can compare the finding of this study with previous studies regarding teacher preparation and qualification and policy makers can use the information of this study to monitor or regulate future teacher preparation programs.
2. The study hopes to identify the most desirable qualities in a teacher. This in turn will help policy makers in decisions touching on these teachers, in terms of responsibility and promotions.
3. The study hopes to provide an insight into the challenges facing the teachers, especially those teaching chemistry and hence it will be useful to policy makers to see how to address these issues.
4. The study aimed to highlight the role played by teachers in the poor performance in chemistry.

1.7 Scope and Limitations of the study

The study was carried out in secondary schools in Bungoma North District. There were 42 secondary schools in the District and 14 schools were selected using stratified random sampling. A total of 14 chemistry teachers from the 14 schools, 54 boys and 58 girls were purposively selected as respondents. A set of questionnaire for teachers and students were used as primary instruments for data collection. Other school inputs like textbooks and classrooms were not

included in this study. The study instead looked at school factors, identified as laboratories, workload of the teacher, class size and distance of the teacher from their home. The student achievement has many facets, and can not be adequately measured by examination performance alone, since the educational process goes beyond passing or failing an examination. Thus the findings of the study will only be valid when academic achievement is accepted as a reliable measure of student achievement. The study did not involve actual examination of the teacher, to ascertain his/ her teaching methodology. Therefore the study was limited to the responses from students and teachers.

1.8 Assumptions of the study

This section highlights the assumptions that the researcher made.

1. The socio- economic background of the student has no effect on his or her achievement in chemistry.
2. Achievement in national examinations is an indicator of student achievement in chemistry.
3. The respondent gave true and reliable information about the various items on the questionnaire.
4. Students in same category of schools have same entry behavior.
5. K.C.S.E. performance of previous group reflects the academic ability of the group under study.

1.9 Theoretical Frame work

This study was based on the Heuristic Theory of learning as advanced by Henry Edward Armstrong. In this view, the learner is conceived as one who actively constructs concepts by a process of guided discovery. The emphasis is to enable students to do science rather than learning about it. Heuristic theory sharply contrasts with the deductive approach postulated by Bandura (1977). In this approach, theory precedes practicals and practicals are used merely to confirm theories. The teacher therefore demonstrates most experiments to passive learners. Armstrong's model moves away from an emphasis of the verification of basic principles of science. It emphasizes the inductive development of a functional understanding of the principles of science through problem solving performed by pupils under the guidance of the teacher.

Hence the teacher's role is not to be a source of all knowledge but rather teach science as an inquiry and monitor investigations done by the student.

According to Armstrong, as students discover knowledge, they are able to integrate the material in their cognitive structure and also use the learned knowledge to solve problems. The learner therefore develops positive attitudes like responsibility, cooperation and self confidence.

Griffin (1957) gave the following as characteristics of a well prepared teacher.

1. The teacher must have mastery of and adequate training in the topic from which the subject-matter has been selected for a certain lesson. In the words of Yoakam and Simpson: "No teacher can map out a proposed unit or write even a single daily plan without knowing thoroughly the field in which he is working."
2. The teacher must know her children thoroughly. She must not only know the facts of social studies but also what part of social studies will be meaningful to her pupils and

how to organize her material in a psychological rather than merely a logical fashion. She must understand her children's traits in order to know how to plan for them.

3. The teacher must be fully conversant with new methods and techniques of teaching the subject.
4. The teacher must be a grounded in the psychology of learning as well as a sound philosophy of education, and an adequate knowledge of sociology and educational biology.
5. The teacher must have basic understanding of the aims of education, especially as they have been modified by educational science, philosophy and biology.
6. The teacher must ensure active student participation.
7. Since monotony is defect, the teacher must vary tasks during the lesson. This variety of work may be marked on different occasions or at different stages of the lesson in the same period

For the teacher to impact the learner in these diverse dimensions, he needs sufficient training in content, methodology, sufficient experience and the right attitude.

1.10 Definition of terms

1. **Attitude**: An acquired internal state or feeling influencing the choice of liking something or disliking it. In this study, attitude is seen in the way the teacher views his work, opinion about his students and absenteeism.
2. **Students' achievement**: Performance as measured by the scores in National examination.
3. **Teacher's experience:** teacher experience will be considered in terms of the number of years taught.
4. **Teacher characteristics**: These are attributes that describe the teachers. They include teacher qualifications, experience, his attitude towards the school and motivational abilities of the teachers.
5. **Teacher qualifications**: Refers to pre-service qualifications and the frequency of attending in-service training. They include a bachelor of education science degree, diploma, Bachelor of Science degree or Masters Degree.
6. **School factors**: These are factors related to the school under study such as the number of laboratories, state of laboratories, distance of teachers' house from school and class size. These factors tend to influence both teacher characteristics and students achievement.

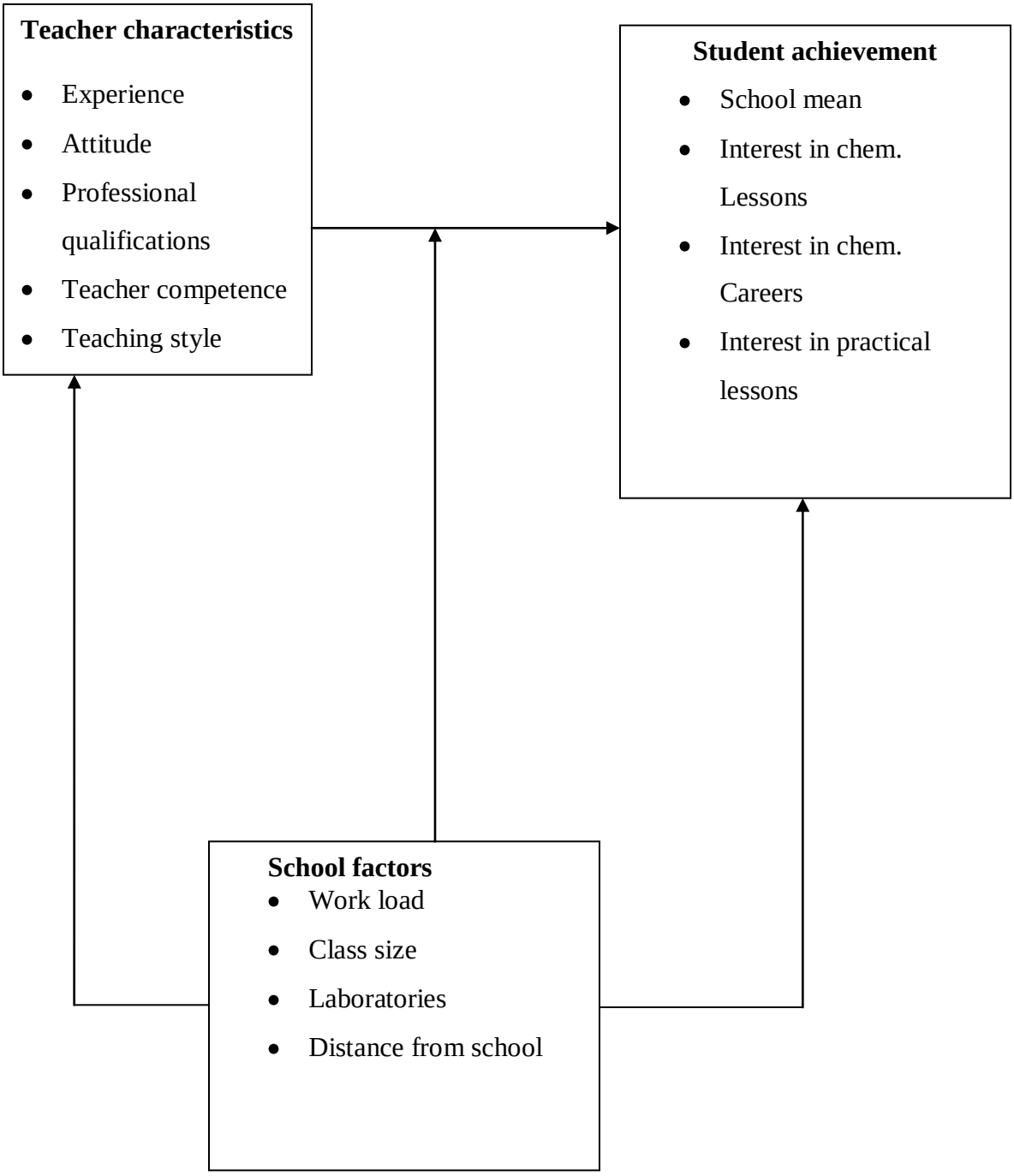


Figure 1.1 Conceptual Model

1.11 Summary of the chapter.

It is clear that the teacher characteristic question needs investigation if quality and equity in education is to be achieved. As the talk of performance contracts gains more ground, the focus seems to be on the teacher input. The above chapter therefore has attempted to highlight the importance of this issue. The next chapter is on the review of literature.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction.

This chapter explores the related literature to the teacher characteristics question. This literature is studied under sub headings as follows: Teacher quality, teacher qualifications, teaching experience, teacher attitudes and laboratories in science education.

2.2 Teacher Quality

For students, good teaching lasts a lifetime and bad teaching limits dreams and opportunities (U.S. Department of Education, 2002). The National Commission on Teaching and America's Future (1996) asserts that what teachers know and can do is the most important influence on what students learn. Few people would disagree that the quality of teachers is the critical element in effective schooling and student learning.

Coleman et al., (1996) suggested that school inputs had little effect on student achievement independent of family and societal background. As new standards for student learning have been introduced across the states, greater attention has been given to the role that teacher quality plays in student achievement (National Commission on Teaching and America's Future, 1996; National Education Goals Panel, 1998). In the last few years, more than 25 states have enacted legislation to improve teacher recruitment, education, certification, or professional development (Darling-Hammond, 1997a).

Research shows that "schools can make a difference, and a substantial portion of that difference is attributable to teachers" (Darling-Hammond, 2000b, p. 2).

Darling-Hammond, analyzing data from a 50-state survey, found that teacher quality variables, namely, holding full certification and a major in the field, appeared more influential than student demographic characteristics in predicting student achievement and it was a stronger correlate of student achievement than class size, overall spending, or teacher salaries. Goldhaber and Anthony (2003), after extensively reviewing the research on the relationship between teacher quality and student achievement, concluded that teacher quality had the largest impact on student achievement among all education factors and school resources (e.g., investments in technology, educational materials, class size).

While teacher effects on student achievement is critical, there are substantial differences among teachers in the ability to produce student achievement gains (Nye et al., 2004). Studies focusing on investigating total teacher effects by looking at differences in growth rates of student achievement across teachers revealed that, in the course of a single school year, students who were assigned to an effective teacher could gain a full grade level more than those students who have an ineffective teacher (Hanushek, 1992; Ferguson, 1991; Sanders and Rivers, 1996). This approach to the examination of teacher quality concentrates on pure outcome-based measures of teacher effectiveness. It does not require the choice of specific teacher characteristics. Hence this study seeks to identify the attributes of teachers in Bungoma North District, where performance in national examinations is very low. At the same time, despite conventional wisdom that school inputs make little difference in student learning, a growing body of research suggests that schools can make a difference, and a substantial portion of that difference is attributable to teachers.

Studies of teacher effects at the classroom level using the Tennessee Value-Added Assessment System and a similar data base in Dallas, Texas, have found that differential teacher effectiveness is a strong determinant of differences in student learning, far outweighing the effects of differences in class size and heterogeneity (Sanders et al., 1996; Wright et al., 1997; Jordan et al., 1997).

Thus, an effective teacher would be one who consistently obtained high learning growth from students, while an ineffective teacher would be one who consistently produced low learning growth (Hanushek et al., 2004). However, in the book of Qualities of Effective Teachers, Stronge (2002) defined that qualities of effective teachers include "characteristics of the teacher as an individual, teacher preparation, classroom management, and the way a teacher plans, teaches, and monitors student progress" This study will however be restricted to measuring the opinions held by teachers regarding their students, the administration, and their teaching career. It will also highlight some mannerisms observed by students in teachers that could be affecting their performance.

2.3 Teacher qualification and student performance

The teacher qualification factor in student's performance is a subject of great concern. The teacher qualification expressed in terms of formal education and training shows different results when correlated to student's performance, hence the need for further investigation. Schiefbein (1973) and Heyneman (1981) found out that the teacher qualification had a positive effect at primary level though significant in regression. Heyneman (1976) found that only teachers competent in the English language had a significant effect on student performance in Uganda's Primary schools. This study used a reading test to establish the teacher effect on pupil performance.

In an analysis of science teaching, Perks (1967-68) found that teachers' coursework credits in science were not significant to student learning, but course work in science education was significantly related to student achievement on tasks requiring problem solving and applications of science knowledge. Teachers with greater training in science teaching were more likely to use laboratory techniques and discussions and to emphasize conceptual application of ideas, while those with less education training placed more emphasis on memorization. Ashton and Crocker (1987) found only 5 of 14 studies they reviewed exhibited a positive relationship between measures of subject matter knowledge and teacher performance.

It may be that these results are mixed because subject matter knowledge is a positive influence up to some level of basic competence in the subject but is less important thereafter. For example, a controlled study of middle school mathematics teachers, matched by years of experience and school setting, found that students of fully certified chemistry teachers experienced significantly larger gains in achievement than those taught by teachers not certified in chemistry.

The differences in student gains were greater for algebra classes than general mathematics (Hawk et al., 1985). However, Begle and Geeslin (1972), found in a review of mathematics teaching that the absolute number of course credits in mathematics was not linearly related to teacher performance.Huron (1977) in a study of 89 schools in Malaysia found a notable correlation between the years of a teachers training and student achievement. This factor retained its significance when entered into a multivariate model, which controlled the effects of pupil's family background and other elements of quality. The study used a comprehensive examination as a dependent variable. The use of a national examination, which is normally standard, could have been more objective. This study hence aims to fill this gap, by using the K.C.S.E as a measure of student achievement.

Kathuri (1986), in a study on factors that affect pupil academic achievement, found a significant relationship between performance in the Certificate of Primary Education (CPE) scores and the quality of teachers as measured by their level of training, frequency of attendance at in- service courses and their use of modern teaching methods. The study however, used simple correlation method, which did not take into account interactive effects of other schools, inputs on pupil's performance, hence the reason for this study,

2.4 Teaching experience

Studies of the effects of teacher experience on student learning have found a relationship between teachers' effectiveness and their years of experience (Murnane and Phillips 1982), but not always a significant one or an entirely linear one. While many studies have established that inexperienced teachers (those with less than three years of experience) are typically less effective than more senior teachers, the benefits of experience appear to level off after about five years, especially in non-collegial work settings . A possible cause of this curvilinear trend in experience effects is that older teachers do not always continue to grow and learn and may grow tired in their jobs.

Furthermore, the benefits of experience may interact with educational opportunities. Veteran teachers in settings that emphasize continual learning and collaboration continue to improve their performance. Similarly, very well-prepared beginning teachers can be highly effective. For example, some recent studies of 5-year teacher education programs-programs that include a bachelor's degree in the discipline and master's in education as well as a year-long student teaching placement-have found graduates to be more confident than graduates of 4-year programs and as effective as more senior teachers (Andrew et al., 1995)

It is also possible that uneven effects of experience in cross-sectional studies can be the result of cohort effects (for example, cohorts of teachers hired in times of shortage may be less well-qualified than those hired when schools can be more selective) or of attrition effects (for example, disproportionate early attrition of more able teachers may leave a less capable senior force on average) (Murnane et al., 1998; Vance et al., 1982). Presumably, the direction of this effect would change if retention policies kept the most able beginning teachers in the profession.

Since experience is also correlated with teacher education and certification status, these variables may be confounded in some analyses. Teaching experience improves content mastery. Subject matter knowledge thus is another variable that one might think could be related to teacher experience and thus teacher effectiveness.

While there is some support for this assumption, the findings are not as strong and consistent as one might suppose. Studies of teachers' scores on the subject matter tests of the National Teacher Examinations (NTE) have found no consistent relationship between this measure of subject matter knowledge and teacher performance as measured by student outcomes or supervisory ratings. Most studies show small, statistically insignificant relationships, both positive and negative (Andrews et al., 1980; Ayers et al., 1979). It makes sense that knowledge of the material to be taught is essential to good teaching, but also that returns to subject matter expertise would grow smaller beyond some minimal essential level which exceeds the demands of the curriculum being taught.

2.5 Attitude

Teachers have the opportunity to leave an indelible impression on their students' lives. School experiences mold, shape, and can influence how children view themselves inside and outside of school. These school memories have the potential to last a lifetime in students' minds and can play a consequential role with present and future decisions. It does not take long for students to realize that teachers make the difference between a long and boring school year and an exciting and challenging year. The effective attitudes and actions employed by teachers ultimately can make a positive difference on the lives of their students. A research from North Dakota University highlights that the main teacher attitudes and actions include:

1. A genuine caring and kindness of the teacher
2. A willingness to share the responsibility involved in a classroom,
3. A sincere sensitivity to the students' diversityA motivation to provide meaningful learning experiences for all students, and
4. An enthusiasm for stimulating the students' creativity.

These effective attitudes and actions employed by teachers ultimately can make a positive difference on the lives of their students. It is known that attitudes have a profound impact on teacher practices and behaviors. Richardson (1996) states, "Attitudes and beliefs are a subset of a group of constructs that name, define, and describe the structure and content of mental states that are thought to drive a person's actions. With effective attitudes, teachers and students can develop relationships of mutual respect and trust.

2.5.1 First Attitude: Demonstrating Care and Kindness

Research by Larson; Silverman (2000) and Noddings (1984) has emphasized the importance of developing a caring and respectful relationship between teachers and students. They support students' needs for both communication and care in order to achieve a personal relationship with their teachers. Noddings (1984) believes the entire school curriculum should be built around the ethic of care. She contends that with this construction, caring will become an integral part of a committed, reciprocal relationship between the teacher and student.

It was suggested that the effective teachers should willingly share emotions and feelings (i.e., enthusiasm, affection, patience, sadness, disapproval) as well as a sincere interest and care about their students.

2.5.2 Second Attitude: Sharing Responsibility

Carlson and Hastie (1997) believe teachers' and students' agendas need to overlap and be in support of each other, and the end result would be a positive learning environment. This way of learning is a challenging way of constructing freedom in the classroom. The strength in a constructivist based classroom is in the lessons and activities of the students.

Zimmerman (1990) and Claxton (1996) believe that the learning process should be organized in such a way that students take responsibility for their own learning. Students should be independent and able to make decisions about their learning ability and then plan accordingly. Richardson (1999) states student-directed learning and curricula have become focal points for all constructivist-based teaching and learning practices. Thus it can be hypothesized that, "an effective teacher must not be overly possessive or need complete control of the children and environment. It is important to allow students both responsibility and freedom within the classroom community."

2 .5.3 Third Attitude: Sensitively Accepting Diversity

It is critical for students to feel positive about themselves as individuals in order to gain the self-confidence to try new things. Verbally praising a shy or friendless child can be a turning point for their self-esteem and confidence level. A child may be born with a talent but someone, such as a teacher, needs to realize and believe in it or it may not ever be nurtured. A teacher has the ability to reinforce, support, and appreciate the work and play of her students.

Teacher training programs need to provide teacher candidates with knowledge and experiences with diversity, including cultural diversity.

Nel (1992) stated that it would seem the trend toward more pluralistic attitudes in teachers needs

to be translated into a strong and clear commitment to multicultural education, which ultimately could result in positive effects on specific classroom behaviors and attitudes. Teachers need to take the initiative to fully understand the meaning and future implications of effectively working in culturally heterogeneous classrooms. An appropriate start in teacher training programs would be to have teacher candidates research their own ethnic and racial identity.

2.5.4 Fourth Attitude: Fostering Individualized Instruction

Teachers may resist the extra work required with individualizing, but research supports its importance. This is especially an issue for students with special needs. When providing daily instruction for students with special needs, the curriculum content, materials, abilities, and teaching methods require thoughtful consideration. Research suggests effective teachers think and behave in certain ways with children who have disabilities. McNergney and Keller (1999) observed a large number of teachers and conducted interviews. Overall, their results revealed effective teachers, and especially those who teach children with special needs, should pay attention to students' progress and actively involve them in learning activities, while offering guidance and praise for effort and accomplishments.

2 .5.5 Fifth Attitude: Encouraging Creativity

When given the opportunity to be creative, students will take their learning to higher levels and become actively engaged in lessons by contributing ideas and insights. Teachers should capitalize on students' intrinsic motivation, cognitive learning styles, and skill levels. This type of environment will be most conducive to fostering learning. Also, incorporating Howard Gardner's intellectual strengths, or multiple intelligences, into daily lesson planning can provide direction for teachers to offer students diverse opportunities for creative ways of learning or knowing in the classroom. The eight intelligences identified by Gardner (1997) are verbal-linguistic, logical-mathematical, visual-spatial, bodily kinesthetic, musical, interpersonal, intrapersonal, and naturalistic. Gardner's notion supports the continued argument that education needs to accommodate students' unique ways of learning and creativity needs to be a partner in the learning process.

Effective teachers genuinely care, like, accept, and value their students. These teachers will demonstrate kindness, share responsibility, accept diversity, foster individual instruction, and encourage creativity. With the knowledge of these five attitudes and actions, they will have the potential to be an effective teacher who will be remembered fondly by former students.

2.6 School factors and quality of education

This section contains a review of literature on school factors and how they affect quality of education. The quality of education offered in schools is determined by the level of material inputs allocated to the school and they efficiency with which these material inputs are organized and managed to raise student's achievement, an argument that was found appropriate for the study.

In industrialized countries, studies have consistently shown that schools have little effect in determining academic performance as measured by quality of education, once school' pre-school development and community background are into account Jencks, (1972); Coleman, (1974); Plowden, (1967). These reports did increase the skepticism over the wisdom of increasing school investment in developing countries. In a world paper, Alexander and Simmons (1975) found out that, schools made little difference in raising literary and academic skills after accounting for the family background of the yield considerable evidence that school quality makes a substantial difference Fuller, (1986). Another study by Rutter et. al (1979) showed that school factors are more significant in determining student's performance in both industrialized and developing countries; it is only the magnitude that differs and this is relevant to the current study.

Focusing on the sub-Saharan Africa, Eicher (1984) observed that the quality of education could be seen in the light of monetary indices, such as expenditure per student, quantity of various resources (books, desks, maps) per student or classroom, pupil-teacher ratio, number of students per classroom and other related aspects. This approach was found relevant to this study since these indicators can easily be expressed in quantitative terms. Considering that the quality and

quantity of educational resources depend on their costs, a study of the effect of these on academic performance of self-financing private primary schools is a worthy cause.

2.7 Laboratory in Science Education.

For over a century, the laboratory had been given a central and distinctive role in science education Science educators have suggested that there are rich benefits in learning that accrue from using laboratory activities (Hofstein et al., 1982). Science educators (Schwab, 1962; Hurd, 1969; Lunetta et al., 1979) have expressed the view that uniqueness of the laboratory lies principally in providing students with opportunities to engage in processes of investigation and inquiry. While the laboratory provides a unique medium for teaching and learning in science, researchers have not comprehensively examined the effects of laboratory instruction on student learning and growth in contrast to other modes of instruction, and there is insufficient data to confirm or reject convincingly many of the statements that have been made about the importance and the effects of laboratory teaching (Hofstein et al., 1982).

Tobin (1990) proposed a research agenda for Science teachers and researchers. He suggested that meaningful learning is possible in the laboratory if the students are given opportunities to manipulate equipment and materials in an environment suitable for them to construct their knowledge of phenomena and related scientific concepts.

In addition, he claimed that, in general, research had failed to provide evidence that such opportunities were offered in school science. The term inquiry has been used in multiple ways in the science education literature. It has been used somewhat broadly to refer to learning science in classrooms and labs in which the students and their teachers explore and discuss science in a "narrative of enquiry" context. As the science education field develops, it is increasingly

important to define and use technical terms like inquiry in the learning of science with greater precision and consistency, and progress to these ends is visible in recent scholarship.

The National Science Education Standards in the United States and other contemporary Science education literature continue to suggest that school science laboratories have the potential to be an important medium for introducing students to central conceptual and procedural knowledge and skills in science (Bybee, 2000). Hodson (1993) emphasized that the principal focus of laboratory activities should not be limited to learning specific scientific methods or particular laboratory techniques; instead, students in the laboratory should use the methods and procedures of science to investigate phenomena, solve problems, and pursue inquiry and interests.

Baird (1990) observed that the laboratory learning environment warrants a radical shift from teacher-directed learning to "purposeful-inquiry" that is more student-directed. Many studies have shown that often the students and the teacher are preoccupied with technical and manipulative details that consume most of their time and energy. Such preoccupation seriously limits the time they can devote to meaningful, conceptually driven inquiry.

In response, Woolnough (1991) wrote that for these reasons, the potential contribution of laboratory experiences to assist students in constructing powerful concepts has generally been much more limited than it could have been. Tobin (1990) wrote that "Laboratory activities appeal as a way of allowing students to learn with understanding and, at the same time, engage in a process of constructing knowledge by doing science". This important assertion may be valid, but current research also suggests that helping students achieve desired learning outcomes is a very complex process.

According to Gunstone (1991), using the laboratory to have students restructure their knowledge may seem reasonable but this idea is also naive since developing scientific ideas from practical experiences is a very complex process. Gunstone and Champagne (1990) suggested that meaningful learning in the laboratory would occur if students were given sufficient time and opportunities for interaction and reflection. Gunstone wrote that students generally did not have time or opportunity to interact and reflect on central ideas in the laboratory since they are usually involved in technical activities with few opportunities to express their interpretation and beliefs about the meaning of their inquiry. In other words, they normally have few opportunities for metacognitive activities. Baird (1990) suggested that these metacognitive skills are "learning outcomes associated with certain actions taken consciously by the learner during a specific learning episode" Metacognition involves elaboration and application of one's learning, which can result in enhanced understanding.

Today, the challenge is to help learners to take control of their own learning in the search for understanding. In the process it is vital to provide opportunities that encourage learners to ask questions, suggest hypotheses, and design investigations-"minds-on as well as hands-on." There is a need to provide students with frequent opportunities for feedback, reflection, and modification of their ideas (Barron et al., 1998). As Tobin (1990) and Polman (1999) have noted, in general, research has not provided evidence that such opportunities exist in most schools in the United States, or, for that matter, in other countries.

Research has also suggested that while laboratory investigations offer important opportunities to connect science concepts and theories discussed in the classroom and in textbooks with

observations of phenomena and systems, laboratory inquiry alone is not sufficient to enable students to construct the complex conceptual understandings of the contemporary scientific community. “If students’ understandings are to be changed toward those of accepted science, then intervention and negotiation with an authority, usually a teacher, is essential” (Driver, 1995). Van den Berg et al., (1994) reported that hands-on activities with introductory electricity materials in clinical studies with individual students facilitated their understanding of relationships among circuit elements and variables. The activities provided clear tests of the validity of the subject’s ideas. “Frequently they led to cognitive conflict.

However, the carefully selected practical activities alone were not sufficient to enable the subject to develop a fully scientific model of a circuit system.” The findings suggested that greater engagement with conceptual organizers such as analogies and concept maps could have resulted in the development of more scientific concepts in basic electricity. Several researchers including Dupin et al., (1987) have reported similar findings.

When laboratory experiences are integrated with other metacognitive learning experiences such as “predict–explain–observe” demonstrations, etc. (White et al.,, 1992) and when they incorporate the manipulation of ideas instead of simply materials and procedures, they can promote the learning of science. The science laboratory, a unique learning environment, is a setting in which students can work cooperatively in small groups to investigate scientific phenomena. Hofstein and Lunetta (1982) and Lazarowitz and Tamir (1994) suggested that laboratory activities have the potential to enhance constructive social relationships as well as positive attitudes and cognitive growth.

The social environment in a school laboratory is usually less formal than in a conventional classroom; thus, the laboratory offers opportunities for productive, cooperative interactions among students and with the teacher that have the potential to promote an especially positive learning environment. The learning environment depends markedly on the nature of the activities conducted in the laboratory, the expectations of the teacher (and the students), and the nature of assessment. It is influenced, in part, by the materials, apparatus, resources, and physical setting, but the learning environment that results is much more a function of the climate and expectations for learning, the collaboration and social interactions between students and teacher, and the nature of the inquiry that is pursued in the laboratory.

2.8 Summary of the chapter

The above chapter has attempted to review literature related to teacher characteristics. It is therefore evident that an effective teacher is one who consistently records higher gains in his or her student achievements. Therefore a good pre-service training in content and methodology coupled with the right attitude and school input together with experience greatly enhances teacher effectiveness.

CHAPTER THREE

3.0 RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction.

This chapter describes the research procedure and methods the researcher employed to obtain data needed for the study. It comprises the research design, the description of the study area, sampling procedure, the research instrument, validity and reliability of data collected and data analysis.

3.2 Research Design

This study shall be guided by descriptive survey design to establish the relationship between teachers' characteristics and their effects on students' achievements. Gay (1981) defines descriptive research as a process of collecting data in order to test hypotheses or to answer questions concerning the current status of the subjects in the study. A descriptive research determines and reports the way things are. This type of research attempts to describe such things as possible behaviours, attitudes, values and characteristics.

According to Sekaran (2004), a descriptive study is undertaken in order to ascertain and be able to describe the characteristics of the variables of interest in a situation. Quite frequently, descriptive studies are undertaken in organizations to learn about and describe the characteristics of a group of employees, as for example, the age, educational level, job status, and length of service of Hispanics or Asians. Descriptive studies are also undertaken to understand the characteristics of organizations that follow certain common practices.

For example, one might want to know and be able to describe the characteristics of the organizations that implement flexible manufacturing systems or those that have certain debt-to-equity ratio. The goal of a descriptive study, hence, is to offer to the researchers a profile or to describe relevant aspects of the phenomena of interest from an individual, organizational, industry-oriented, or other perspective. Besides, the information will be very easily collected given that the primary sources are government agents. There is no biased information because it will be official. Besides, the information will be very easily corrected given that the primary sources are government agents. There is no biased information because it will be official.

3.3 Description of the Study Area

The study was carried out in selected secondary schools in Bungoma North District of Western Province in Kenya. It is one of the Districts that form part of the former Bungoma District. It borders Mt Elgon district to the North, Bungoma west district, Bungoma East district and Bungoma south district. The district covers an area of 555.6 km^2 (Development plan for Bungoma district 2002-2008). Bungoma North District was purposely selected for the study because of continued poor performance in science subjects and in particular chemistry subject over years, hence, representative since other Districts had registered similar downward trend in chemistry examinations. Furthermore, the area was familiar to the researcher and thus it was easier to access all the necessary schools for study.

3.4 Sample and Sample Techniques

The study targeted form four students and chemistry teachers from Bungoma North District. There were 42 secondary schools in this District. There were 2,827 candidates (1,450 boys and

1,377 girls) who sat for KCSE in 2009. Since there are 42 secondary schools, 14 schools were selected as the target population through stratified random sampling (180 form boys and 194 form four girls). This is in conformity to the 30% criteria that provides a sample that will be representative of the entire population according to Kerlinger (1973). 14 chemistry teachers from 14 schools, 54 form boys and 58 form four girls were purposively selected as respondents. Form four students were used since they had stayed in school long enough with vast experience and had understanding of their teachers better.

3.5 Research Instruments

The study employed a questionnaire as the instrument of data collection. The questionnaire had both structured (closed ended) and unstructured (open- ended) items in simple language. Structured items means that the questions were accompanied by a list of all possible alternatives from which respondents selected the answer that best described their situation (Mugenda and Mugenda, 1999). The advantage of this type of instrument is the ease with which it affords the research during analysis. Moreover, they are easy to adminster and economical to use in terms of time and money. In addition, open ended question were used so as to give the respondents complete freedom of response. Open ended question were necessary since they gave insight into the challenges facing the teachers.

3.6 Data Collection

Official permission to conduct the research was sought from the Ministry of Education and reference letters from Moi University. The instruments were administered through personal visit on appointment with school principals. The questionnaires were filled and observations made in the schools on the day of the visit.

3.7 Validity and Reliability of the Research Instrument

This section tests the validity and the reliability of the research instruments that are too used when analyzing the data collected.

3.7.1 Validity of Research Instruments

Validity is the extent to which the instrument measures what it purports to measure according to the researcher's assessment (Nachiamis: 1990). Best and Kaln (1989) suggest that the validity of the instrument is determined by asking the right question framed in the least ambiguous way. Content validity is based on the adequacy with which the item in an instrument measures the attributes of the study (Mugenda, 1999). To test the content validity of the instrument, the researcher consulted with his supervisor and other members in the department of curriculum instruction and educational media at Moi University. Construct validity is a measure of the degree to which data obtained from an instrument meaningfully and accurately reflect or represents a theoretical concept. The research measured construct validity by administering the instrument in a selected random sample of students.

3.7.2 Reliability of the Research Instrument

Reliability refers to the consistency or stability in the research measurements (Christensen 1988:129). To test reliability of the instrument, both questionnaires- teachers' characteristics and students' achievements were piloted using one school, one chemistry teacher and four form four students from Mt. Elgon District. After about a week, the questionnaire was re- administered to the same group.

The data was analyzed using Pearson correlation coefficient and the results correlated to determine their reliability coefficient as shown in table 3.1. Best and Kaln (1989) suggest that Pearson Product Moment correlation coefficient (r) is most often used because of it's precision, with a p-value of 0.5. Both reliability and validity should be high in order to be desirable. (Fraenkel et al., 1993). Therefore from the analysis research instrument was reliable and valid to collect the data which helped to achieve the objectives of the study and confirm the hypotheses (average $\alpha = 0.92$).

Table 3.1: Reliability Coefficients of the Questionnaire

Variables	Precision (r)
Teachers characteristics	0.95
Students Achievements	0.90
School Factors	0.90
Average	0.92

3.8 Data Analysis

Data analysis was done at two levels; first the data was collected through questionnaires coded manually. The questions were structured targeting teachers and form four students drawn from the Bungoma North District. The range of specific multiple choice answers gave the respondents wide areas to choose from.

Then data was organized under different variables and the frequency established. The results were then presented in the frequency tables showing frequency and percentages and scatter plots. The second level of the data analysis involved inferential statistics where Spearman's rho correlation coefficient was used to establish the relationship among the variables.

Simple regression analysis was used since it shows the interactive effect of the independent variables on the dependent variable. The simple regression analysis was used to determine statistical relationship between only two variables, one variable (independent variable) and its effects on another variable (dependent variable). Using SPSS (Statistical Program for Social Sciences), the values of the coefficients and regression analysis were obtained.

3.11 Summary

The research design and methodology have thus been discussed. Description of the study area, sampling procedure, research instruments to be used; data collection procedure, validity and reliability of instruments and variables to be considered are all important aspects of the research. The next chapter presents the analysis and interpretation of data.

CHAPTER FOUR

4.0 DATA PRESENTATION, ANALYSIS, INTERPRETATION AND DISCUSSIONS

4.1 Introduction

This chapter presents analysis and interprets the data collected from the respondents by means of questionnaire. The data shows the extent to which teacher qualification; experience; attitude and School factors affect student's achievement. Descriptive and inferential statistics were used to analyze the data. Descriptive statistics used to analyze the data include the mean, while standard deviation was used as a measure of dispersion. Inferential statistics used were Spearman's rho correlation and regression.

The hypotheses were tested using the Spearman's rho correlation coefficients and regression as the statistical tools to establish the strength of the relationships between the variables. The positive correlation coefficient **(r)** indicates a positive correlation between the two variables, negative value of **r** indicates a negative correlation while a zero value of **r** means no association between the two variables. The value of **r** nearer to +1 or -1 indicates a high degree of correlation between the two variables (Kothari, 2003).

In regression analysis**, B** is the slope representing a regression coefficient. A positive **B** value indicates a positive correlation between the two variables while a negative **B** value represents a negative correlation. Similarly, a zero value of **B** indicates no correlation between the variables and the values of **B**±1 indicate high degree of correlation between the two variables. The levels of significance for the social sciences is set at 5% (0.05) with 95% confidence interval, which gives the range of the regression slope within which one can be sure the population lies.

4.1.0 Background Information of Students

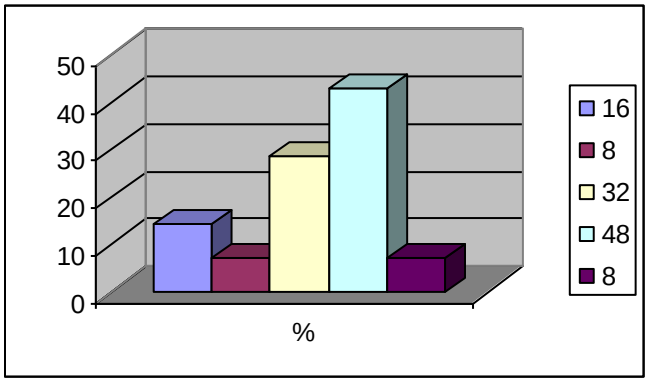


Figure 4.1: Distribution of type of school

Regarding the nature of the school, 16 (14.3%) were in girls boarding, 8 (7.15) in boys boarding, 32 (28.6%) in mixed boarding, 48 (42.9%) in mixed day while 8 (7.1%) in girls day schools. This shows that most students (71.5%) are in mixed schools.

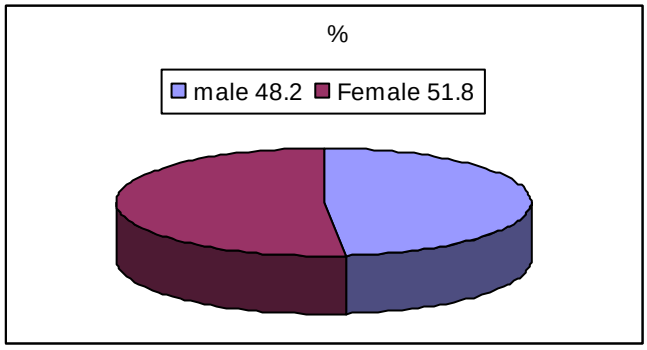


Figure 4.2: Distribution of gender of students

The figure shows that 54 (48.2%) of the students were male while 58 (51.8%) were female. This shows that the number of boys and girls is almost equal.

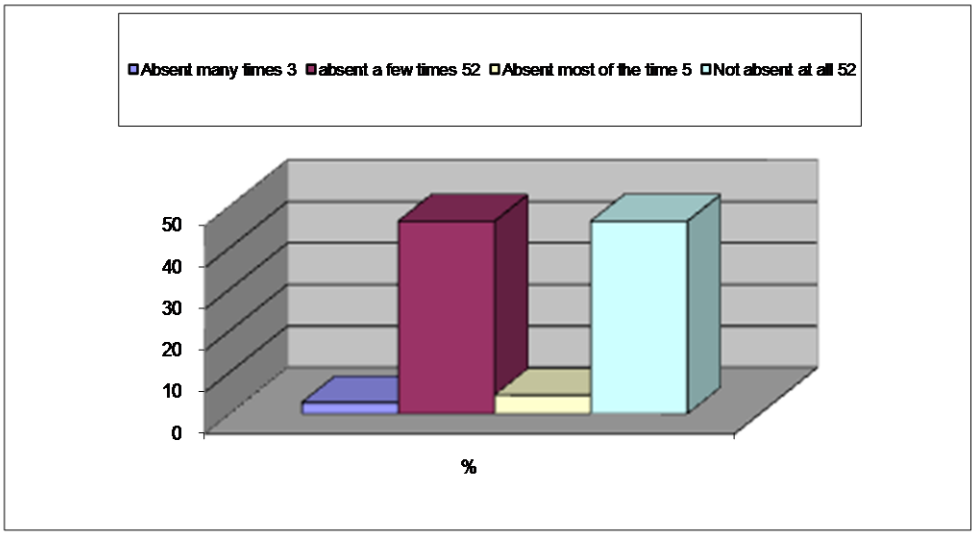


Figure 4.3: Distribution of class attendance

Regarding their school attendance, 3 (2.7%) answered being absent a few times, 52 (46.4%) absent many times, 5 (4.5%) were absent most of the time while 52 (46.4%) were not absent at all. Therefore, 57.6% claimed to have been absent and hence missed school sessions. This meant that absenteeism among students could be affecting their performance.

4.1.1 Teacher Competence

This section gives analysis of students' response regarding teacher competence.

Table 4.1 Chemistry teacher answers questions satisfactorily

Responses	Frequency	Percentage
Strongly agree	65	58.0
Agree	30	26.8
Undecided	8	7.1
Disagree	6	5.4
Strongly disagree	1	.9
Total	110	98.2
Total	112	100.0

The results show that 65 (58%) strongly agree, 30 (26.8%) agreed, 8 (7.1%) were undecided, 6 (5.4%) disagreed and 1 (0.9%) strongly disagreed. This indicates that 86.4% find their teachers very competent in terms of answering questions.

Table 4.2: My chemistry teacher marks our examinations on time

		Frequency	Percentage
	Strongly agree	61	54.5
	Agree	38	33.9
	Undecided	5	4.5
	Disagree	5	4.5
	Strongly disagree	1	.9
	Total	110	98.2
Missing	System	2	1.8
Total		112	100.0

Regarding whether their teachers marked exams on time, 61 (54.5%) strongly agreed, 38 (33.9%) agreed, 5 (4.5%) were undecided, 5 (4.5%) disagreed and 1 (0.9%) strongly disagreed. This further indicates that apart from their competence, teachers marked examinations on time.

Table 4.3: Punctuality of chemistry teacher in class

		Frequency	Percentage
	Strongly agree	50	44.6
	Agree	45	40.2
	Undecided	4	3.6
	Disagree	9	8.0
	Strongly disagree	2	1.8
	Total	110	98.2
Missing	System	2	1.8
Total		112	100.0

On whether their teacher was punctual, 50 (44.6%) strongly agreed, 45 (40.2%0 agreed, 4 (3.6%) were undecided, 9 (8.0%) disagreed and 2 (1.8%) strongly disagreed. this shows that most teachers were punctual in class attendance.

4.1.2: Students' Attitude towards Chemistry

This section gives analysis of responses regarding students' attitude towards chemistry as presented in tables 4.4 and 4.5.

Table 4.4: I would like to have chemistry lessons more often

	Frequency	Percentage
Strongly agree	70	62.5
Agree	31	27.7
Undecided	5	4.5
Disagree	6	5.4
Total	112	100.0

When asked if they would like to have chemistry lessons more often, 70 (62.5%) strongly agreed, 31 (27.7%) agreed, 5 (4.5%) were undecided, 6 (5.4%) disagreed. Hence, 90.2% of the students agreed that they would like to have chemistry lessons more often. This tends to suggest that students have a strong interest in chemistry.

Table 4.5: Interest in chemistry careers

	Frequency	Percentage
Strongly agree	56	50.0
Agree	23	20.5
Undecided	13	11.6
Disagree	16	14.3
Strongly disagree	4	3.6
Total	112	100.0

On whether they would like to pursue a career in chemistry, 56 (50%) strongly agreed, 23 (20.5%) agreed, 13 (11.6%) were undecided, 16 (14.3%) disagreed and 4 (3.6%) strongly disagreed. Hence many students (79%) feel that chemistry is critical to their career.

4.1.3: Students' Response on Teacher Attitude

This section presents analysis of students' response regarding teacher attitude as presented in tables 4.6, 4.7 and 4.8

Table 4.6: How often does your chemistry teacher ask questions about your progress?

	Frequency	Percentage
Never	11	9.8
A few times	36	32.1
Many times	37	33.0
Most times	28	25.0
Total	112	100.0

On how often their teacher inquires of their progress, 47 (42%) answered never or a few times while 65 (58%) answered many or most times. This shows that a significant number of students (42%) lacked individualized attention from teachers.

Table 4.7: Descriptive statistics of teacher attendance

	Frequency	Percentage
Absent many times	3	2.7
Absent a few times	57	50.9
Absent most of the time	10	8.9
Not absent at all	42	37.5
Total	112	100.0

Regarding teacher absenteeism, 3 (2.7%) noted their teacher being absent many times, 57 (50.9%) said absent a few times, 10 (8.9%) noted absent most of the time while 42 (37.5%) noted their teacher as present throughout. Hence absenteeism is seen in 62.5% of the cases. This suggests that absenteeism is a problem to teachers just like the students.

Table 4.8. My chemistry teacher disregards students who perform poorly

	Responses	Frequency	Percentage
	Strongly agree	14	12.5
	Agree	18	16.1
	Undecided	14	12.5
	Disagree	31	27.7
	Strongly disagree	33	29.5
	Total	110	98.2
Missing	System	2	1.8
Total		112	100.0

On whether the teacher disregards students who perform poorly 14 (12.5%) strongly agreed, 18 (16.1%) agreed, 14 (12.5%) were undecided, 31 (27.7%) disagreed while 33 (29.5%) strongly agreed. This tends to indicate that about 42% of the students feel that their teachers disregard them due to their poor performance in the subject. This further kills their moral and results in poor performance.

4.1.4: Teaching Style

This section presents analysis of students' response regarding teaching style

Table 4.9: Our chemistry teacher makes us to do practical work

Responses		Frequency	Percentage
	Strongly agree	55	49.1
	Agree	42	37.5
	Undecided	8	7.1
	Disagree	6	5.4
	Strongly disagree	1	.9
	Total	112	100.0

On whether their teachers taught practically, 55 (49.1%) strongly agreed, 42 (37.5%) agreed, 8 (7.1%) were undecided, 6 (5.4%) disagreed and 1 (0.9%) strongly disagreed. This indicates that most teachers integrated practical work with theory in their teaching.

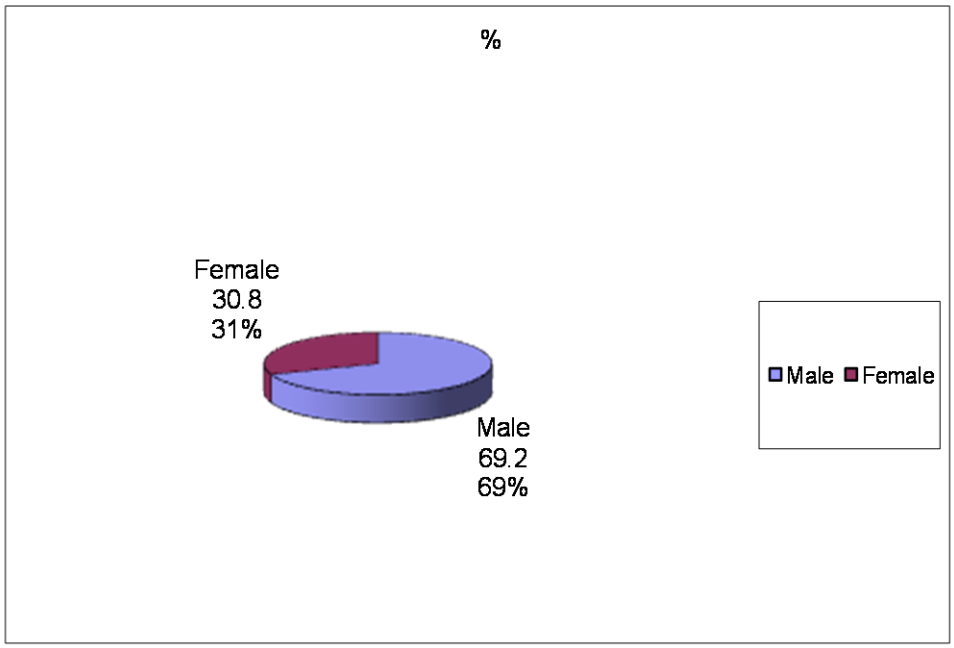


Figure 4.4 distribution showing teachers' gender.

The results showed that 9 (69.2%) teachers were male while 4 (30.8%) were female. This showed that two thirds of the teachers were male and only one third female. This disparity may further discourage girls, resulting in poor performance.

4.2 Effect of teacher characteristics on students' performance

4.2.1 Effect of teacher qualification on students performance

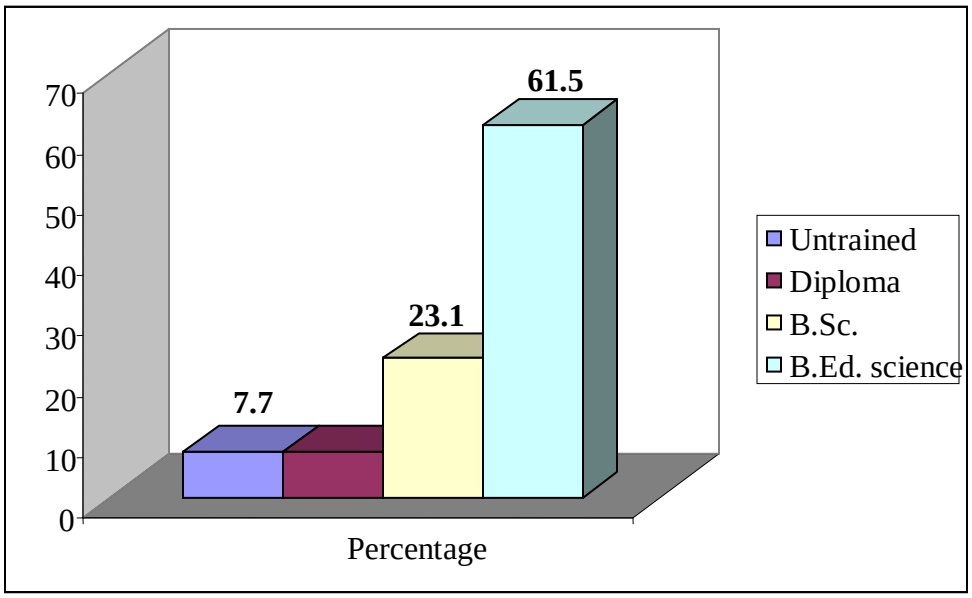
The first objective of the study was to determine the effect of teacher qualification on students' performance. To achieve this, a questionnaire was given to the respondents where they answered the following questions:

a) State your qualification

b) How many SMASSE cycles have you attended?

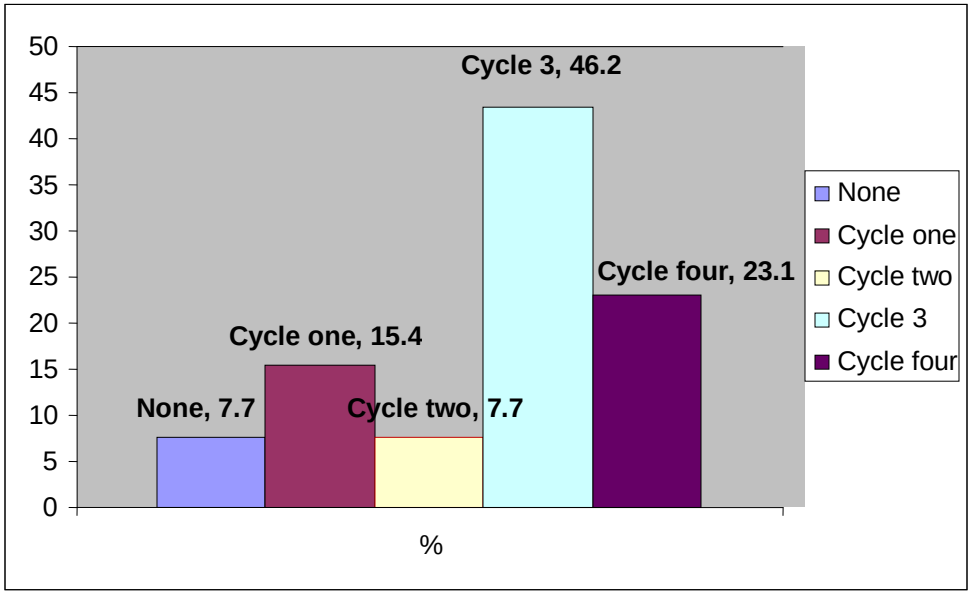
.The results are presented in the subsections that follow.

Figure 4.5: Distribution of individual teacher certification.



Regarding qualifications, 1 (7.7%) was untrained, 1 (7.7%) had a diploma, 3 (23.1%) had Bachelor of Science degree while 8 (61.5%) had Bachelor of Education (science) degree. This shows that most teachers (69.8%) in the schools are adequately trained in subject matter and education methods.

Figure 4.6: Distribution of number of SMASSE cycles attended



Regarding attendance of SMASSE in-set program, 1 (7.7%) had not attended any cycle, 2 (15.4%) one cycle, 1 (7.7%) two cycles, 6 (46.2%) three cycles and 3 (23.1%) four cycles. This indicates that the larger number of teachers (69.3%) had attended more than three cycles.

Table 4.10 Distribution table for the question on teacher competence

	Frequency	Percentage
Strongly Agree	1	7.7
Agree	12	92.3
Total	13	100.0

Regarding their personal perception in competency, 1 (7.7%) strongly agreed to be competent while12 (92.3%) agreed to being competent.

Table 4.11 Summary of Statistical analysis of teacher qualification indicators

	N	Minimum	Maximum	Mean	Std. Deviation
Qualification	13	2.00	3.66	2.9723	0.58208

The minimum qualification score was 2.00 and the maximum 3.66. The mean was 2.97and the standard deviation was 0 .58.

Table 4.12 Descriptive Statistics of the school means

	N	Minimum	Maximum	Mean	Std. Deviation
School mean grade	13	2.79	9.97	3.8215	1.89194

The lowest mean was 2.79 and the highest 9.97. The mean was 3.82, while the standard deviation was 1.89.

Table 4.13 Spearman's rho correlation to test the relationship between teacher qualification indicators and school mean grade

		School mean grade
Qualification	Spearman's rho Correlation	0.416
	Sig. (1-tailed)	0.079

The table shows the correlation coefficient of the school mean against teacher qualification. The results show a positive correlation between teacher qualification and school mean ($r=0.42$, $p<.079$).

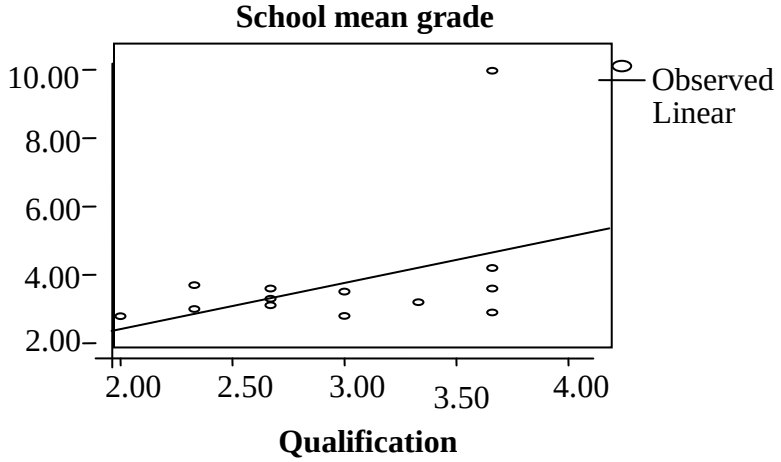
Table 4.14: Regression analysis between teacher qualification and students' performance

	Unstandardized Coefficients	
	Regression Coefficient (**B**)	Std. Error
(Constant)	-0.193	2.696
Qualification	1.351	0.891

Dependent Variable: School mean grade

Table 4.14 shows the regression coefficient (B = slope) as 1.35 at α =0 .05.The constant -0.193 is the y-intercept. The two tests show a positive correlation between the school mean grade and qualification of the teacher in terms of the level of education and attendance of in-service courses.

This suggested that teachers gain a variety of skills, which are transferred to actual teaching in class room increasing the school mean grade.



a=-.193 and B=1.35

Figure 4.7: Teacher qualification against school mean grade

Figure 4.7 shows that high qualification results in high school mean grade. This is a positive correlation between the two variables, that is, increase in teacher qualification leads to increase in school mean grade. This led to the rejection of the null hypothesis Ho1, which stated that there is no significant between teacher qualification and students performance. Therefore it is concluded that teacher qualification affects student's performance. This view is supported by Beebout and Juriah (1972), who in their study found that there was a positive correlation between teacher qualification and student's performance.

4.2.2 Effect of teacher experience on students performance

The second objective of the study was to determine the relationship between teacher experience and students performance. The data was analyzed using both descriptive and inferential statistics.

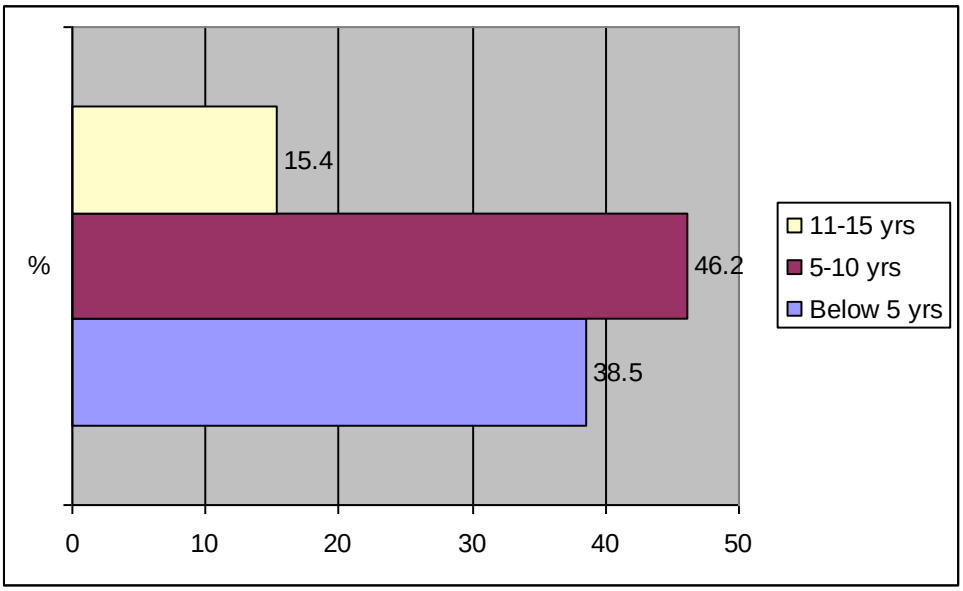


Figure 4.8: Distribution of the number of years taught

From figure 4.8, 5 (38.5%) had taught below 5 years, 6 (46.2%) between 5-10 years, 2 (15.4%) between 11-15 years. The modal class is 5-10 years, indicating that most teachers are quite experienced.

Table 4.15: Descriptive statistics showing teacher experience

	N	Minimum	Maximum	Mean	Std. Deviation
Experience	13	1.00	3.00	1.7692	0.72501

The table 4.15 shows the lowest experience as 1.00 (taught below five years) while the highest experience as 3.00. The mean for experience is 1.77 while the standard deviation is .73. Respondents with a score above one were considered to be experienced while those who scored less than one to be less experienced.

Table 4.16: Spearman's rho correlation between teacher experience and students performance

		School mean grade
Experience	Spearman's rho Correlation	0.549
	Sig. (1-tailed)	0.026

The model shows the correlation between teacher experience and the school mean.

The results show a positive relationship between teacher experience and students performance ($r=0.55$, $p<.026$).

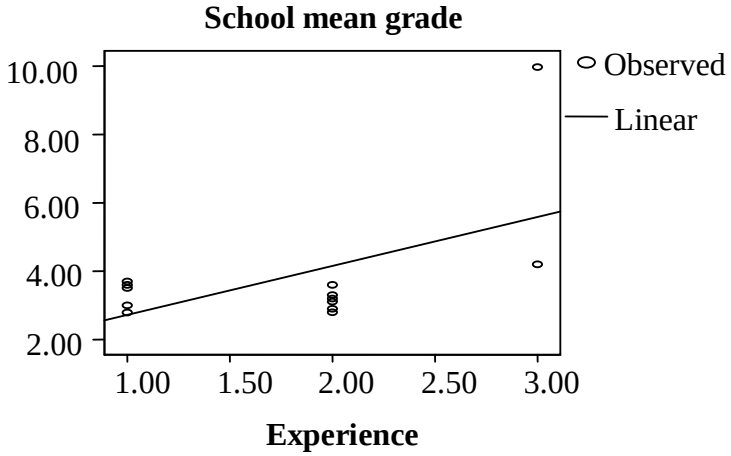
Table 4.17: Regression results between teacher experience and school mean

Coefficients(a)

	Unstandardized Coefficients	
	Regression Coefficient (B)	Std. Error
(Constant)	1.287	1.251
Experience	1.432	0.658

Dependent Variable: School mean grade

Table 4.17 shows the regression coefficient B = slope 1.43 at $\alpha = 0.05$ .The constant, 1.287 is the y-intercept. This test shows a positive correlation between the school mean grade and teachers experience as measured by the number of years taught.



a=1.287 and B=1.43

Figure 4.9 shows experience against mean grade

Figure 4.9 shows that experience results in better student achievement in examination results. This is a correlation between two variables, which suggested that higher teacher experience leads to a better mean grade. The null hypothesis Ho2, which states that there is no significant

relationship between teacher experience and student's performance, was thus rejected. Therefore, it is concluded that teacher experience affects student's performance. This is because the teacher gains new and better skills in their teaching, which leads to improved performance.

This view is supported by Murnane and Phillips (1981), who in their study found a positive relationship between teacher's effectiveness and their years of experience.

4.2.3: Effect of teacher attitude on students' performance

The third objective was to determine the relationship between teacher attitude and students performance. Respondents were to respond to the following items: Some students do not have the ability to learn chemistry; I feel I could do better if changed to another station, I have full support of the administration in teaching chemistry and how has been your teaching career as a chemistry teacher? Descriptive and inferential statistics were used to analyze the data.

Table 4.18: Distribution table for the question; some students do not have the ability to learn chemistry

Responses	Frequency	Percentage
Strongly Agree	5	38.5
Agree	6	46.2
Disagree	2	15.4
Total	13	100.0

The results show that 5 (38.5%) strongly agreed, 6 (46.2%) agreed, 2 (15.4%) disagreed. This shows that most teachers agree that some students do not have the ability to learn chemistry. This attitude in turn impacts on their effectiveness in teaching.

Table 4.19: Distribution for the question: I feel i could do better if changed to another station

Responses	Frequency	Percentage
Strongly Agree	3	23.1
Agree	4	30.8
Undecided	3	23.1
Disagree	1	7.7
Strongly Disagree	2	15.4
Total	13	100.0

Results show that 3 (23.1%) strongly agreed to change, 4 (30.8%) agreed, 3 (23.1%) were undecided, 1 (7.7%) disagreed while 2 (15.4%) strongly disagreed. This shows that over 54% of the teachers preferred to move to another station. This shows that many teachers were tired of their stations and may have reached burnout.

Table 4.20: Distribution table showing attitude towards school administration

Responses	Frequency	Percentage
Stongly Agree	6	46.2
Agree	3	23.1
Undecided	2	15.4
Disagree	1	7.7
Stongly Disagree	1	7.7
Total	13	100.0

The results show that 6 (46.2%) strongly agreed to having full support of the school administration, 3 (23.1%) agreed, 2 (15.4%) were undecided, 1 (7.7%) disagreed and 1(7.7%) strongly disagreed. This shows that most teachers (69.3%) agree that they have the support of the administration in their professional endeavuors.

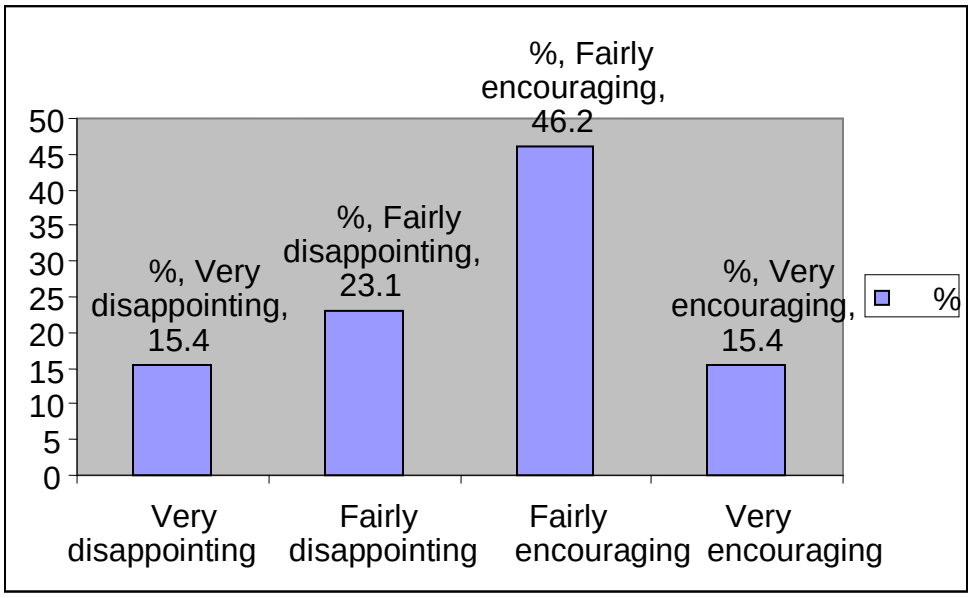


Figure 4.10: Distribution for the question: How has been your teaching career as a chemistry teacher?

Regarding their opinion about their career, 2 (15.4%) found it to be very disappointing, 3 (23.1%) fairly disappointing, 6 (46.2%) fairly encouraging and 2 (15.4%) to be very encouraging**.** This indicates that a significant number of teachers (38.5%) don't enjoy their profession.

Table 4.21: Descriptive statistics showing the attitude of teachers ,

	N	Minimum	Maximum	Mean	Std. Deviation
Attitude	13	0.50	3.00	1.7885	0.90626

The lowest attitude score was 0.50 and the highest 3.00. The mean was 1.79 and the standard deviation 0.91. Those who had an attitude score less than 1.5 were considered to have a poor attitude while those above 1.5 as having a positive attitude.

Table 4.22: Correlation coefficient between teacher attitude and school mean.

		School mean grade
Attitude	Spearman's rho Correlation	0.385
	Sig. (1-tailed)	0.097

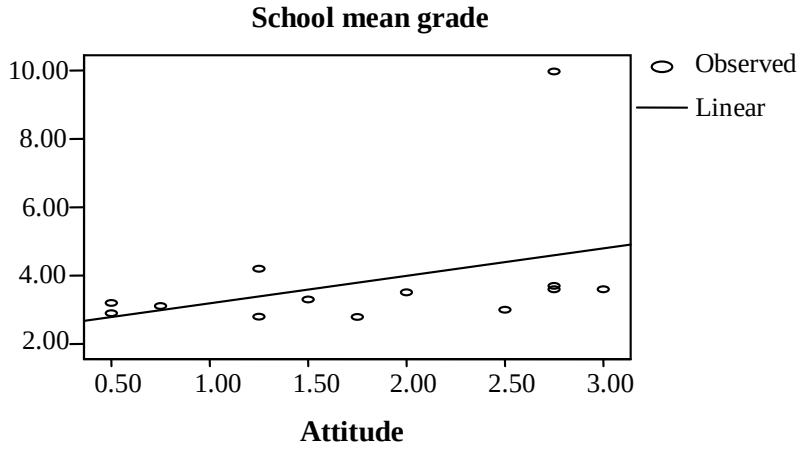
The table above shows the correlation between teacher attitude and students' performance. The results indicate that there is a positive relationship between teachers attitude and students performance ($r=0.39$, $p<0.097$).

Table 4.23.shows simple regression between teacher attitude and school mean

	Unstandardized Coefficients	
	Regression coefficient (B)	Std. Error
(Constant)	2.383	1.155
Attitude	0.804	0.581

Dependent Variable: School mean grade

Table 4.23 shows the regression coefficient (B=Slope) as 0.80 at $\alpha=0.05$ and Y-intercept as 2.383. The two tests show a positive correlation between the school mean grade and the teachers' attitude, in terms of their perception of their teaching career, their relationship with the administration and so on.



a=2.38 and B=0.80

Figure4. 11: Schools mean grade against teacher attitude

The figure 4.11 shows that a positive attitude results in better student achievement and vice versa. It therefore suggests that a positive teacher's attitude results in higher student achievement. Based on this evidence, the null hypothesis, which states that there is no significant relationship between teacher attitude and student's performance, was rejected.

Table 4.24 shows correlation between teacher characteristic mean and the school mean.

		School mean grade
Teacher characteristic mean	Spearman's rho Correlation	0.751
	Sig. (2-tailed)	0.003

The results indicate a strong positive correlation between overall teacher characteristics and the school mean ($r=0.75$, $p< 0.03$).

4.2.4: Effect of school factors on students performance

The fourth objective was to determine the relationship between school factors and students performance. Respondents answered questions regarding the number of laboratories in the school, how equipped the laboratory is, the class size, distance of teachers home from school and their workload.

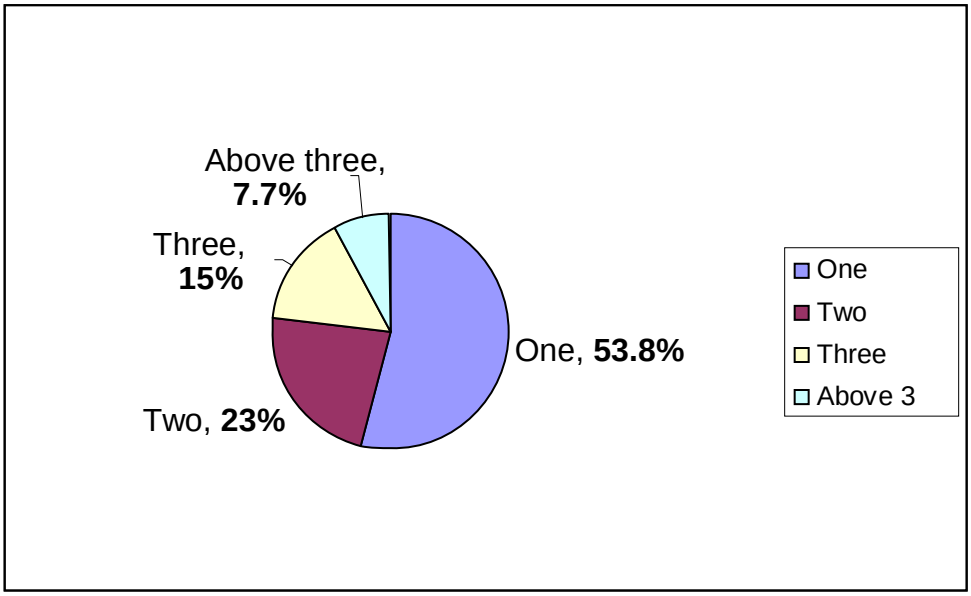


Figure 4.12: Distribution showing the number of laboratories

Regarding the number of laboratories, 7 (53.8%) of the schools had one, 3 (23.1%) had two, 2 (15.4%) had three and 1 (7.7%) had above three. Hence, 76.9% of the schools had less than three laboratories for three science subjects.

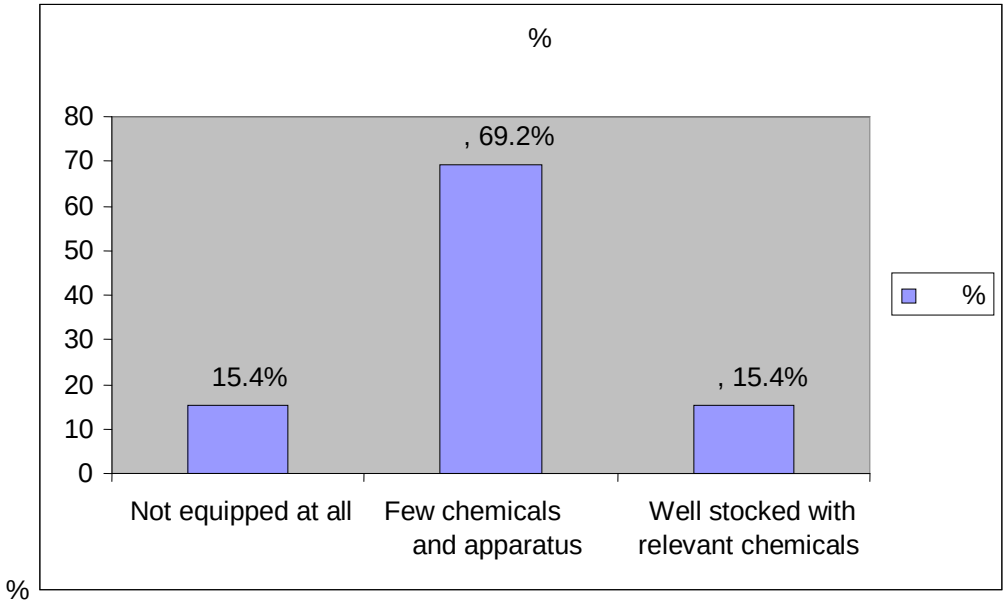


Figure 4.13: Description of the state of school laboratory

On description of the school laboratory, 2 (15.4%) were not equipped at all, 9 (69.2%) had few chemicals and apparatus, 2 (15.4%) were well stocked with relevant chemicals and apparatus.

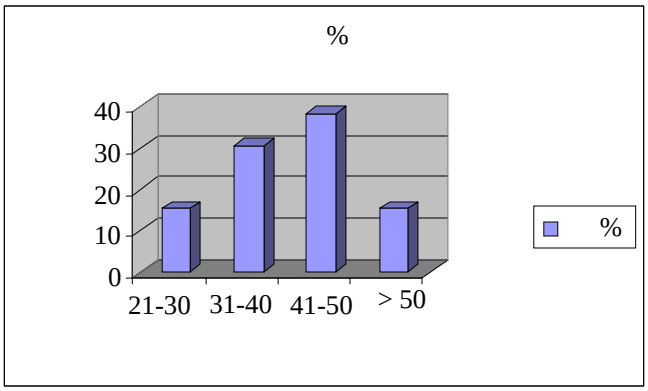


Figure 4.14: Distribution showing class size

The figure 4.14 shows that 2 (15.4%) of classes had 21-30 students, 4 (30.8%) had 31-40, 5 (38.5%) between 41-50 and 2(15.4%) had above 50 students. This indicated that most classes are small and hence should be manageable to teachers.

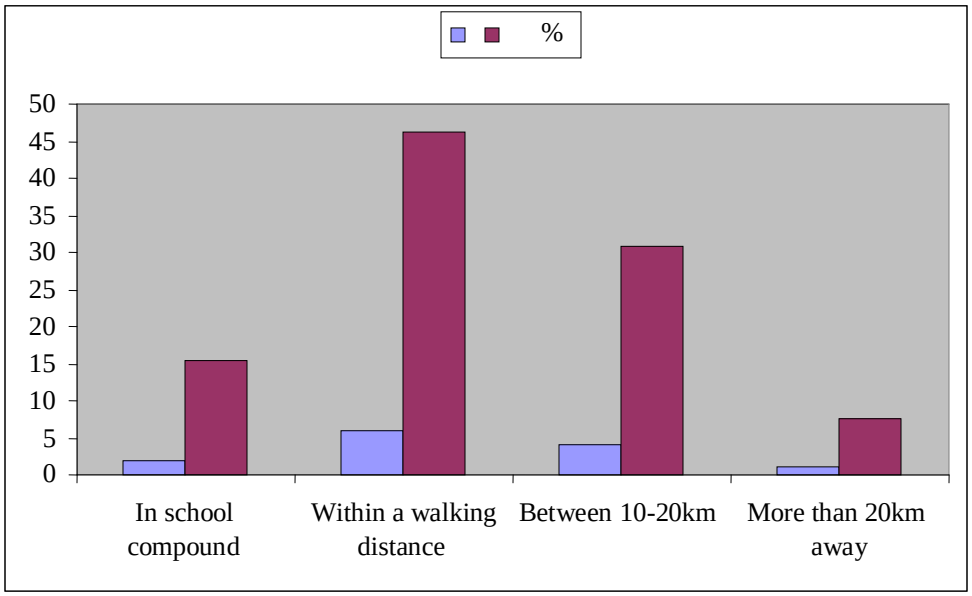


Figure 4.15 Distribution showing teachers distance from home

The results from figure 4.15 show that 2 (15.4%) reside on the school compound, 6 (46.2%) stay within a walking distance, 4 (30.8%) between 10-20kilometres away while 1 (7.7%) stays more than 20 kilometres away. This indicates that 38.5% of the teachers stay relatively far from school and thus may be absent from school, hence missing lessons.

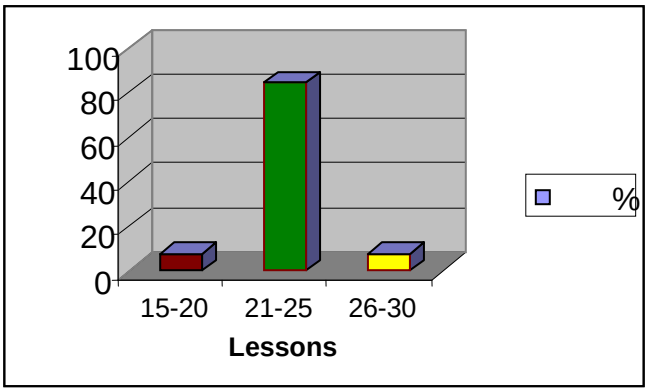


Figure 4.16: Distribution showing work load

The results show that 1(7.7%), 11(84.6%) and 1(7.7%) of the teachers had between 15-20, 21-25 and 26-30 lessons respectively.. This shows that over 92% of the teachers taught below 25 lessons in a week. Hence the workload of teachers is below 27, which is recommended by the teachers' service commission.

Table 4.25. Descriptive Statistics showing means and standard deviation of school factors

	Minimum	Maximum	Mean	Std. Deviation
Distance from school	0	3	1.31	0.855
Class size	1	4	2.54	0.967
Workload	1	3	2.00	0.408
Number of laboratories	1	4	1.77	1.013
Description of laboratories	1	3	2.00	0.577

The results show that the minimum distance of a teacher's residence from school is the school compound, while the farthest was more than 20 km away. The standard deviation is high, (0.855), further indicating the variation in working conditions in schools. The smallest classes had 20-30, students, while the largest classes had more than 50 students. The standard deviation is also large, (0.967), indicating that the class size varies between the two extremes. The minimum numbers of lessons per week were 15-20, while the highest numbers were 26-30. The standard deviation is low (0.408), showing that the number of lessons in a week is almost standard .The minimum number of laboratories was one and the highest four. The standard deviation was large (1.013), indicating that most schools were between the two extremes. On state of laboratories, the mean index was 2.00.

Table 4.26: Descriptive statistics about school factor means.

	Minimum	Maximum	Mean	Std. Deviation
school factors	0.8	3.4	1.924	0.74679

The table shows the minimum score as 0.8 and the maximum as 3.40. The mean was 1.92 and standard deviation 0.75.

Table 4.27: Correlation coefficient between school factor means and school mean

		school factors
School mean grade	Spearman's rho Correlation	0.254
	Sig. (2-tailed)	0.402

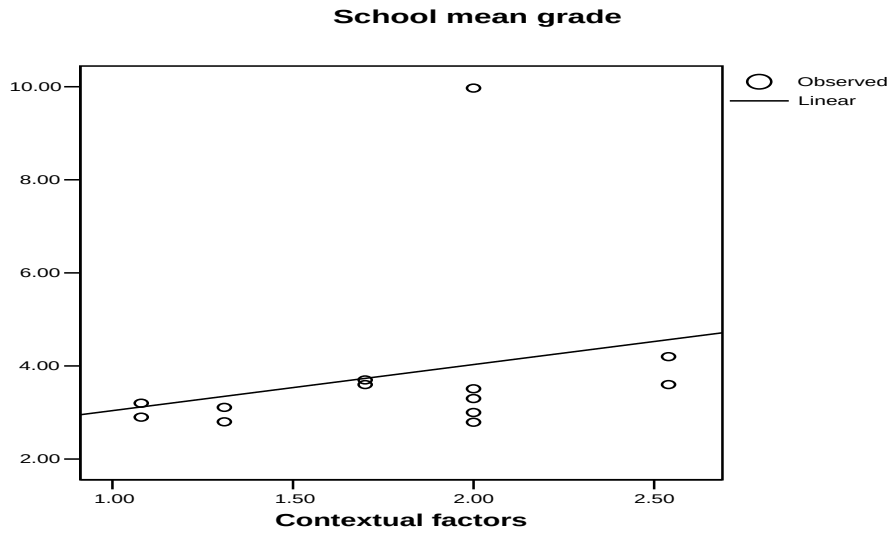
The figure shows that there is a positive relationship between school factor means and school mean (r=0.25, p=0.40).

Table 4.28: Simple regression between school factors and school mean

Model		Unstandardized Coefficients	
		B	Std. Error
1	(Constant)	2.050	2.100
	school factors	0.990	1.136

Dependent Variable: School mean grade

Table 4.28 shows the regression coefficient (B=slope) as 0.99 at α=0.05 and Y-intercept as 2.05. The two tests show a strong positive correlation between the school factors and the school mean grade.



a=2.05, B=0.99

Figure 4.17: Relationship between school factors and school mean grade

Figure 4.17 shows that school factors have an effect on the school mean. This implies that when school factors are favourable, they result in better student performance and vice-versa. Based on this evidence, the null hypothesis, which states that there is no significant relationship between school factors and student's performance, was rejected. It is therefore concluded that school factors have an effect on the general academic performance of students.

Table 4.29: Correlation between school factors and teacher characteristics mean

		school factors
Teacher characteristic mean	Spearman's rho Correlation	0.522
	Sig. (2-tailed)	0.068

The results indicate a positive correlation between teacher characteristic mean and school factors ($r=0.522$, $p< 0.68$). This indicates that school factors have an effect on the general characteristics portrayed by the teacher. Based on this empirical evidence, the null hypothesis which states that there is no significant relationship between the overall teacher characteristics and the school mean was rejected. It is therefore concluded that school factors greatly determine teacher characteristics, which in turn impact on student performance.

Table 4.30 Summary of the correlation coefficients between school mean grade and variables: teacher characteristics and school factors.

		School mean grade	school factors	Teacher characteristic mean
School mean grade	Spearman's rho Correlation	1	0.254	0.751
	Sig. (2-tailed)		0.402	0.003
school factors	Spearman's rho Correlation	0.254	1	0.522
	Sig. (2-tailed)	0.402		0.068
Teacher characteristic mean	Spearman's rho Correlation	0.751	0.522	1
	Sig. (2-tailed)	0.003	0.068	

The results indicate that both teacher characteristics and school factors have a significant effect on the school mean ($r=0.75$, $p<0.03$) and ($r=0.25$, $p<0.40$) respectively. The table also shows that school factors have an effect on the overall teacher characteristics ($r=0.522$, $p<0.068$). These results show that teacher characteristics are a stronger factor in predicting student performance than the school factors. These findings are consistent with those of Sanders et al., 1996 and Wright et al., 1997, who found out that differential teacher effectiveness is a strong determinant of differences in student learning, far outweighing the effect of differences in class size and heterogeneity.

4.2.5 Summary

The chapter has analyzed the responses of students and teachers regarding background information, teacher qualification, experience attitude and laboratories. The results show a positive correlation between student's achievement and teacher qualifications, experience, attitude and school factors. The next chapter presents the summary, conclusions and recommendations.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the whole study. The findings of the study are discussed, the implications interpreted in reference to the available data and conclusions derived from the analysis and interpretation. Finally the chapter gives recommendations and suggestions for further research.

5.2 Summary of the Study Findings

The purpose of the study was to investigate the effect of teacher characteristics on students' performance. Data was collected using students questionnaire and teachers' questionnaire. The independent variables were teacher qualification, teacher experience, teacher attitude and contextual factors. The dependent variable was student's achievement. The research design adopted was Descriptive Survey design.

The sample of the study was form four students. Stratified random sampling was used to select students from boys' schools, girls' schools and mixed schools. One chemistry teacher from each of the selected schools was also selected randomly. The data was analyzed using descriptive statistics where mean variance and standard deviation were used. Spearman's rho correlation and simple regression were used to test for the strength of relationships.

5.3 Effect of teacher qualification on students performance.

The findings of this study showed that 7.7% of the teachers were untrained, and 23.1% had Bachelor of Science degrees (B.Sc). The majority (69.2%) had the necessary qualification in both subject matter and methods. This therefore indicates that most schools are endowed with qualified teachers. Similar results are obtained when it comes to attendance of INSET programs. It is observed that 92.3% of the teachers have attended at least one cycle. This further shows that most teachers are improving on their pedagogy.

Spearman's rho correlation further showed a positive correlation coefficient of ($r=.42$, $p<.079$),) between teacher qualification and student's performance. Similarly, a regression coefficient of 1.35 significant at $\alpha=.05$ was obtained for the same.

This led to the rejection of the null hypothesis Ho1, which stated that there is no significant between teacher qualification and students performance. Therefore it is concluded that teacher qualification affects student's performance. This view is supported by Beebout and Juriah (1972), who in their study found that there was a positive correlation between teacher qualification and student's performance.

5.4 Effect of teacher experience on students performance.

Results show that 38.5% of the teachers had taught for less than five years, 46.2% between five and ten years and 15.4% between eleven and fifteen years.

Spearman's rho correlation showed that there was a significant positive correlation between teacher experience and students performance($r=.55$, $p<.026$). Furthermore simple regression showed a regression coefficient of 1.43 significant at $\alpha=.05$.

5.5 Impact of teacher attitude on student's performance.

Various question items were used to determine teacher attitude. On whether they had full support of the administration in carrying out their duties, 84.7% agreed and 15.4% disagreed. This indicates that most teachers felt supported and were positive towards the school administration.

On how they viewed their teaching career, 53.9% found it to be disappointing while 46.1% to be encouraging. This indicates that more than half the teachers don't enjoy their career, and hence find it to be a burden.

On whether they preferred to change stations, 76.9% agreed, while 23.1% disagreed. This might be as a result of some teachers overstaying in some stations and hence experiencing burnout.

On whether some students do not have the ability to learn chemistry, 84.7% agreed, while only 15.4% disagreed. This shows that despite their efforts, many teachers don't believe in their own students. This scenario only leads to mechanical teaching and positive results cannot be expected.

When students were asked if their teacher asks them questions about their progress, 69.7% either disagreed or were undecided. Only 28.6% agreed. This further shows a lack of personal attachment and empathy towards the students.

Regarding their teacher attendance, 50.9% of the students reported them to be absent a few times, 13% to be absent many times and 37.5% not to be absent at all. This further shows that

teachers missed a considerable time of curriculum delivery.

Spearman's rho correlation was used to test the relationship between teacher attitude and students performance. A positive correlation was recorded ($r=.39$, $p<.097$). On regression analysis a coefficient of .805 was obtained at $\alpha=.05$.

The null hypothesis Ho3, which stated that there is no significant relationship between teacher attitude and student's performance, was thus rejected. Therefore, it is concluded that teacher attitude affects student's performance.

5.6 Effect of school factors on student performance.

Most schools were found to be inadequate as far as number of laboratories is concerned. 53.8% of schools had one laboratory, 21.3% had two, 15.4%had three and 7.7% had above three. This shows that many schools do not have enough laboratories, especially if they are to offer the three science subjects.

On whether the laboratories are equipped, 15.4% responded not equipped at all, 69.2%had few chemicals and apparatus, while 15.4% were well stocked. This shows that most laboratories were ill equipped and hence cannot sustain good performance.

Regarding class size, 2 (15.4%) of classes had 21-30 students, 4 (30.8%) had 31-40, 5 (38.5%) between 41-50 and 2(15.4%) had above 50 students. This indicates that most classes are small and hence should be manageable to teachers.

Responses about teachers distance from school showed that 2 (15.4%) reside on the school compound, 6 (46.2%) stay within a walking distance, 4 (30.8%) between 10-20kilometres away while 1 (7.7%) stays more than 20kilometres away. This indicates that 38.5% of the teachers stay relatively far from school and thus may be absent from school, thus missing lessons.

Spearman's rho correlation showed a positive correlation between school factors and students performance($r=.25$ $p<.402$). Simple regression test was used to confirm this relationship, where a regression coefficient of .99 at $\alpha=.05$ was obtained.

The null hypothesis, which states that there is no significant relationship between school factors and students' performance, was thus rejected. It is therefore concluded that there is a significant positive relationship between school factors and students' performance.

5.7 Conclusion.

The assertion that teacher characteristics affect students performance is thus empirically supported ($r=.75$, $p<.005$). There is a strong positive correlation between teacher characteristic mean and students' performance. There is a weak positive correlation between school factors and the school mean ($r=.25$, $p<.402$). The findings also indicate a significant positive correlation between school factors and teacher characteristics ($r=.522$, $p<.068$). This shows that whereas school factors may not significantly influence students' performance, they do influence teacher characteristics which in turn impact on students' performance.

5.8 Recommendations.

The following recommendations can therefore be made based on the research findings:

1. The school administrations need to involve chemistry teachers more in decision making, especially as concerns acquisition of apparatus, so that teachers don't feel left out in decision making. They should also be consulted when designing of laboratories. Such efforts will go a long way in boosting their attitude towards the school.

2. Internal inspection to be strengthened in schools. This will help strengthen teacher preparation and improve delivery since teachers will be able to critic each other.

3. Teachers to be posted in districts outside their home districts. This will enable teachers to concentrate on teaching and not on personal businesses as is the case now.

4. Schools to prioritize building of staff houses. This will help improve in the supervision of programs, particularly the boarding schools. Housing will also save teachers the hustle of looking for the same, hence increasing their focus on school matters. It will also mean that teachers don't mingle extensively so much with the neighboring villages, hence improving on professionalism.

5.9 Recommendations for further research.

The study was conducted in Bungoma North District using form four students. The K.C.S.E performance of the school was taken as student's performance. This in a way may affect the generalization of the findings, since student's achievement could be viewed in many different ways. However, the researcher viewed that the K.C.S.E. was a standardized examination, and could be used to compare performance of different schools on a uniform scale.

Other areas that should be focused on for further study include:

1) This study found positive correlation between teacher characteristics and school mean. The research was done in boys' schools, girl schools and mixed schools. It is therefore recommended that a study be carried out to investigate if teacher characteristics affect boys and girls in the same way.

2) The K.C.S.E. examination and its effectiveness as a measure of students' achievement in chemistry. This is due to the fact that students tend to have a positive attitude towards chemistry, yet their performance at K.C.S.E. level is not that impressive.

5.10 Summary

In this chapter clarity on the teacher characteristic question is achieved. The findings show that teacher characteristics in terms of qualification, experience and attitude contribute significantly to students' performance. It is therefore evident that an effective teacher can mitigate against the absence of other essentials in the learning process.

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APPENDIX A

Introductory letter to respondents.

Dear respondent,

RE: Informed consent.

I kindly request you to participate in this study. I am a researcher from Moi University, interested in finding out challenges facing teachers in secondary schools. I have selected you to participate in this study because I believe that you can provide useful information. The study requires your honest and accurate response to all the items in the questionnaire used in data collection. I will be gratefully if you could take time and complete the questionnaire.

You will not be required to write your name on the questionnaire. The researcher will also not write your name on any of the papers used during data collection. Confidentiality of your responses is guaranteed by the researcher.

Thank you

Yours faithfully

Kennedy. K. Kilaha.

APPENDIX B Letter of introduction to the principal.

Kennedy . K. Kilaha

Dept of Curr. Studies and Educational media.

Moi University

P.O BOX 3500

ELDORET.

TO

The Principal of Sec. School

Bungoma North District

Dear Sir/ Madam,

RE: PERMISSION TO CONDUCT RESEARCH IN YOUR SCHOOL

I am a student of Moi University Pursuing a master's degree course in Curriculum instruction and educational media. I have chosen your school as my area of study and I would like your teachers and students to participate in the study. I am conducting a research on the topic: Effect of teacher characteristics on student's achievement in chemistry. This study will be important since it will expose some of the challenges faced by chemistry teachers in their bid to deliver their best to students.

Thank you for your cooperation

Yours faithfully

Kennedy. K. Kilaha.

APPENDIX C

Questionnaire for students

This questionnaire is concerned with what you think about chemistry and your chemistry teacher. The in formation you will provide by responding to the items below will be used in making suggestion on how students may be helped in their science studies. It is therefore meant for student's academic welfare. There is neither right nor wrong answers. You are invited to indicate your choice according to what you think.

STUDENT QUESTIONARE.

Fill and tick where appropriate

General information

SECTION A:

1. Your school is

Girls boarding school [ ] Boys boarding school [ ]

Mixed boarding [ ] mixed day [ ]

2. Please indicate your gender (tick as appropriate)

Male [ ] Female [ ]

3. Are you given any assignment in chemistry at school? (Please write yes or no)_____

4. How often does your chemistry teacher ask you questions about your progress in chemistry? (Please tick as a appropriate)

Never [ ] A few times [ ] Many times [ ] Most of the [ ]

5. Which of the following is true about your school attendance this term? (Please tick one box).

About many time [ ] absent a few time

Absent most of the time [ ] Not absent at all

6. If you answer to 5 above says you have been absent, please state the reason why you were absent_____

7. Which of the following is true about your teacher attendance to lesson this term? (Please tick one option)

1) Absent many time [ ] 2) Absent a few times [ ]

3) Absent most of the time [ ] 4) Not absent at all [ ]

Information about chemistry as a subject

In this section, you are to lick appropriate whether you strongly Agree (SA); Agree (A); Undecided (U); Disagree (D); Strongly Disagree (SD).

	Numerical value	1	2	3	4	5
		SA	A	U	D	SD
1	I would like to have chemistry lesson more often					
2	I find chemistry to be very interesting					
3	I would like to pursue a career related to chemistry					
4	I like chemistry practical lessons					

SECTTION D

	Numerical value	1	2	3	4	5
		SA	A	U	D	SD
1	My chemistry teacher is my personal model, I would like to be like him					
2	I like my chemistry teacher					
3	Our chemistry teacher makes us to do practical work					
4	Our chemistry teacher demonstrates practical most of the time instead of allowing us to do them					
5	My chemistry teacher marks our exams on time					
6	My chemistry teacher disregards student who perform poorly					
7	Our chemistry teachers is punctual in class					
8	Our chemistry teachers answers our question satisfactorily					
9	I would do better if my chemistry teacher was changed					
10	I find chemistry lessons boring.					

END **Thank you**

APPENDIX D
QUESTIONNAIRE FOR TEACHERS

You are required to fill in this questionnaire to collect information regarding teacher characteristics and students' achievement in chemistry. The information gathered from this questionnaire will relate directly to you and your school and what you feel about your school. Your answers will not be shared with any one and will be kept anonymous. DO NOT indicate your name or number anywhere. There is no correct or wrong answer. Thank you for your contribution.

PART A

(PERSONAL INFORMATION)

This section asks you questions about your personal details. (Tick options provided that apply to you)

1. Please indicate your gender Male [ ] Female [ ]

2. What is your Age bracket?

20-30 Years [ ] 31-40 Years [ ] 41-50 Years [ ] Above 50 Years [ ]

3. State your qualification?

a) Untrained [ ] b) Diploma [ ] c) B.Sc. [ ] d) B.Ed. (Science) [ ] e) Masters [ ] f) Other (Specify)……

4. When did you start teaching? ……

5. How many years have you taught in this school? ……

6. Who is your employer?

a) B.O.G b) T.S.C

7. How far do you stay from school?

a) In the school compound [ ] b) Within a walking distance [ ]

c) Between 10-20km away [ ] d) More than 20km away [ ]

8. How many cycles of SMASSE have you attended?

a) None [ ] b) Cycle one [ ] c) Cycle two [ ] d) Cycle three [ ] e) Cycle four [ ]

9. How has been your teaching career as a chemistry teacher?

a) Very disappointing [ ] b) Fairly disappointing [ ]

c) Fairly encouraging [ ] d) Very encouraging [ ]

10. What is the average number of students for each of the classes that you teach? please indicate

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11. How many lessons do you teach per week?

SCHOOL INFORMATION

10. Please indicate your school mean Grade in chemistry as per 2007 KCSE results

……..

11. How has been the trend in the performance of chemistry in your school in the last three years? …….

12. How many laboratories does your school have?

a) None [ ] b) One [ ] c) Two [ ] d) Three [ ] above three [ ]

13. Please tick the option(s) that best describes your school laboratory

a) Well stocked with relevant chemicals and apparatus [ ]

b) Has few chemicals and apparatus [ ]

c) Not equipped at all [ ]

PART C

For each of the following questions, state whether you Strongly Disagree(SD); Disagree (D); are Undecided (U); Agree (A) or Strongly Agree (SA) with each of the following statements.

	Numerical value	1	2	3	4	5
		SA	A	U	D	SD
1	I am comfortable teaching some topics more than others.					
2	I prefer to teach chemistry to my other teaching subject.					
3	I feel I could do better if changed to another station					
4	I have full support of administration in teaching of chemistry					
5	I am very competent in chemistry					
6	I would be more motivated if I taught high ability students.					
7	Chemistry should be made optional					
8	Some students do not have the ability to learn chemistry.					

1. Please indicate the method you mostly use when teaching chemistry

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2. In your opinion, outline what should be done to improve the teaching and learning of chemistry in this school.

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3. What strategies have you put in place to ensure that chemistry performance improves in your school? Please indicate

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END **Thank you**