INFLUENCE OF SCHOOL INFRASTRUCTURAL ENVIRONMENT ON PERFORMANCE IN KENYA CERTIFICATE OF SECONDARY EDUCATION IN KIBAUNI DIVISION OF MACHAKOS COUNT, KENYA

BY

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DECLARATION

This research project report is my original work and has not been presented for an academic award in any other University.

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L50/77011/2014

The research project report has been submitted for examination with my approval as the University of Nairobi supervisor.

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DEDICATION

This research project is dedicated to my husband Francis Muendo Ndungi, daughter Caroline Muendo, my sons Maurice, Victor, and Eric whose support enabled me to succeed due to their encouragement during the whole period of my research project.

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LIST OF ABBREVIATIONS AND ACRONYMS

B.O.M	Board of Management
DEO	District Education Officer
F.D.S.E	Free Day Secondary School Education
EFA	Education for All
FSE	Free Secondary Education
GOK	Government of Kenya
KCSE	Kenya Certificate of Secondary Education
KESSP	Kenya Education Sector Support Program
KIE	Kenya Institute of Education.
KNEC	Kenya National Examination Council
MOE	Ministry Of Education
NCST	National Council of Science and Technology
NPE	National Policy on Education
PE	Physical Education
SPSS	Statistical Package for Social Sciences
UN	United Nations
UNESCO	United Nations Education Scientific and Cultural Organization.
W H O	World Health Organization
WASCE	West Africa Senior School Examination
WASH	Water and Sanitation

ABSTRACT

Secondary Education provides a vital link between basic education and the world of work, on one-hand and further training on the other. It is an important sub-sector of education in the preparation of human capital for development and provision of life opportunities. For this reason, Kenya has invested heavily in secondary education as evidenced by the introduction of Free Secondary Education (FSE) in 2008. Despite this, effectiveness of curriculum implementation factor that is infrastructural facilities has not been established well in some parts. Further, it is not clear how infrastructural facilities have influenced students' academic achievement since the inception of subsidized FSE from the year 2008 to 2010. The main objective of the study was to establish the influence of school infrastructural environment on student's academic performance of Kenya certificate of secondary education, in Kibauni division, Mwala sub-County. The specific objective was to determine the extent to which the physical classroom environment affects student's academic performance in KCSE in Kibauni division, to establish how the school library influences student's academic performance in KCSE in Kibauni division, to determine how the provision of science laboratory affects academic performance in Kenya certificate of secondary education, to find out how adequacy of boarding infrastructure influences students academic performance in KCSE in Kibauni division. The study adopted descriptive survey design. The target population of the study was 9 secondary school Principals, 27 teachers and 43 form fours students. The researcher used three sets of questionnaires, one for the principal, for the teachers and another one for form 4 students. Quantitative data was analyzed using descriptive statistics. The analysis was done using the Pearson Correlation Coefficient. This established whether classroom environment of the schools affects performance in KCSE which is objective one. To establish whether School library, laboratory facilities and boarding infrastructure (objectives 2, 3, and 4) had any influence on students' performance in KCSE, Pearson correlation was used. The Statistical Package for Social Sciences (`SPSS) aided the analysis of the data collected and the results were presented in frequency tables, pie charts, bar graphs and percentages to make meaningful conclusions. The study findings were that schools do not have adequate physical facilities. Such physical facilities include classrooms, laboratories, library and dormitories which negatively affect their academic performance. The study findings conclude that schools should be sensitized to acquire physical facilities that are important for the success of schools in academic performance. Among the ways of lobbying money may include sensitizing parents to pay school fees on time, holding harambees, writing proposals to well wishers and governmental programs that deals with educational development e.g. CDF funds, LATIFF among other ways. Parents should also be sensitized to engage in programs that are geared towards improving the schools physical facilities in order to improve the learning environment for academic excellence of their students. This can be done through participating in school income generating activities.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Education is a process of imparting or acquiring knowledge, developing the powers of reasoning and judgment and generally of preparing oneself or others intellectually for matured life. It makes an individual civilized, refined, cultured and educated and prepares them for battle of life so as to enable them to shoulder their responsibility towards the progress of the society and country. Every society gives importance to education and is regarded a panacea for all evils. It is the key to solve the various problems in life Kahn *et al, (*1963).The quality of school buildings is critically important in the drive for improving education. Good quality facilities provide teachers and students with supportive environments that are responsive to their changing needs and could make a real difference to learning and teaching. Successful teaching and learning depends on the availability of crucial resources, such as learning materials and a teaching and learning environment that is conducive, United Nations Educational, Scientific and Cultural Organization UNESCO, (2000).

School with physical infrastructure and environment that inspire learners to want to come to school and learn and teachers to teach good infrastructure provide an appealing environment that will stimulate their minds to learn and improve their performance. A good school infrastructure environment include; building in good shape including an adequate number of well-organized classrooms, sufficient blackboards, tables, desks, benches, chairs, and adequate number of sanitation facility, access to adequate clean drinking water, electricity, ventilation and light, fire exits

and first aid kit, medical assistance, canteen, sufficient recreation ground, library, laboratory, computer facilities UNESCO, (2000).

School infrastructure is an essential part of secondary schools to realizing the objectives of education. Inadequate school infrastructure may cause irritation and friction while a planned infrastructure is a center of satisfactory students learning that led to the improvement of academic performance. If there is improved standard of infrastructure of secondary school there will be remarkable development in the education system as a whole.

In the World Conference on Education for All (EFA) held in Jomtein in 1990.It was agreed that education is a basic need for all people. In Africa, this declaration was domesticated by the Dakar Framework of Action (2000). The participants identified several elements necessary for quality education among them motivated students, well trained teachers using actual learning techniques, adequate facilities and materials, local language curriculum that builds on teachers and learners knowledge and experience, welcoming gender sensitive, health, safe environment that encourage learning and accurate assessment of learning outcomes UNESCO, (2000).

The importance of education was to meet the goals of EFA which was set by 2015.
In order to expand and improve all aspects of quality education and ensure excellence to provide conducive environment which enhances teaching and learning. Provision of quality education is enhanced by providing adequate physical infrastructure. Since time immemorial human beings have done a lot to facilitate their lives with the entire

physical infrastructure in the world. Physical infrastructure include laboratory, library, dormitory, solid waste disposals and classrooms. This plays an important role in enhancing safe and clean environment which is conducive for high achievement of students and physical comfort. Heyneman (1980) supports the idea as cited in John Beynon (1997) that developing countries, low levels of learning among children can be partly attributed to poor and inadequate physical infrastructure in schools.

Physical facilities play a key role in the attainment of the school's intended objectives and overall quality performance in national examinations. Public secondary schools are often characterized by lack of infrastructure facilities such as; adequate classrooms, latrines, hostels and laboratories. Ironically the introduction of Free Primary and Secondary Education has been touted as an accelerator of the aforementioned problems. Since its inception in 2003, more students now attend school, however a number of challenges continue to plague the implementation of these programs including overstretched and overcrowded facilities such as classrooms, latrines, hostels and laboratories. It may be a fact that dilapidated; crowded or uncomfortable school infrastructure leads to low morale among the students, teachers and the parents. Hence this leads to the drop in achievement when school facilities are inadequate Fraizer, (1993).

The Free Primary Education was aimed at reducing illiteracy levels in the country as it aims that by 2015 every Kenyan will be able to read and write (Universal Primary Education and Education For All) by the year 2015. This policy has however

worsened the quality of education due to high enrollments with limited physical infrastructure such as classrooms.

Wolfenson (2000) has submitted that education is a fundamental human right and it is the key to sustainable development, peace and stability within and among populace of such countries. Availability of teaching/learning resources enhances the effectiveness of schools as these are basic things that can bring about good academic performance in the students. The provision of Free Day Secondary Education (FDSE) funds is meant to cater for tuition and operations costs in schools. A large amount of the FDSE funds go to tuition vote head for the purchase of classroom teaching and learning materials to enhance students' academic achievement, Ministry Of Education, (2009).

1.2 Statement of the problem

In Kibauni division most of the secondary schools, there has been dismal academic performance in KCSE attributed to inadequate infrastructure facilities and are in deteriorating conditions out of date designs. The deficiency of teaching and learning resources is attributed to the government's commitment towards Education for All (EFA) and the MDGs has resulted in the free primary education since 2003 and free day secondary education in 2007. This has resulted to increased enrollment (given data for both primary from 5.9m in 2002 to 8.6m in 2010 and secondary) of students in primary and students in secondary schools. This has over stretched the already existing inadequate water and sanitation and infrastructural facilities. With increase in enrollment in primary schools there is also high enrolment in secondary school due to high transition rate republic of Kenya, (2008).

Secondary schools are experiencing many challenges relating to access and equity, Including overstretched facilities, overcrowding, and poor learning environments and lack of appropriate sanitation this is adversely influencing academic performance. With this state deficiency of infrastructure the quality of teaching and learning is affected and creates health and safety concern to staff and students. A safe and secure school infrastructure environment increases learners enrolment, completion and hence quality education republic of Kenya, (2008). In Kibauni division, performance in Kenya certificate of secondary school education has been poor as compared to neighboring division as shown below.

Table 1.1 K.C.S.E performances 2012-2015 (mean scores)

	2011	**2012**	**2013**	**2014**	**2015**
Ikalaasa	4.49	3.69	3.98	4.45	3.56
Kibauni	4.72	4.766	4.06	4.69	4.977
Matulani	-	3.45	3.76	3.45	4.56
Kiundwani	4.32	4.34	4.21	3.21	3.02
Kitile	3.031	2.93	2.61	2.92	3.08
Kikaso	2.93	2.01	2.21	3.32	3.45
Kyamatula	3.11	3.00	3.12	3.91	2.99
Lema	4.52	3.45	4.61	5.12	5.23
Mulu	3.42	3.32	4.12	3.99	3.87

Source: DEO'S office Mwala Sub-County (2016)

The dismal performance in KCSE conducted by the Kenya National Examination council (KNEC) has been attributed to inadequate learning facilities. This situation is of great concern to school Administrators, Government and other stakeholders. The deficiency of learning infrastructure facilities due to increased enrollment challenges teaching and learning that prevent attainment of education objectives. Musyoka (2013) conducted a study on the influence of provision of school physical infrastructure on students' academic performance in KCSE in Mwingi central district found out that schools do not have adequate physical facilities, classrooms, laboratories, library, desks and toilets which impacts negatively on their academic performance. Several studies have been carried out to establish the factors that contribute to poor KCSE performance in secondary schools in Kibauni division; however, studies focused on student's attitude towards education, cultural factors and personal characteristics of students. Therefore the study sought to establish influence of infrastructural environment on student's academic performance in K.C.S.E Exams in Kibauni division, Mwala sub-County.

1.3 Purpose of the study

The study established the influence of school infrastructural environment on students' academic performance of Kenya certificate of secondary education, in Kibauni division, Mwala sub-County.

1.4 Objectives of the Study

i. To determine the extent to which the physical classroom environment affects student's academic performance in KCSE in Kibauni division.
ii. To establish how the school library influences students academic performance in KCSE in Kibauni division.

iii. To determine how the provision of science laboratory affects academic performance in KCSE in Kibauni division.

iv. To find out how adequacy of boarding infrastructure influences students academic performance in KCSE in Kibauni division.

1.5 Research questions

i. To what extent does the physical classroom environment affects student's academic performance in KCSE in Kibauni division?

ii. How does school library influences student's academic performance in KCSE in Kibauni division?

iii. What is the influence of science laboratory on students' academic performance in KCSE in Kibauni division?

iv. How adequacy of boarding infrastructure influences students' academic performance in KCSE in Kibauni division.

1.5.1 Hypotheses

The hypotheses of the study are stated as follows:

1. Ho: There is no significant relationship between physical classroom environment and student's academic performance in KCSE in Kibauni division.
2. Ho: There is no significant relationship between school library and student's academic performance in KCSE in Kibauni division.
3. Ho: There is no significant relationship between school science laboratory and student's academic performance in KCSE in Kibauni division.

4. Ho: There is no significant relationship between adequacy of boarding infrastructure and student's academic performance in KCSE in Kibauni division

1.6 Significance of the study

It was hoped that the study finding would be helpful to the school planning and management committees because they may use the findings to provide the necessary physical infrastructures to enhance academic performance of Kenya Certificate of Secondary Education. The study findings would also give suggestions which may be used in formulation of necessary policy statements through its recommendations on availability of physical infrastructures in schools. Such recommendations would help the school planning and management committees to prioritize and avail the necessary infrastructure which may be used in improving academic performance of Kenya Certificate of Secondary Education.

The study findings were anticipated that they would benefit the teachers and the learners by encouraging them to utilize well the physical infrastructure provided in the school. The study findings were hoped to contribute to the poll of knowledge in the area of project planning and management. The study provided useful information to project planners and managers on the need to adhere to safety standards and guidelines in respective schools in order to enhance school safety. The findings of this study formed a basis for further researchers who might be interested in advancing this study on the other regions of the country.

1.7 Delimitations of the study

The study only focused on the contribution of the infrastructural environment on the performance of Kenya Certificate of Secondary Education in 9 public secondary schools in Kibauni division and other factors that contribute to the performance of Kenya Certificate of Secondary Education were not considered. The study also sought the views of the principals, teachers and form four students only.

1.8 Limitations of the study

There were chances of facing problems such as lack of co-operation and unwillingness to answer questionnaires by some respondents. However, explaining to the potential interviewees that information given was treated with utmost confidentiality and research was purely for academic purposes mitigated the problem. The other limitation was time scheduled for data collection and finances were not adequate this is because there were many other variables that influence academic performance of students that were not addressed in this study.

1.9 Assumptions of the study

The researcher assumed that:

a. That the poor performance of KCSE in Kibauni division was associated with provision of inadequate physical facilities in schools.
b. That the respondents would cooperate and give genuine responses.

1.10 Definition of significant words

A school infrastructure: Is generally defined as the set of inter-connected structural element that provide framework supporting an entire structure of development**.**

Academic performance: Refers to the grades both per subject and overall that the students obtain in Kenya Certificate of Secondary Education Examination.

Library service: Refers to the provision of reading materials in a special room designed for reading.

Physical resources: Refers to school infrastructures that are used by students and teachers in the daily school activities.

School environment: A school physical environment includes the building and the surrounding.

Boarding facilities: Refers to physical infrastructures that support students' schools such as sanitation blocks, dining halls, and dormitories among others.

Government policy: Refers to the guidelines of operating institutions.

Sanitation: The hygienic disposal or recycling of waste.

1.11 Organization of the study

The study was organized in the five chapters. Chapter one dealt with the background of the study, statement of the problem, purpose of the study and objectives of the research. It also dealt with research questions, significance of the study, assumptions of the study, limitations, delimitations and definition of the significant terms.

Chapter two consisted of literature review related to the influence of school infrastructural environment on students' academic performance in KCSE; The influence of physical classroom environment on academic performance, the influence of school library on students' academic performance, effects of adequacy of boarding facilities on student performance in secondary schools, influence of science laboratory in academic performance and conceptual framework.

Chapter three included research methodology used in the study and it explains research design, target population, sample size, sampling procedure, research instrument, reliability and validity and procedures for data collection and analysis techniques.

Chapter four outlines the methods of data analysis presentation and interpretations. Chapter five gives a summary of the findings, discussions, conclusions and recommendations of the study and suggestions for further research. The appendix contains transmittal letter and questionnaires.

CHAPTER TWO

LITERATURE REVIEW

2.1Introduction

This chapter contains a review of the past studies. The purpose of the review is to examine the available studies from other scholars and researchers who have done studies on the same subject under investigation. The literature available provided a guideline to this study and offered a critical analysis of past studies in order to avoid the duplication of previous work.

2.2Government Policy on Students' Performance in Secondary Schools

One of the aims of the Government goal is to ensure that all the Kenyans citizens acquire quality education. The specification for the establishment and requirement of physical and material resources in public secondary schools are stipulated in the laws and policies that govern a country's education system. Ministry of Education inspection manual for educational institutions states that learners output is determined by such factors as sanitation facilities, availability of physical resources, effective utilization well maintained and trained teachers.

Over the years school managers have emphasized that physical facilities available in most of the schools may as well be regarded as obsolete in terms of quality and quantity since they were meant for a small population but now enrolment has increased. This calls for increase in number so as to improve Mworia, (1993). A part from personal threats insecurity for children can emanate from inappropriate school facilities and infrastructure. Poorly constructed classrooms, dormitories, playing grounds, insufficient and broken down facilities GOK (2003). This goal has however

not been achieved especially in semi arid region where students are faced by myriad of challenges that act as impediment to access quality education.

To this end, the government has made some allocation to the development of school infrastructure; however, this allocation has been minimal as compared to the schools Infrastructural needs. According to Kenya Institute of Education (KIE) (2006), the Government recognizes curriculum as the pillar of quality education and training where Kenya Institute of Education (KIE) plays central role in the implementation of the Kenya Education Sector Support Program (KESSP). The Institute is relied upon to develop quality curriculum and curriculum support materials. However the implementation of education policies and development of the schools' physical infrastructure have lagged behind schedule especially in semi arid region including Kibauni division. This has resulted to poor academic performance of the students in these regions, Kibauni secondary schools included.

2.3The influence of physical classroom environment on students' academic performance in secondary schools.

A good infrastructure indicates a good school. A good infrastructure includes; building in good shape of benches, chairs, access to drinking water, electricity, ventilation and light, fire exits and first aid kit canteen and computer facilities UNESCO (2000). Classroom Infrastructure facilities can be either permanent or temporary structures. The structures should be appropriate, adequate and properly located, devoid of any risks to users or to those around them. They should also comply with the provisions of the Education Act (Cap 211), Public Health Act (Cap

242) and Ministry of Public Works building regulations/standard. The school should ensure classrooms are clean well maintained, safe and properly utilized Ministry of education, (2008). It is important to observe the above with regard to the various types of school buildings**.**

Classrooms are important infrastructures in a school setting since learners spend most of their time in these facilities. It is important to observe the following: The size of the classroom, in terms of length and width, should be as specified in the Ministry of Education building specifications i.e. 7.5m x 5.85m or 7.5m x 6.0m. Such classrooms should accommodate a maximum of 30 learners in one-sitter desks or 40 learners in two-sitter desks in line with the provisions of the Ministry of Education circular on Health and Safety Standards in Educational Institutions (2001)**.**The doorways should be adequate for emergency purposes, open outwards and should not be locked from outside at any time when learners are inside.

Classroom windows must be without grills and should be easy to open. The classrooms should be properly lit and ventilated. The floors should be level and kept clean always. For cemented floors, any cracks should be repaired in good time. Similarly, for mud walls and floors teachers should ensure that they are regularly smeared with fresh mud and floors smeared with cow dung to prevent the development of cracks and the generation of dust that can pose risks to the health of both teachers and learners. In all cases, efforts should be made to cement all the classroom floors. Each block should be fitted with serviced fire extinguishers Ministry of education, (2008).

Regular inspection of classroom buildings, halls and stairways should be carried out and immediate measures taken to correct any problems noticed. The furniture in classrooms, especially the desks, should be appropriate for use by both male and female learners. Poorly constructed or inappropriate desks can lead to physical deformities such as curvature of spine, contraction of chest, roundness of shoulders or a confirmed stoop. They can also create tension and fatigue among learners and that brings discomfort to learners during teaching and learning.

The class teacher should ensure that the desks are arranged in a manner that facilitates easy and orderly movement of learners in the classroom, ideally each desk should have no more than three learners and the space between any two desks should be at least 2 feet. According to Akande (1985), learning can occur through one's interaction with one's environment. Environment here refers to infrastructure facilities that are available to facilitate students learning outcome. It includes books, audiovisual, software and hardware of educational technology; so also, size of classroom, sitting position and arrangement, availability of tables, chairs, chalkboards, shelves on which instruments for practical's are arranged Farrant, (1991) and Farombi, (1998).

According to Oni (1992), facilities constitute a strategic factor in organizational functioning. This is so because they determine to a very large extent the smooth functioning of any social organization or system including education. He further stated that their availability, adequacy and relevance influence efficiency and high productivity. In his words, Farombi (1998) attested that the wealth of a nation or society could determine the quality of education in that land; emphasizing that a

society that is wealthy established good schools with quality teachers, learning infrastructures that with such, students may learn with ease thus bringing about good academic achievement.

Writing on the role of facilities in teaching, Balogun (1982) submitted that no effective science education program can exist without equipment for teaching. This is because facilities enable the learner to develop problem-solving skills and scientific attitudes. In their contribution, Ajayi and Ogunyemi (1990) reiterated that when facilities are provided to meet relative needs of a school system, students will not only have access to the reference materials mentioned by the teacher, but individual students will also learn at their own paces. The net effect of this is increased overall academic performance of the entire students.

In his study on resource concentration, utilization and management as correlates of students learning outcomes in Oyo State, Farombi (1998) found that the classroom learning environment in some schools was poor. He cited examples of schools without chalkboard, absence of ceiling, some roofing sheets not in place, windows and doors removed among others, a situation which the researcher regarded as hazardous to healthy living of the learners .According to Nigerian Tribune on Thursday 25 November 1999, in caption; Mass Failure will Continue until…" the chairman of the National Committee of WAEC, Dr. U.B Ahmed opined that the classroom is the origin of failure…a close look at the public schools and what goes on there shows that nothing good can come out of most schools as they do not have facilities, adequate and appropriate human resources to prepare candidates for WASCE.

In a comparative study done in Flemish secondary schools India OECD (2011) on students attending school with high quality infrastructure, with those in schools with poor infrastructure found out that students who enjoy good quality school infrastructure were in contact with teachers, involvement in class was high, they had good learning process and their well-being was good, all that affects academic performance of students. Without doubt the study concluded that school infrastructure definitely contributes to well-being of students that improves academic performance.

In Virginia, Cash (1993) developed research that examined the impact of various factors of building condition on student achievement in a manner that controlled for socio-economic status of the students. Cash (1993) found that when socio-economic factors were constant, facility condition had a significant correlation with student achievement. Cash (1993) found that air conditioning, absence of graffiti, classrooms, correlated with student academic achievement at a significant level when controlling for socio-economic status of the students.

Chan (1996) conducted a similar study of the impact of physical infrastructure on students' performance. Chan (1996) concluded that technology and adaptabilities of physical infrastructure better equipped students for success and that to ignore that fact was to disregard the physical difficulties of learning. On classroom size, studies have shown that students in larger classes may perform more poorly if the resulting reduced motivation leads to increased absenteeism. However, such issues have not been empirically tested. Teaching is generally assumed to be a public good; however, as Bonesronning (2003) points out, there are also private good aspects. As classroom

size is reduced, instructors have a greater chance to provide students with individual attention and can respond to the reduced class size by reallocating resources towards low-achieving students or by adopting teaching methodologies geared towards student needs Brown and Saks (1987).

The impact of classroom size on achievement can therefore be ambiguous, depending on the instructor's teaching method and student motivation. A well planned and organized layout of physical classroom infrastructure do much to banish apathy, supplement inadequacy of books as well as arouse students interest by giving them something practical to see, do and at the same time helping to train them to think things out themselves.

Savoury (1958) suggested a catalogue of useful visual aids that are good for teaching history be pictures, post cards, diagrams, maps, filmstrips of materials. It is against this background that this study sought to establish the influence of physical infrastructure environment on the performance of students in Kenya Certificate of Secondary Education in Kibauni division. World Bank publication (1990), citing Mwamwenda and Mwamwenda (1987) linked performance of students to the provision of adequate facilities while referring to a survey of 51 primary schools in Botswana that students performed significantly better on academic tests when they had adequate classrooms, desks and books.

Fagbamiye (1979) in his study in Lagos state and attested why students' performance standard fall observed 559 cases from 13 secondary schools using age,

type of school (Day or Boarding, mixed or single sex), teachers qualification and teaching experience as well as intake quality using students' entrance examination achievement. His findings revealed that schools which are equipped had good records of achievement and attracted more students. He concluded that good quality schools in terms of facilities and younger students' intake perform better in WASCE.

In Nigeria, a lot of studies have been conducted by various researchers on the relationship between educational resources and students academic performance. Idiagbe, (2004) concluded that teachers Qualification and adequate facilities were determinants of assessing academic performance of students in secondary schools. Hence the availability or unavailability of facilities in schools affects the academic performance of students in Delta State.

The school environment affects academic achievement of students. Facilities such as, desks, seats, chalkboard, teaching aids, and cupboard are ingredients for effective teaching and learning. In the same vein the Nigeria Education Research Council of 1998 also emphasized that, for a good education policy or programmed to guarantee quality outputs, it must be adequately supplied with necessary facilities and equipment.

In Kenya a number of studies have been conducted to assess the level of availability and adequacy of classroom facilities in the schools. An evaluation which was conducted by KIE in the year 2007 to investigate how much prepared schools were for the new curriculum showed most of the sampled schools had inadequate

classrooms for teaching and learning. Other important resources in teaching and learning were found to be textbooks, charts, posters, library and computers. The most commonly used resource was found to be the textbooks some of which, according to a monitoring report have shallow content, contradictory information, and too much unnecessary content and factual errors. A study by Musyoka (2013), on the influence of provision of school physical classroom infrastructure on students' performance in K.C.S.E in Mwingi Central, Kitui County found out that schools don't have adequate facilities which negatively impacts on their academic performance. A study by Kiplagat *et al* (2013) on factors contributing to poor academic performance in K.C.S.E in secondary schools in Kericho sub county found out that 56.6% disagreed while 43.4% agreed that school classroom infrastructure affect academic performance. According to the study to some extent, infrastructure does not affect academic performance. Juma (2011) links performance in examinations to state of teaching and learning resources in schools. He notes that students from poor backgrounds perform poorly in the examinations because the poor are often in areas where schools are seriously deprived of vital facilities like classrooms, an attitude of helplessness may be inculcated early into children making them feel that being in school is a waste of time.

Physical materials in terms of adequacy and quality have been noted to have a great impact on performance of students in the examination Husen, Saha, & Noonan, (1978). A school that has adequate instructional materials is likely to post better quality grades than a school which has poor quality physical resources. A school with inadequate classrooms was forced to accommodate more students than recommended.

This exerted a lot of pressure on resources such as teachers who may compromise their methodology as part of adaptive mechanism Nafukho, (1991; Pscharapolous & Woodhall, (1985). This ends up affecting negatively students' performance reducing their competitiveness for opportunities whose placement is pegged on performance in such subjects Mayama (2012); Lumuli, (2009).

A study by Onyata (2013), on school based factors influencing student academic performance at K.C.S.E in Teso south district in Kenya. The study was done by studying the adequacy of classroom the study found out that 100% of head teachers strongly agreed that availability of physical facilities affects academic performance of students, while 87 % of class prefects agreed that availability of physical facilities affects the student's performance. Studies on the effect of school environment on academic performance attest to the fact that school environment that is not conducive for learning may lead to under performance Chimombe, (2011).Provision of adequate learning facilities at all levels including equipment enhances the quality and relevance of imparted skills of learners Lumuli, (2009).learning involves the interaction of students with the environment.

2.4 The influence of School library environment on students' academic performance

Hornby (2010) described a library as a building or room in which collection of books, tapes, newspapers, journals; and articles are kept for people to read study or borrow. Library is an essential factor in the teaching-learning process. It forms one of the most important educational services. The educational process functions in a world of

books. The chief purpose of a school library is to make available to the students, at their easy convenience, all books, periodicals and other reproduced materials which are of interest and value to them but which are not provided or assigned to them as basic or supplementary textbooks. The importance of a library has been demonstrated by the government when she expressed in the National Policy on Education (NPE) that every state Ministry needs to provide. Fowowe (1988) clarifies that a library must be up-to-date and at the same time have older materials. It must be properly supported financially to fund materials and services among others. He concluded that a well-equipped library is a major facility which enhances good learning and achievement of high educational standards. In his words, Farombi (1998) reiterated that school libraries may not be effective if the books therein are not adequate and up-to-date. Its impact may only be meaningful if the library could always be opened to the students for a considerable length of time in a school day. With all the above mentioned facts, it is sad to know that many schools operate without libraries Shodimu, (1998). Ogunseye (1986) had earlier noted that the total absence of an organized school library would continue to spell a doom for thousands of secondary school students. This statement clearly implied that many schools operate without libraries and this had affected the academic performance of their students.

Moreover, Fuller (1985) identified a school library as an instructional resource which may significantly influence students' achievement after controlling for students' family background. He found out that one effect of library size and its activity have been positive in 15 out of 18 analyses. Those schools with well-equipped library normally maintain high academic performance. In another study on raising school

quality in developing countries, Fuller (1985) found out that collection of books kept for reading in the library is related to performance.

Since the 1990s, numerous studies have examined the impact libraries have on student achievement and behavior, giving special attention to the librarian's important role in teaching, leading the way for technology use, and inspiring literacy. More than 60 studies in nearly two dozen states confirm that schools with a well-equipped library, staffed by a full-time certified librarian and appropriate support staff contribute significantly to gains in student learning. For a full picture, surveys have been conducted to include perspectives of librarians, staff, parents, administrators Shannon, (2012); Lance, (2013), and students OH 2003; Bleidt, (2011).

Results from dozens of large-scale studies, involving over 8,700 schools and over 2.6 million students, have consistently demonstrated that students score an average of 10-20 % higher on reading and achievement tests when their school has a strong library media program. This effect holds, regardless of other school conditions such as student-teacher ratio, overall per-student spending, student demographics, and community socio-economic conditions. Lance, et al., 2005; Lance, et al., (2003). Higher quality school libraries correlate with higher scores on reading tests done at state, national, and international levels. Aspects of school library quality that relate to reading achievement include: the size of the collection, the presence of a credentialed librarian, and overall staffing.

A study by a Scholastic Research Foundation (2008) on school libraries work to provides overview of library research studies. Found out a correlation between student achievement on standardized tests and school libraries. The study attested that Library media specialists play an essential role in the learning community by ensuring that students and staff are efficient and effective users of ideas and information. The study also found out that effective school libraries are much more than books. They are learning hubs, each with a full range of print and electronic resources that support student achievement. In addition, when library media specialists work with teachers to support learning opportunities with books, computer resources, and more, students learn more, get better grades, and score higher on standardized test scores than their peers in schools without good libraries.

Pribesh, Shana, *et al*.(2011) did a study to examined the differences in school library characteristics (staffing, books added to collection, schedule, and number of days closed) in schools with various concentrations of students living in poverty. The researchers found that the students in most need – those attending schools with the highest concentrations of students living in poverty – had the fewest school library resources to draw on. Findings suggest that in order to close achievement gaps between high and low socio-economic groups, work must be done to repair the access gap in school libraries in high and low-poverty schools.

A study on the impact of school libraries on student achievement published by the NY Comprehensive Center (2011), found out that it is clear that school libraries with certified school librarians play an important role in student achievement, curriculum

development and instruction. Information and digital literacy is recognized as a critical aspect of each student's education. The school librarian is a true educational partner with every teacher and administrator in providing the best possible learning experience for each child. The study recommended incentives for school libraries to work with communities.

2.5 The influence of Boarding Facilities environment on Students' Academic Performance in Secondary Schools

Boarding facilities encompasses the physical infrastructures such as; sanitation blocks, dining halls, dormitories, staff houses among others. In order to plan and construct effective boarding facilities and improve the physical learning environments, not only technical specifications need to be elaborated; qualitative and adequacy aspects also need to be considered Marton and Booth, (2007). Beer (2005) and Watson (2003) observed that housing teachers and students in the school compound goes a long way to improve learner performance. She established that teachers who stay in school compound can get time to help learners after class hours through remedial teaching.

Dormitories are the single most used physical infrastructure, where learners spend the longest continuous period of time in a day. It is therefore important to keep these structures clean and properly ventilated. In every school, care should be taken to observe the following: The space between the beds should be at least 1.2 meters while the corridor or pathway space should not be less than 2 meters. Since sharing of beds is prohibited in schools, admissions should be tied to bed capacity at all times

all doorways should be wide enough, at least 5 feet wide, and they should open outwards. They must not at any time be locked from outside when learners are inside. Each dormitory should have a door at each end and an additional emergency exit at the middle. It should be clearly labeled “Emergency Exit” .Dormitory doors should be locked at all times when learners are in class or on the playing fields. The keys to the doors should be kept by the Dormitory Master/Mistress or the Dormitory prefect. Dormitory windows must be without grills and should be easy to open outwards. Fire extinguishing equipment should be functioning and placed at each exit with fire alarms fitted at easily accessible points. Bunk beds should be strong and firm and fitted with side-grills to protect young learners against falling off Ministry of education, (2008).

Sanitation facilities should include solid waste disposal, drainage and adequate water for personal hygiene and to clean toilets. According to Gogo (2002), Wilkens, White and Kinder (2003), materials used in constructions of school buildings and type of buildings determine the levels of cleanliness. A safe school must have sanitation facilities built up to the required standards and kept clean with high standards of hygiene. In order to enhance safety, the following must be observed: In cases where pit toilets are used these structures should be built at least 10 meters away from tuition and boarding facilities and on the downwind side. Where ablution block is attached to the dormitory, a high degree of cleanliness must be maintained. Pit latrines should not be less than 6 meters (20ft) deep, and should be regularly well disinfected. Pit latrines should be at least 15 meters (50 ft) away from a borehole or well or water supply point. Where there are boreholes or shallow wells in places with difficult soil types or

land forms, the school management should seek the advice of the water department before the digging of a pit latrine. In mixed schools, girls' sanitation areas must be separate and offer complete privacy. Each school should ensure safe and effective disposal of sanitary wear Ministry of education, (2008).

In the construction of sanitary facilities, the following must be observed in relation to numbers: The first 30 learners: 4 closet (holes).The next 270 learners: one extra closet for every 30 learners. Every additional learner over 270 learners: 1 closet per 50 learners. All closets must be clean, well-ventilated and properly maintained. At least one third of the fittings for boys should be closets and the rest urinals. If a urinal is a trough, then 0.6m (2 ft.) of the trough is equivalent to one fitting. Proper consideration should be given for staff sanitation, with at least one closet for 12 persons and with separate provision for ladies and gentlemen. All sanitary facilities and equipment should be in the best state or repair, serviceable and inspected regularly. If learners are responsible for cleaning their sanitation facilities, proper protective measures (e.g. provision of gloves) must be taken. Soap and tap water or water cans fitted with taps should be set outside the toilets for washing hands after use of these facilities. When cleanliness in schools is maintained students get attracted and motivated and this contributed to good academic performance of the students Kinder (2003).

2.6 The influence of science laboratory environment on students academic performance in Kenya certificate of secondary education.

Laboratory has been conceptualized as a room or a building specially built for teaching by demonstration of theoretical phenomenon into practical terms. Farombi (1998) argued the saying that "seeing is believing" as the effect of using laboratories in teaching and learning of science and other science related disciplines as students tend to understand and recall what they see more than what they hear or were told. A laboratory is essential to the teaching of sciences. Laboratory occupies a central position in sciences instruction; it is where theoretical work is put into practical Ogunniyi (1983).

A study by Ango (1986) found out that laboratory work stimulates learners' interests as they are made to personally engage themselves in useful scientific activities and experimentation. Science is not only products or processes. It affords the learner the basic skills and scientific method of problem solving and knowledge obtained through laboratory work it promotes long term memory. Nwachukwu (1984) discovered in her survey of the resources for the teaching and learning of Biology in some of the new secondary schools in Lagos that there was a general inadequacy of resources. She also found out among other things that (a) out of 80 per cent of the old schools that accepted as having laboratories, none had a well-equipped laboratory and (b) 40 % of the schools had no laboratory at all, while the remaining 60 % had rooms' labeled "laboratory" without adequate apparatus. She concluded that teaching of Biology practical by teachers would be difficult and that students learning experiences would be limited.

In his contribution, Balogun (1982) admitted that no effective science education programs can exist without equipment for teaching. Writing on the situation of our secondary schools today, Okoli (1995) reported that laboratories have become shelves of empty bottles of chemicals. In terms of academic achievement, Soyibo and Nyong (1984) have shown that schools with well-equipped laboratories have better results in the school certificate science examinations than those that are ill-equipped. Yadar (2001) observed that no course in science and mathematics can be considered as complete without including some practical work. The practical work ought to be carried out by individuals either in science laboratories or in classes. At school level, practical work is even more important because of the fact that we learn by doing. Scientific practices and applications are thus rendered more meaningful.

In conclusion, school environment should have healthy that include the structures that protect students and staff but poorly designed school buildings and play areas may present serious health risks. Special construction techniques may be required to ensure safety particularly in areas prone to natural disasters. Schools should be designed to prevent temperature extremes inside classrooms. Cold damp and poorly ventilated classrooms provide an unhealthy environment for students particularly poorly nourished and inadequately clothed students who are especially vulnerable to respiratory and other infections. Extremely warm conditions may reduce concentration and attention span and can lead to heart related illnesses, thermal stress, fatigue and heat stroke WHO, (2003).

Since students spend much of their day within the school environments during their critical developmental stages a healthy school environment is required to improve their health and effective learning and this contributed to the development of healthy adults who were skilled and productive members of society. In addition students who learn about the link between the environment and health are able to recognize and reduce health threats in their own homes WHO, (2003).

Safety and thermal condition is a constituent of school infrastructure. Therefore before a school infrastructure is designed the designer or the architect must study the environment and ensure human lives that are the students, teachers and support staffs are relatively safe and the thermal condition will not hinder effective academic activities. According to Earthman (2004) temperature rates, heating and air quality are the most elements that influence student's achievement. Fisuer (2001) and Schneider (2002) rate these factors as likely to affect students' behavior and academic outcomes. A study by Kimmel *et al* (2003) emphasizes the need for ventilation in educational establishments to minimize temperature and improved air in the classrooms. A study by Nyakungi (2012) on the implementation of safety standards and guidelines for students in secondary schools in Marani district, Kisii County, Kenya found out that safety situation guideline had partially been implemented in most of sampled schools. He also found out that some schools didn't have ministry of education circular and were not conversant with the safety standards and guidelines as specified. With the free day secondary introduced in 2007 this has resulted to increased enrollment that has overstretched the educational facilities to an extent that safety standards and guidelines cannot be fully implemented. The influence of school infrastructural

environment in academic performance in K.C.S.E in Kibauni division is not well known the study was carried to fill this gap.

2.7Theoretical Framework

The study was guided by Education production function theory. Education function represents mathematically the process of which a school transforms inputs Stephen & Eileen, (1990). An education production function is an application of the economic concept of a production function to the field of education. It relates various inputs affecting a student's learning like Student-teacher ratio, instructional materials, infrastructure facilities, healthy and safety of facilities that affect the quality of education. It measures outputs including subsequent labor market success, school enrollment, graduation rates, and most frequently, standardized test scores.

A large number of successive studies, increasingly involving economists, produced inconsistent results about the impact of school resources on student performance, leading to considerable controversy in policy discussion. In this case since the physical infrastructure is part of the input in education system the provision of such facilities is very the key in relation to the output. This theory is suitable for this study because it was establishing the contribution of physical facilities and their health and safety on academic performance.

2.8 Conceptual Framework

Figure 1: Conceptual framework showing interrelationship between variables and academic achievements.

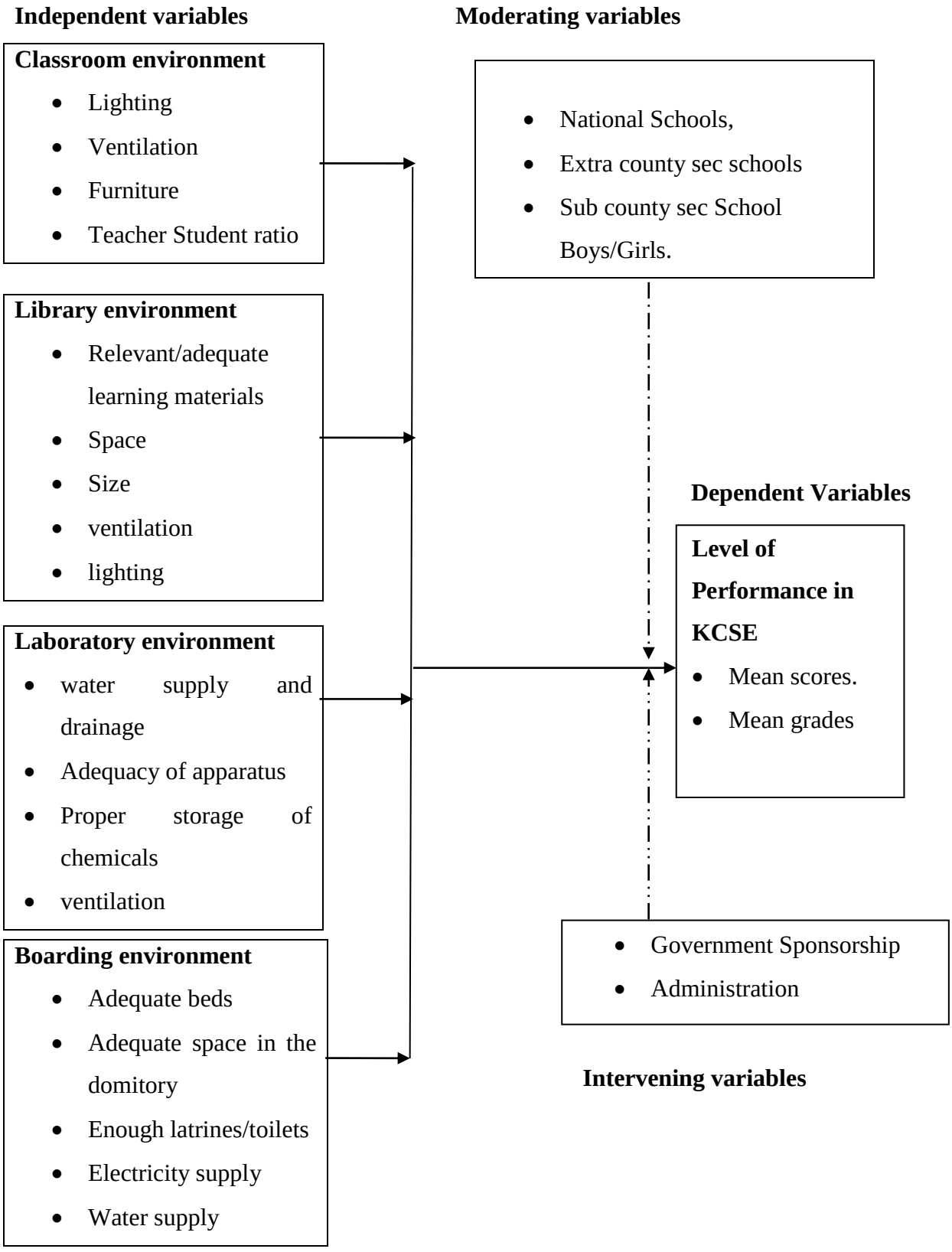

Figure 1 shows that the performance of students in examinations depending on the availability of adequate physical infrastructures which includes library, laboratory, classrooms and boarding facilities. In addition, the infrastructure must be in line with the government safety and standards guidelines. If resources are made available for financing the provision of physical infrastructure students performance in Kenya Certificate of Secondary Education will improve.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology of the study; it comprises research design, target population, sampling procedure and sample size, research instrument, validity of the instrument, reliability of the instrument, data collection and analysis methods. The chapter addresses the actual methodologies used in the research process from inception to the end.

3.2 Research design

According to Ngechu (2001), a research design is a plan showing how problems under investigation are solved. Krejcie (1964) defines a research design as a plan structure and strategy of investigation conceived to meet the study objective and to control valiance. The research design used in this study was descriptive survey, which includes both qualitative and quantitative approaches. Descriptive design attempts to describe what was or what is in a social system such as a school according to Wiria & Wachahiu (1995). This design is ideal for studies that seek to determine the frequency with which variables occur. This design also allows for the description of characteristics of a given phenomenon presently in a systematic and accurate manner to allow for drawing conclusion and generalization to the general population.

The study sought to answer the question of the effects on physical classroom environment, the school library environment, the provision of science laboratory and

adequacy of boarding infrastructure on students' academic performance in KCSE in Kibauni division, Mwala sub-county.

3.3 Target population

This refer to the group or individual to whom the survey applies to, the element of population whom the study seeks response from in relation to the research questions.

Borg and Gall (1989) defines target population as the population to which the researcher wants to generalize the result of the study. Mugenda and Mugenda (1999) says population is the aggregate of all that confirms to a given specification. The target population of this study consisted of 9 public, day and boarding secondary schools in Kibauni division, Mwala Sub County, Machakos County. The researcher targeted on 9 principals, 90 teachers and 450students of Kibauni division, Mwala sub county Machakos County. (Machakos county DEO, 2015).The targeted secondary schools included Ikalaasa, Matulani, Kibauni, Kiundwani, Kilala, Kikaso, Kyamatula, Lema and Mulu Secondary Schools.

3.4 Sample size and sampling procedure

A sample is a subset of the population to which research intents to generalize the results Wiecma, (1986) Mugenda and Mugenda (1999) defines sample as a smaller group obtained from the accessible population. This sub-group is representative of the whole population with the relevant characteristics. Orodho (2005) defines sample as a small portion of a target population. He continues to define sampling as a means of selecting a given number of subsets from a defined population as a representative of population. . The researcher sampled the 9 principals from the nine public day and boarding secondary school since the population is small. The researcher sampled 27 teachers which is 30% of the total population of teachers .The researcher also sampled

45 form four students which is 10% of the total population. According to Mugenda and Mugenda (2003) a sample of between 10 and 30 percent is adequate. Random sampling is deemed suitable because it is designed to avoid biasness Ogonda (1991)

3.5 Research instrument

The researcher used three questionnaires, one for the principal, another one for the teachers and another one for form four students. According to Moore (1983), questionnaires give detailed answers to complex problems and they are most effective for use in survey. Mugenda and Mugenda (1999) observes that the use of questionnaire is a popular method for data collection in education because of the relative ease and cost effectiveness with which they are constructed and administered to large sample. Questionnaire gives a relatively objective data and enriches them to the survey research design of this kind.

The questionnaire had two parts, part one contained questions aimed at obtaining general information about the respondent and the school. The second part contained specific questions that are related to the main objective of the study and aids to gather information about the effects of physical classroom environment. The influence of school library, the provision of science laboratory, and influence of boarding infrastructure on student's academic performance in KCSE.

3.6 Validity and reliability of the research instrument

3.6.1 Validity of the research instrument

Validity is the degree to which data collected by an instrument can be said to be valid for the purpose of the analysis and making influences from that data Mugenda and Mugenda (2003). It is the degree to which a test measures what it intends to measure. To this effect, questionnaire guides are said to valid when they actually measure the intended parameter Borg & Gall (1989) to enhance the instrument validity the research instrument was appraised by the supervisor to evaluate, the applicability and appropriateness of the content clarity and adequacy of the construction of the instrument from a research perspective. To ensure validity the questionnaire was developed in such a way that it was very clear and easy to use. Questions were designed in such a way that they are connected to the variables specified in the conceptual framework.

3.6.2 Reliability of the research instrument

To test the reliability of the item in the items in the questionnaire the study used test retest reliability method. Reliability is a measure of the degree to which a research instrument yields consistent results or data after repeated trials Mugenda and Mugenda (2003). The researcher used test retest reliability method by administering questionnaire twice to the same respondents after an interval of a week to ensure consistency. The scores on the first and second test were computed and calculated reliability coefficient in order to indicate the relationship between the two sets of scores which was obtained Franke and Wallen, (2006) Pearson product moment

correlation formula was used to check for the reliability Ary, (2006) According to Best and Kahn (2006) the reliability coefficient formula is

$$\mathbf{r} = \frac{\mathbf{[N(\sum XY) - (\sum X) \times (\sum Y)]}}{\sqrt{[\sum X2 - (\sum X)2x\ (\sum Y)\ 2 - \ (\sum Y)\ 2}}$$

Where **r** = reliability

N = total number of items

X = first test

Y = second test

According to Kasomo (2006), if the value r lies between y and x1, it indicates perfect or total relationship while if the value of r is 0 or near, it indicates no discernible relationship between the variables.

3.7 Data collection procedures

The researcher obtained a research permit letter from The National Council of Science and Technology (NCST) then the researcher obtained an introduction letter from the DEOs office Mwala district in order to conduct the research. The researcher also sought permission from principals of the participating 9 secondary schools. The researcher administered the research (be specific) instruments tools personally to the respondent who were given ample time to respond to the questions. One week was enough. This ensured achievement of a good return ration and gave respondents a chance who sought clarification for them to answer. The respondents were assured of strict confidentiality of their identities.

3.8 Data analysis

The questionnaires were collected and checked for completeness. After data collection, it was edited and entered into statistical package for social sciences (SPSS)

which aided data analysis. Coding was expected to organize and reduce research data into manageable summaries. Quantitative data was analyzed, presented and interpreted using descriptive statistics. The analysis was done using the Pearson correlation coefficient.

To establish whether classroom environment of the school affects performance in KCSE, Pearson correlation coefficient was used. Pearson correlation coefficient was used to establish whether library, laboratory facilities and boarding infrastructure had any influence on students' performance in KCSE. The analyzed data was presented in frequency, tables and percentages were applicable. In conclusion, data analysis was done on the objectives and research question.

3.9 Ethical consideration

According to O.M Mugenda and A.G Mugenda (2003) ethical issues are issues that a researcher must be aware of before starting the research. Permission to undertake this research in the public secondary schools was sought from the DEO'S office through a letter clarifying the aim of the research. The researcher sought consent of each participant in the research and encouraged voluntary participation. The researcher explained the purpose and nature of the research to every participant before engaging them in the study. The researcher also ensured anonymity and confidentiality of the information given by the respondents. The names of the participants from whom the data was collected were not mentioned.

3.10 Operational definitions of variables

Objectives	Types of Variables	Indicators	Measurements	Measurement Scale	Tools of Analysis	Method of Analysis
To determine the extent to which the physical classroom environment affects students academic performance in KCSE in Kibauni division	**Independent:** classroom environment **Dependent:** Academic performance in KCSE	Furniture, Teacher student ratio consideration. Condition of structure Spacing of furniture	No. of classes No. of desks in each class No. of students per class No. of teachers	Interval	Quantitative	Descriptive: statistics analysis, computing, frequency and percentage. Correlation
To establish how the school library influences students performance in KCSE in Kibauni division	**Independent:** Library environment **Dependent:** Academic performance in KCSE	Adequacy of Learning resources Spacing of furniture	No of books No of desks No of students accommodated in one room	Interval	Quantitative	Descriptive: statistics analysis, computing, frequency and percentage. Correlation
To determine how the provision of science Laboratory affects academic performance in KCSE in Kibauni division	**Independent:** Laboratory environment **Dependent:** Academic performance in KCSE	Adequacy of apparatus Spacing Condition of laboratory structure Access of water	Size of laboratory Kinds of apparatus in the Lab	Interval	Quantitative	Descriptive: statistics analysis, computing, frequency and percentage. Correlation
To find out how adequacy of boarding infrastructure influences students academic performance in KCSE in Kibauni division	**Independent:** Boarding Environment **Dependent:** Academic performance in KCSE	Cleanliness Adequacy of beds Condition of the boarding structure	Evidence of students accommodated No. of beds No of day scholars, no. of toilets/ latrines.	Interval	Quantitative	Descriptive: statistics analysis, computing, frequency and percentage. Correlation.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents data analysis, presentation and interpretation of the findings on the influence infrastructural environmental on students' performance in Kenya certificate of secondary education Kibauni Division data was collected using questionnaires the questionnaire administered to the respondents. 9 questionnaires were administered to the 9 principals, 27 to teachers and 45 to students. The data collected was analyzed using SPSS software. The researcher made use of frequency tables and percentages to present data.

4.2 Questionnaire return Rate

The return rate of the questionnaires was analyzed so as to determine whether the findings obtained could be reliable and valid. Data was collected by the researcher from 9 sampled secondary schools in Mwala sub-county, Machakos County. The questionnaire return rate was shown in Table 4.1.

Table 4.1 Response rate

	Questionnaires Administered	**Questionnaires filled and returned**	**Percentage**
Principals	9	9	100
Teachers	27	18	66.7
Students	45	34	75.6
Total	**81**	**61**	**75.3**

Table 4.1 indicates that out of the 81 questionnaires administered, 61 were filled and returned. This represented a 75.3 % response rate, which considered satisfactory to make conclusions for the study. According to Mugenda and Mugenda (2003) a 50% response rate is adequate, 60% good and above 70% rated very good. This also collaborates Bailey (2000) assertion that a response rate of 50% is adequate, while a response rate greater than 70% is very good. This implies that based on this assertion; the response rate in this case of 90% is very good. This high response rate can be attributed to the data collection procedures, where the researcher pre-notified the potential participants of the intended survey, the questionnaire was self administered to the respondents who completed them and these were picked shortly after.

4.3 Demographic data

The respondents were asked to indicate their gender, age, highest academic professional qualification and number of years they have served as principals and also teachers.

4.3.1 Gender of respondents

The respondents were asked to indicate their gender with the aim of establishing whether gender influences students' academic performance. The responses were presented in Tables 4.2, 4.3 and 4.4.

Table 4.2 Distribution of the respondent by the type of school.

	Frequency	**Percentage**
Male	7	77.8
Female	**2**	22.2
Total	**9**	**100.0**

This indicates that there was a gender balance in the distribution of secondary school principals since 7 (77.8%) male principals head mixed secondary schools while 2 (22.2%) female principals head girls' schools. This is not likely to affect academic performance.

Further study sought to establish gender of teacher findings as indicated in Table 4.3.

Table 4.3 Gender distribution of teachers

	Frequency	**Percentage**
Male	14	74.0
Female	4	26.0
Total	**18**	**100.0**

Table 4.3 revealed that 74.0% of teachers are males while 26.0% are females. This implies that more male teachers were employed by Teachers Service Commission to teach in the secondary schools more than the female teachers.

Table 4.4 Gender distribution of students in form four

	Frequency	**Percentage**
Male	19	55.9
Female	**15**	44.1
Total	**34**	**100.0**

Table 4.4 implies that the highest number 19, (55.9%) of the respondents were male while 15 (44.1%) were female students. This indicates that there was a gender balance in the distribution of respondents. This did not affect academic performance in students.

4.3.2 Age distribution of respondents

The researcher further sought to establish the age of distribution of the respondents. This was to establish whether age was affecting academic performance in any way. The responses were presented in Table 4.5 and 4.6

Table 4.5 Age distribution of principals

	Frequency	**Percentage**
31-45	5	55.6
40-60	4	44.4
Total	**9**	**100.0**

According to Table 4.5, 5, (55.6%) of the respondents were within the ages 31-45 years, 4 (44.4) of the respondents were within the ranges of 40-60 years. The study

results shows that majority of the principals are within the range 31-45 years. This implies that the principals are energetic enough to execute their duties diligently.

Table 4.6 Age distribution of teachers

The researcher sought to establish age distribution for the respondents. The findings are summarized in Table 4.6.

	Frequency	**Percentage**
25-35 yrs	5	30
36-45yrs	6	35
46-55yrs	3	20
56yrs	4	15
Total	**18**	**100.0**

Table 4.6 revealed that majority of respondents (35%) were 36-45yrs of age followed by those aged (25-35yrs) of age with 30%, followed by those of 56yrs and above with 15%. The least were those who are aged 46-55 years of age with 20%. This implies that most of the teachers are energetic enough to school activities and experienced because the more years in service of the teacher the more experience one gets. However age did not influence secondary school academic performance in K.S.C.E in Kibauni division.

4.4 Academic qualification of the principals and teachers

The researcher sought to establish the academic qualification of the respondents with aim to establish whether it had any influence on academic performance. The responses were presented in Table 4.7 and 4.8.

Table 4.7 Academic qualification for the principals

	Frequency	**Percentage**
Diploma	2	22
Bachelors degree	5	55.6
Masters	2	22.2
Total	**9**	**100.0**

According to Table 4.7, (55.6 %) of the principals had bachelor's degree, 22.2 % with master degree qualification and 22% with diploma. The findings therefore indicate that the principals have the capacity and management acumen to steer school activities successfully. They have the skill to handle and responsibilities and emerging issues in school physical environment to best level possible.

Table 4.8 Education levels of teachers

	Frequency	**Percentage**
Diploma	5	30
Bachelors degree	9	50
Masters	4	19
Total	**18**	**100.0**

From the findings majority of the teachers had Bachelors degree 50% while 30% diplomas and 19 % with masters' degree an indication that they had the capacity disseminate knowledge and influenced the provision of physical environment for better academic performance.

4.5 The influence of physical classroom environment on student's performance

The first objective of this study was to determine effects of classroom environment on student's performance in examination in secondary schools. The respondents were asked to indicate the number of classroom streams, classroom size. This was to determine whether an education ministry guideline was followed when building the classes. The results were presented in Table 4.9 and 4.10 respectively.

Table 4.9 Distribution of classroom streams

	Frequency	**Percentage**
1 stream	12	20
2 streams	35	57
3 streams	11	18
4 streams	3	5
Total	**61**	**100.0**

Table 4.9 reveals that 57 % of the schools had 2 streams which is the highest number of students while 20 % had 1 stream. This is an indication that there is an increase in enrollment in secondary schools because of the free day secondary school introduced by the government thus increase in physical classroom environment.

Table 4.10 Distribution of class size in terms of number of students

	Frequency	Percentage
Less than 30	10	16.1
31-40	23	37.1
41-50	18	30.6
Above 50	10	16.1
Total	**61**	**100.0**

Table 4.10 shows that 53.2 % of schools had less than 40 students in class which is the recommendation of the ministry of education while 46.7 % of schools had more than even reaching 50 student in one class. This makes the class to be congested, marking students' work becomes a challenge to the teacher. This makes the teacher to be overwhelmed by the work thus deterioration of academic performance in Kibauni division.

4.5.1 Adequacy of classroom size to accommodate students

The study sought to establish adequacy of classroom size to accommodate students and the results were presented in Table 4.11.

Table 4.11 Class size adequacy to accommodate students

	Frequency	Percentage
Yes	26	42.4
No	35	57.6
Total	**61**	**100.0**

According to Table 4.11 42.4% of the respondents attested that class size is adequate to accommodate students while 57.6% that class size is inadequate to accommodate students. This implies that most of the schools in Kibauni Division, learners in classrooms are more than the recommended number. This affects academic performance

Table 4.12 Number of classroom in relation to number of students

	Frequency	**Percent**
Very inadequate	13	21.3
Inadequate	22	36.1
Not sure	14	23.0
Adequate	8	13.1
Very adequate	4	6.6
Total	**61**	**100.0**

According to Table 4.12, 36.1 % of the respondents attested that the schools have inadequate classrooms for teaching while 13.1 % adequate an indication that an increase in enrollment due the free day secondary education. This has overstretched teaching in classroom, hence adverse effect in Kibauni secondary schools academic performance.

4.5.2 Number of students Desks, teacher's chairs and tables in class

The study sought to establish the number of student's desks, teacher's chairs and tables in class whether the influence students academic performance. The results were presented in the Table 4.13

Table 4.13 Adequacy of students desk, teachers chairs and tables in the classroom

	Frequency	**Percentage**
Very inadequate	16	26.2
Inadequate	24	39.3
Not sure	11	18.0
adequate	10	16.4
Total	**61**	**100.0**

According to Table 4.13, student's desks, teacher's chairs and tables are inadequate 39.3 %, 26.2 very inadequate while 10% attested that they are adequate. This can be attributed to increased enrollment due to free day secondary education. Students' desk, teachers chairs and table in the classroom facilitates smooth teaching and learning activities. Inadequacy of these facilities cause discomfort to the learners

during learning hence low concentration. It results to low performance of students in Kibauni secondary schools

4.5.3 Size and location of writing board

The study sought to determine the size and location of writing board whether the influence students academic performance. The results were presented in Table 4.14.

Table 4.14 Distribution of size and location of the writing board

	Frequency	Percentage
Very inadequate	9	14.9
Inadequate	17	27.9
Not sure	6	9.8
Adequate	29	47.5
Total	**61**	**100.0**

Table 4.14 reveals that 47.5 % of the respondents attested that the size and the location of writing board is adequate while 27.9% inadequate. This is an indication that classroom boards are adequate for learning thus improved academic performance.

4.5.4 Adequacy of Classroom lighting

The study sought to establish adequacy of classroom lighting in relation to student's academic performance. These results were presented in table 4.15.

Table 4.15 Adequacy of classroom lighting

	Frequency	Percentage
Very inadequate	7	11.5
Inadequate	15	24.5
Not sure	28	45.9
Adequate	11	18.0
Total	**61**	**100.0**

Table 4.15 indicates that 45.9 % of classrooms have good lighting, 18 % very adequate lighting in classroom while 24.5 % inadequate and 11.5 % very inadequate. The findings of the study show that majority of secondary schools classrooms have good lighting. This can attributed with the government initiative in lighting of all learning institutions. Classrooms should have adequate light because proper lighting influences efficiency and therefore this improves student performance.

4.5.5 Teachers student ratio

The study sought to determine teacher student ratio in relation to student's academic performance. The results were presented in the Table 4.16.

Table 4.16: Teacher student ratio

	Frequency	Percentage
Very inadequate	23	37.7
Inadequate	27	44.3
Not sure	3	4.9
Adequate	6	9.8
Very adequate	2	3.3
Total	**61**	**100.0**

According to Table 4.16, 37.7% of the respondents indicated that teacher student ratio is very inadequate, 44.3 % inadequate, while 9.8 %, 3.3 % adequate and very adequate respectively this has resulted to dismal academic performance in secondary schools in Kibauni Division. .

Further the researcher tested the hypothesis to establish the relationship between physical classroom environment and students' academic performance in KCSE in Kibauni division.

Ho: There is no significant relationship between physical classroom environment and student's academic performance in KCSE in Kibauni division.

The results were presented in Table 4.17.

Table 4.17. Physical classroom environment and students' academic performance

		Academic performance	**Physical classroom Environment**
Academic performance	Pearson Correlation	1	.740
	Sig. (2-tailed)		.023
	N	9	9
Physical classroom Environment	Pearson Correlation	.740	1
	Sig. (2-tailed)	.023	
	N	9	9

According to Table 4.17, the correlation the correlation coefficient for relationship between students' academic performance and physical classroom environment is +0.740.The correlation coefficient implies that there is relationship between students' academic performance and physical classroom environment. The relationship is significant, P value of 0.023 is below o.05, therefore the hypothesis was rejected and conclusion made that there is significant relationship between physical classroom environment and academic performance in Kibauni secondary schools.

4.6 The influence of school library environment on student's academic performance

The study sought to establish the influence of school library service on academic performance. The results were indicated in the Table 4.18

Table 4.18: Distribution of library in schools

	Frequency	Percentage
Yes	20	32.8
No	41	67.2
Total	**61**	**100.0**

Table 4.18 revealed that 67.2 % respondents attested that school had no library while 32.8 % of schools had library in schools. Library is an essential factor in the teaching-learning process. Inadequacy of school library negatively has influenced students' academic performance in Kibauni division. According to Shodimu, 1998 it is sad to know that many schools operate without libraries. Ogunseye (1986) had noted that the total absence of an organized school library would continue to spell a doom for thousands of secondary school students. This implies that dismal academic performance in Kibauni division is attributed to inadequacy of library in schools.

4.6.1 Availability learning materials for students in the library, space and furniture.

The study sought to establish the influence of school library service on academic performance. The results were indicated in the Table 4.19 and Table 4.20

Table 4.19: Availability of relevant learning materials for students

	Frequency	Percentage
Very inadequate	30	49.2
Inadequate	20	32.8
Not sure	3	4.9
adequate	6	9.8
Very adequate	2	3.3
Total	**61**	**100.0**

Table 4.19 revealed that 49.2% of relevant learning materials are very inadequate, 32.8% Inadequate, and 9.8 % adequate and 3.3% very adequate. This is in line with Hornby (2010) that education process functions in a world of books. Information and digital literacy is recognized as a critical aspect of each student's education. Inadequacy of learning materials has adversely affected academic performance in secondary schools in Kibauni division. This is in line with Fuller (1985) identified a school library as an instructional resource which may significantly influence pupils' achievement after controlling for pupils' family background. He found out that one effect of library size and its activity have been positive in 15 out of 18 analyses. Those schools with well-equipped library normally maintain high academic performance. In another study on raising school quality in developing countries, Fuller (1985) found out that collection of books kept for reading in the library is related to performance.

Table 4.20 Space and furniture for the students in the library

	Frequency	Percentage
Very inadequate	26	42.6
Inadequate	20	24.5
Not sure	5	8.2
Adequate	2	3.3
Very adequate	8	13.1
Total	**61**	**100.0**

Table 4.20 indicates that 42.6 % space and furniture in library was very inadequate, 24.5% inadequate, 8.2% not sure, 3.3% adequate and 13.1% very adequate. The findings of the study show that there is inadequacy of space and furniture in the library which is adversely affecting student's academic performance. Most of the school had bookstore instead of library.

4.6.2 Ventilation and lighting

The study sought to determine the influence of ventilation and lighting on academic performance. The results were indicated in the Table 4.21 and Table 4.22.

Table 4.21: Ventilation and lightning

	Frequency	Percentage
Very inadequate	32	52.6
Inadequate	16	26.2
Not sure	7	11.4
Adequate	6	9.8
Total	**61**	**100.0**

Table 4.21 reveals that 52.5% of school ventilation and lighting in the library is very inadequate, 26.3% inadequate, 11.5 % not sure while 9.8% adequate. This is an indication that almost all school library section is in deplorable condition and does not support academics effectively resulting to poor academic performance.

Further the researcher tested the hypothesis about the relationship between library and students academic performance

Ho: There is no significant relationship between school library and student's academic performance in KCSE in Kibauni division

The results were presented in the table 4.22

Table 4.22 School library and student's academic performance in KCSE

		Academic performance	School library
Academic performance	Pearson Correlation	1	.605
	Sig. (2-tailed)		.035
	N	9	9
School library	Pearson Correlation	.605	1
	Sig. (2-tailed)	.035	
	N	9	9

According to Table 4.22, the correlation coefficient for the relationship between school library and the students' academic performance in secondary school is +0.605. The correlation coefficient implies that there is relationship between students' academic performance and school library. The relationship is significant, P value of 0.035 is below 0.05, therefore the hypothesis was rejected and conclusion made that there is significant relationship between school library and students' academic performance in secondary schools.

4.7 The influence of school science laboratory environment on student academic performance

The other objective was to determine the influence of school science laboratory on students' academic performance. The results were presented in Table 4.23

Table 4.23: Distribution of science laboratories schools

	Frequency	Percentage
YES	41	67.2
NO	20	32.8
Total	**61**	**100.0**

Table 4.23 revealed that 67.2% of the secondary schools had science laboratories while 32.8 % didn't. This is an indication that majority of secondary schools in Kibauni division had science laboratory facilities which have lead to better performance in secondary school in Kibauni division. In secondary schools science laboratories are very effective in teaching and learning of science and any other related disciplines as students tend to understand and recall what they do and see more than what they hear. A library is an essential facility to teaching of sciences.

4.7.1 Water supply and drainage in science laboratory

The study sought to establish influence of water supply and drainage in science laboratory in academic performance and the results were presented below in Table 4.24.

Table 4.24: Water supply and drainage in science laboratory

	Frequency	Percentage
Very inadequate	17	27.9
Inadequate	20	32.8
Not sure	1	1.6
Adequate	17	27.9
Very inadequate	6	9.8
Total	**61**	**100.0**

Table 4.24 revealed that 32.8 percent water supply and drainage in science laboratory is inadequate, 27.9 % very inadequate, 27.9% adequate and 9.8% very adequate. The finding of the study show that most of the laboratories are not fitted with water supply and proper drainage this has affect performance of science subjects in Kibauni division.

4.7.2 Apparatus chemicals and availability and storage.

The study sought to determine the influence of apparatus and chemical availability and storage and the results were presented in Table 4.25.

Table 4.25 Apparatus and chemical availability and storage.

	Frequency	Percentage
Very inadequate	17	27.9
Inadequate	15	24.6
Adequate	29	47.5
Total	**61**	**100.0**

According to Table 4.25, 47.5 % of schools had adequate apparatus and chemical availability and storage, 24.6% inadequate and 27.9% very inadequate. The findings of the study show that those schools with laboratories that had apparatus and chemical availability and storage had better academic performance. In terms of academic achievement, there is need for all secondary school laboratories to be well equipped for better performance in K.C.S.E in Kibauni divisional secondary schools.

4.7.3 Heating, lightning and ventilation.

The study sought to determine the influence of heating and lighting and ventilation to academic performance and the results were presented in Table 4.26.

Table 4.26: Heating, lighting and ventilation to students during practicals

	Frequency	Percentage
Very inadequate	12	19.2
Inadequate	14	22.2
Not sure	1	1.6
Adequate	29	47.5
Very adequate	5	9.5
Total	**61**	**100.0**

Table 4.26 revealed that 47.5% of the schools had adequate heating, lighting and ventilation to students during practical's, 9.5% very adequate, 22.2% inadequate while 19.7% very inadequate. The findings of the study show that majority of laboratories had heating, lighting and ventilation to students during practical. This is an indication that practicals are effectively done in those schools with laboratories. According to Earthman (2004) temperature rates, heating and air quality are the most elements that influence student's achievement. Fisuer (2001) and Schneider (2002) rate these factors as likely to affect students' behavior and academic outcomes.

Further the researcher tested the hypothesis about the relationship between science laboratory and students academic performance

Ho: There is no significant relationship between school science laboratory and student's academic performance in KCSE in Kibauni division.

The results were presented in the Table 4.27

Table 4.27 Relationship between science laboratory and academic performance

		Academic performance	Science laboratory
Academic performance	Pearson Correlation	1	.868
	Sig. (2-tailed)		.002
	N	9	9
Science Laboratory	Pearson Correlation	.868	1
	Sig. (2-tailed)	.002	
	N	9	9

According to Table 4.27 the correlation coefficient for relationship between students' academic performance and school science laboratory is +0.868. The correlation coefficient implies that there is relation between students' academic performance and school science laboratory. The relationship is significant, P value of 0.002 is below 0.05, therefore the hypothesis was rejected and conclusion made that there is significant relationship between school science laboratory and academic performance.

4.8 The influence of school boarding facilities environment on students academic performance

The fourth objective the study sought to establish the influence of school boarding facilities on students academic and the results are indicated in the Table 4.28.

Table 4.28 School boarding facilities

	Frequency	Percentage
Yes	19	31.1
No	42	68.9
Total	**61**	**100.0**

Table 4.28 indicates that 31.1% of secondary schools had boarding facilities while 68.9% didn't have boarding facilities. The findings of the study shows that majority of the secondary school in Kibauni doesn't have boarding facilities at 68.9 % while few had 31.1%.This has contributed to dismal performance in secondary schools in Kibauni division. Housing teachers and students in the school compound goes a long way to improve learner performance. Teachers who stay in school compound can get time to help learners after class hours through remedial teaching.

4.8.1 Safety and security of boarding facility

The study sought to determine the influence of safety and security of boarding facility on academic performance and the results were presented in Table 4.29.

Table 4.29: Safety and security of boarding facility to students

	Frequency	Percentage
Inadequate	7	11.5
Not sure	5	8.2
Adequate	48	78.7
Very adequate	1	1.6
Total	**61**	**100.0**

According to Table 4.29, 78.7% of secondary schools had adequate safety and security of boarding facilities, 1.6 % very adequate, and 8.2 % not sure while 11.5% inadequate. The findings reveals that safety and security in most of the secondary schools in Kibauni division is inadequate. Safe and secure environment for students provides conducive learning environment to students and therefore, this leads to improvement in academic performance

4.8.2 Provision of sanitation facilities

The study sought to determine the influence of provision of sanitation facilities on academic performance and the results were presented in Table 4.30.

Table 4.30: Provision of sanitation facilities to students

	Frequency	Percentage
Very inadequate	10	16.4
Inadequate	14	23.0
Not sure	8	13.1
Adequate	21	34.4
Very adequate	8	13.1
Total	**61**	**100.0**

Table 4.30 revealed that 34.4% of secondary schools had adequate provision of sanitation facilities to students, 13.1% very adequate, and 13.1% not sure and 23.0% provision is inadequate while 16.4% very inadequate. There is need for the government to construct adequate sanitation facilities for secondary schools in Kibauni division. Adequacy of sanitation helps students save study hours hence improvement in academic performance

4.8.3 Water provision

The study sought to determine the influence of water provision on academic performance and the results were presented in Table 3.31.

Table 4.31: Water provision

	Frequency	Percentage
Very inadequate	9	14.8
Inadequate	24	39.3
Not sure	3	4.9
Adequate	22	36.1
Very adequate	3	4.9
Total	**61**	**100.0**

Table 4.31 indicates that 36.1% of secondary schools had adequate provision of water, 4.9 % very adequate, and 4.9% not sure, while 39.3 % inadequate and 14.8 % very inadequate. This implies that in the majority of secondary school water provision is inadequate this is attributed to the fact that Kibauni division is located in arid and semi arid area (ASALS) where water supply is inadequate. Lack of adequate water supply in secondary school has influenced academic performance in Kibauni secondary schools.

4.8.4 Electricity supply

The study sought to determine the influence of electricity on academic performance and the results were presented in Table 4.32.

Table 4:32 Electricity supply

	Frequency	Percentage
Very inadequate	2	3.3
Inadequate	15	24.6
Adequate	29	47.5
Very adequate	15	24.6
Total	**61**	**100.0**

Table 4.32 revealed that majority (47.5%) of secondary schools had adequate electricity supply, 24.6% very adequate and 24.6 % inadequate while 3.3 % very inadequate. The adequacy of electricity supply is attributed to government initiative to put electricity in all learning institution this has enabled student to have more study hour of study in schools. To some extent, this has resulted to positive improvement in secondary academic performance in Kibauni division.

The researcher tested the hypothesis to establish the relationship between boarding facilities and student's academic performance

Ho: There is no significant relationship between boarding facilities and student's academic performance in KCSE in Kibauni division.

The results were presented in the Table 4.33

Table 4.33 Relationship between boarding facilities and students academic performance

		Academic performance	**Boarding facilities environment**
Academic performance	Pearson Correlation	1	.577
	Sig. (2-tailed)		.044
	N	9	9
Boarding facilities environment	Pearson Correlation	.577	1
	Sig. (2-tailed)	.044	
	N	9	9

According to the Table 4.33, the correlation coefficient for the relationship between students' academic performance and boarding facilities is +0.577. The correlation coefficient implies that there is relationship between students' academic performance and boarding facilities. The relationship is significant, P value of 0.044 is below 0.05, therefore the hypothesis was rejected and conclusion made that there is significant relationship between boarding facilities environment and academic performance.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, DISCUSSION OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter focuses on the summary of the study, conclusions and recommendations for further research.

5.2 Summary of the Study

The study sought to determine influence of infrastructural environment on students' academic performance in KCSE Kibauni division. From the study findings majority of the respondents on average indicated that all the mentioned physical facilities are not adequate, averagely adequate or they were not sure about the situation of the adequacy of the situation in their respective schools.

The study further sought to determine physical classroom environment and student academic performance in Kibauni division. From the study findings majority 36.1 % of the respondents attested that the school have inadequate classroom for teaching while 13.1 % adequate an indication that an increase in enrollment due to free day secondary education.

The study also sought the influence of school library service in academic performance. From the findings majority 67.2 % of the respondents attested that school had no library while 32.8 % of schools had library in schools. Library is an essential factor in the teaching-learning process. Inadequacy of school library negatively has influenced students' academic performance in KCSE in Kibauni

division. The inadequacy of textbooks may be due to increased number of transition rate from primary to secondary therefore the ratio of students to textbooks widens up which affects students academic Performance.

The study sought the influence of school science laboratory on student's academic performance. The findings revealed that 67.2% of the secondary schools had science laboratories while 32.8 % didn't .This is an indication that majority of secondary schools in Kibauni division had science laboratory facilities which have led to better performance.

Finally the study sought the influence of school boarding facilities on students' academic performance. From the findings 31.1%, secondary schools had adequate boarding facilities while 68.9% didn't have boarding facilities. The findings of the study shows that majority of the secondary school in Kibauni don't have boarding facilities at 68.9 % while few had 31.1%.This has contributed to dismal performance in KCSE in Kibauni division secondary schools.

5.3 Discussion of Findings

These findings revealed that there is significant relationship between physical classroom environment and academic performance in Kibauni division. This was indicated by positive correlation (+0.740) between physical environment and academic performance. This was in line with a number of scholars including Bailey (2000), Oni (1992), Mwamwenda and Mwamwenda (1987) and World Bank publication (1991) who linked academic performance of student and provision of physical classroom environment. The researcher noted that the studies by Oni (1992),

and Mwamwenda and Mwamwenda (1981) indicated students performed significantly better in academic tests when they had adequate physical classroom environment, therefore the studies had similar conclusion and so was this study.

The study findings also established that there is a significant relationship between school science laboratory and academic performance. This was indicated by positive correlation (+0.868) between school science laboratory and academic performance. This is in line with Farombi and Asoyibo and Nyong (1984) who laboratory has correlations with better results in school science examination.

The study findings established that there is a significant relationship between school library and academic performance. This was indicated by positive correlation (+0.605) between school library and academic performance. This finding agree with Harnby (2010), Fuller (1985) and Ogunseye (1986) who observed that total absence of school library spell doom to academic performance in secondary education.

Finally the study findings established that there is significant relationship between boarding facilities environment and academic performance. This was indicated by a positive correlation of (+0.577) between boarding confirm that findings of a study carried out Beer (2005) and Watson (2003) that observed that housing teacher and students in school compound goes a long way to improve learners performance.

5.4 Conclusion of the findings

From the study findings the study interprets that secondary schools in Kibauni division do not have adequate physical facilities. Such physical facility includes

classrooms, laboratories, dormitories, library, desks, toilets and other apparatus which negatively impacts on their academic performance. However on availability of teaching facilities in schools teachers indicated that there are adequate improved teaching aids, adequate teachers preparing teaching aids, inadequate text books, inadequate exercise books and other respondents indicated that other apparatus are also inadequate. The inadequacy of textbooks may be due to increased number of transition rate from primary to secondary therefore the ratio of students textbooks widens up which may affect students academic performance. Students also indicated that their respective schools do not have adequate learning facilities which were considered as a factor affecting their academic performance.

5.5 Recommendations of the study

From the study findings the study recommends that:-

i. The BOM members should be involved in sourcing for more funds from donors to acquire physical facilities that are important for the success of schools in academic performance.

ii. The principals should improve the infrastructural environment for the schools so as to improve academic performance among the students in their respective schools.

iii. The government should allocate more funding to secondary schools for construction of adequate learning physical facilities.

5.6 Suggestion for further research

Based on the findings of the study the researcher makes the following suggestions for further research:

i. A research needs to be carried out on the influence of provision of school physical infrastructure on students' performance in Kenya Certificate of Secondary Education in other sub counties in Kenya in order to compare the results since every county may be experiencing unique factors.

ii. There is need to carry out a study on the influence of physical school environment on students' academic performance in Kenya Certificate of Secondary Education in Kenya.

iii. A research to be carried out on the influence of sustainability of school physical infrastructure on students' academic performance.

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APPENDICES

APPENDIX I: Transmittal Letter

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Dear Sir/ Madam

RE: MASTERS RESEARCH PROPOSAL PROJECT

I am a final year MA student carrying out an academic research for the purpose of examination leading to the award of a degree of masters of Arts in project planning and management. The research is designed to establish the influence of school infrastructural environment on students' academic performance in KCSE in Kibauni Division; Mwala Sub county.

The purpose of this letter is to request you to provide the required information as per the questionnaire guides provided. Kindly be honest and thorough. The information provided was treated with utmost confidentiality and it was only used for the purpose of my examination only. Thanking you in advance for your cooperation.

Yours faithfully,

Janet K. Muendo
Masters Student.

APPENDIX II: Principal's Questionnaire

This questionnaire is designed to collect information on the influence of infrastructural environment on students' academic performance in K.C.S.E in Kibauni division, Mwala Sub County. Kindly take your time to answer the questions as honestly and truthfully as possible. The information collected in this questionnaire will be used solely for the intended purpose and therefore any response or information given will be treated with utmost confidentiality. Respond to all items by ticking (√) the correct option or providing the accurate information.

SECTION A: Principal's background information.

1. Please indicate your gender

(a) Male ☐ (b) Female ☐

2. Kindly indicate your age in the appropriate box.

(a) Less than 30 ☐ (b) 31-45 ☐ (c) 46-60 ☐

3. What is your highest level of education?

(a) Diploma ☐ (b) Bachelors Degree ☐ (c) Masters ☐

4. For how long have you been a principal?

(a) Less that 5yrs ☐ (b) 6-10 yrs ☐ (c) 11-15 yrs ☐

(d) 16-20 yrs ☐ (e) Over 20 yrs ☐

5. For how long have you been in current school as a principal?

(a) Less than 3 yrs ☐ (b) 4-6 yrs ☐ (c) 7-9 yrs ☐

(d) 10-12 yrs ☐ (e) over 12 yrs ☐

SECTION B

COUNTY…….SUB-COUNTY……

DIVISION……..SCHOOL ……

6. Indicate the school enrolment for the following years.

YEAR	**ENROLMENT**		**TOTAL**
	BOYS	**GIRLS**	
2011			
2012			
2013			
2014			
2015			

7. Please indicate the mean grade for your school in the following years.

YEAR	**2011**	**2012**	**2013**	**2014**	**2015**
MEAN					
GRADE					

SECTION C.

The influence of physical classroom environment on students' academic performance.

8. How many streams per class?

(a) 1 ☐ (b) 2 ☐ (c) 3 ☐ (e) 4 ☐

9. Indicate the class size in terms of numbers of students.

(a) Less than 30 ☐ (b) 31-40 ☐ (c) 41-50 ☐ (d) Above 50 ☐

10. Is the class size adequate to accommodate all the students in the class?

(a) Yes ☐ (b) No ☐

11. Indicate the appropriate situation of physical classroom facility in your school.

Very adequate (5) Adequate (4) Not sure (3)

Inadequate (2) Very inadequate (1)

Classroom physical environment	**5**	**4**	**3**	**2**	**1**
Number of classrooms in relation to number of students.					
The number of students' desks, teacher's chairs and tables in the room.					
Size and location of the writing board.					
Classroom lightning					
Teacher students ratio					

SECTION D: The influence of school library on students' academic performance.

12. Is there a library in your school?

(a) Yes ☐ (b) No ☐

13. If yes, how does the school library assist learners in improvement of academic performance?

.....

.....

14. What is the ratio of the available text books to students?

(a) 1:1 ☐ (b) 1:2 ☐ (c) 1:3 ☐ (d) 1:4 ☐ (e) 1:5 ☐

15. Indicate the appropriate situation about school library environment in your school.

Very adequate (5) Adequate (4) Not sure (3)

Inadequate (2) Very inadequate (1)

School library environment	**5**	**4**	**3**	**2**	**1**
Availability of relevant learning materials for students.					
Space and furniture for the students in the library.					
Library ventilation and lightning.					

SECTION E: The influence of school science laboratory on the student academic performance.

16. Are there science laboratories in your school?

(a) Yes ☐ (b) No. ☐

17. If yes or no, how does this affect student academic performance?

……

……

18. Please indicate the mean grade for the science subjects in your school.

SUBJECT/YEAR	2011	2012	2013	2014	2015
PHYSICS					
CHEMISTRY					
BIOLOGY					
HOMESCIENCE					

19. Indicate the appropriate situation about school laboratory environment in your school.

Very inadequate (5) Adequate (4) Not sure (3)

Inadequate (2) Very inadequate (1)

Science laboratory environment	**5**	**4**	**3**	**2**	**1**
Water supply and drainage in science laboratory.					
Space for wide range of teaching and learning approaches.					
Apparatus and chemical availability and storage.					
Heating, lighting and ventilation to student during practical.					

SECTION F

The influence of school boarding facilities on students' academic performance.

20. Does the school have boarding facilities?

(a) Yes ☐ (b) No ☐

21. If yes or no, how does this affect students' academic performance?

……

……

22. Indicate the appropriate situation of boarding facilities in your school.

Very adequate (5) Adequate (4) Not sure (3)

Inadequate (2) Very inadequate (1)

Boarding facilities environment	**5**	**4**	**3**	**2**	**1**
Safety and security of boarding facility to students					
Provision of sanitation facilities to students.					
Water provision.					
Electricity supply.					

Thank you.

APPENDIX III: Teacher's Questionnaire

This questionnaire is designed to collect information on the influence of school infrastructural environment on students' academic performance in KCSE in Kibauni division, Mwala sub-county. Kindly take your time to answer the questions as honesty and truthfully as possible. The information collected in the questionnaire will be used solely for the intended purpose and therefore any response or information given will be treated with utmost confidence. Respond to all items by ticking (√) the correct option or providing the accurate information.

SECTION A: Teacher's Background Information

1. Indicate your gender

(a) Male ☐ (b) Female ☐

2. What your highest level of education?

(a) Diploma ☐ (b) Degree ☐ (c) Masters ☐

(d) Others (specify)……

3. Indicate your professional qualification (Tick as appropriate)

(a) ATSI ☐ (b) G.Tr. II ☐ (c) G.Tr I ☐ (d) Snr. G Tr I ☐

4. For how long have you been a teacher?

(a) Less than 2 years ☐ (b) 3-4 years ☐

(c) 5-7 years ☐ (d)Over 8 years ☐

5. How do you rate instructional materials that are available in your school for teaching / learning science?

Very adequate (5) Adequate (4) Not sure (3)

Inadequate (2) Very inadequate (1)

Instructional materials	**5**	**4**	**3**	**2**	**1**
Improved teaching aids					
Prepared teaching aids					
Text books					
Lab apparatus					
Books					

SECTION B: The influence of physical classroom environment on students' academic performance.

6. How many classroom streams do you have?

(a) 2 ☐ (b) ☐ (c) 4 ☐ (d) More than 4 ☐

7. How many students do you have in your class?

(a) Less than 30 ☐ (b) 31-40 ☐ (c) 40-50 ☐ (d) Above 50 ☐

8. Is the class size enough to accommodate all the students in the class?

(a) Yes ☐ (b) No ☐

9. If Yes or No, how does this affect students' academic performance?

……

……

10. Indicate the appropriate situation of physical classroom facility in this school.

Very adequate (5) Adequate (4) Not sure (3)

Inadequate (2) Very inadequate (1)

Classroom physical environment	**5**	**4**	**3**	**2**	**1**
Number of classrooms in relation to number of student.					
The number of students' desks, in the room, teacher's chairs and tables.					
Size and location of the writing board.					
Classroom lighting and ventilation					
Teacher to students ratio					

SECTION C: The influence of school library to student's academic performance

11. Does your school have a library?

(a) Yes ☐ (b) No ☐

12. How many times do the students visit the library in a week?

(a) None ☐ (b) Once ☐ (c) Twice ☐ (d) Thrice ☐ (e) Four times ☐

13. What is the ratio of availability of textbook to students?

(a) 1:2 ☐ (b) 1:3 ☐ (c) 1:4 ☐ (d) 1:5 ☐

14. Indicate the appropriate situation about school library environment in your school.

Very adequate (5) Adequate (4) Not sure (3)

Inadequate (2) Very inadequate (1)

School library environment	**5**	**4**	**3**	**2**	**1**
Availability of relevant learning materials for students.					
Space and furniture for the students at school					
Library ventilation and lightning					

SECTION D: The influence of science laboratory on students' academic performance.

15. Does the school have a science laboratory?

(a) Yes ☐ (b) No. ☐

16. If Yes or No, how does this affect students' academic performance?

……

……

17. Are you a science teacher?

(a) Yes ☐ (b) No. ☐

18. If yes, please indicate the subject and its mean grade in the respective years.

SUBJECT/YEAR	2011	2012	2013	2014	2015

19. Indicate the appropriate situation about school laboratory environment in your school.

Very adequate (5) Adequate (4) Not sure (3)

Inadequate (2) Very inadequate (1)

Science laboratory environment	**5**	**4**	**3**	**2**	**1**
Water supply and drainage in science laboratory.					
Space for wide range of teaching and learning approaches.					
Apparatus and chemicals availability and storage.					
Heating, lighting and ventilation to student during practical.					

SECTION E: The influence of school boarding facilities on students' academic performance

20. Does the school have boarding facilities?

(a) Yes ☐ (b) No ☐

21. If Yes or No, how does this affect students' academic performance?

……

……

22. Indicate the appropriate situation of boarding facilities in your school.

Very adequate (5) Adequate (4) Not sure (3)

Inadequate (2) Very inadequate (1)

Boarding facilities environment	**5**	**4**	**3**	**2**	**1**
Safety and security of boarding facility to students					
Provision of sanitation facilities, students' ratio 1:30 boys, 1:25 girls.					
Water provision.					
Electricity supply					

Thank you.

APPENDIX IV: Questionnaire for form four Students

Dear Student,

This questionnaire is designed to collect information on the influence of school infrastructural environment on students academic performance in KCSE in Kibauni, division, Mwala- Sub County Kindly take your time to answer the questions as honestly and truthfully as possible. The information collected in this questionnaire will be used solely for the intended purpose and therefore any responses or information given will be treated with utmost confidentiality. Respond to all items by ticking (√) the correct option or providing the accurate information. Your response will be treated with strict confidence and at no instance will your name be mentioned in this research whatsoever.

SECTION A: Demographic Information

1. What is the name of your school? _____

2. Which year of study are you?

(a) Form III ☐ (b) Form IV ☐ others (specify) ☐

3. What is your gender? (a) Male ☐ (b) Female ☐

4. What is your age bracket?

(a) 15 -17 years ☐ (b) 18-20 years ☐ (c) Above 20 years ☐

SECTION B: Learning Infrastructure

5. Assess the current status of the learning infrastructure in your school in the table shown.

Very adequate (5) Adequate (4) Not sure (3)

Inadequate (2) Very inadequate (1)

	Facilities	**5**	**4**	**3**	**2**	**1**
(a)	**Classrooms**					
(b)	**Laboratories**					
(c)	**Libraries**					
(d)	**Pre-tutorial rooms**					
(e)	**Home science**					

6. How would you rate the spacing of the learners' lockers in the classes in your school?

(a)Very adequate ☐ (b) adequate ☐ (c) Average ☐

(d) Inadequate ☐ (e) Very inadequate ☐

7. How often do you perform science practical's?

(a)Regularly ☐ (b) Once a while ☐ (c) Rarely ☐ (d) Not at all ☐

8. How would you rate the adequacy of the laboratory equipment in your school?

a) 5=Highly Adequate ☐ b) 4=Adequate ☐ c) 3=Inadequate ☐

d) 2=Highly Inadequate ☐ e) 1=Not Available ☐

9. Do you access the school library when in need?

a) Yes ☐ b) No ☐

10. Explain your answer

……

……

11. Suggest what needs to be improved in the library so that you can realize good results in your performance

……

……

12. How would you agree or disagree with the following facilities on how they affect your performance in this school?

5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree.

	Facilities	**5**	**4**	**3**	**2**	**1**
(a)	**Classrooms**					
(b)	**Laboratories**					
(c)	**Libraries**					
(d)	**Pre-tutorial rooms**					
(e)	**Home science**					

SECTION C: Boarding Infrastructure

12. How would you rate the adequacy of the following boarding infrastructure in your school?

(**5) Very adequate** (**4) Adequate (3) Average 2) Inadequate 1) Very inadequate**

	Facilities	**5**	**4**	**3**	**2**	**1**
(a)	**Sanitation blocks**					
(b)	**Dining halls**					
(c)	**Dormitories**					
(d)	**Dustbin/rubbish pit**					
(e)	**Electricity**					
(f)	**Water**					

13. How many toilets or latrines for the learners do you have in your school?

……

14. In your own opinion are the toilets well located to serve all the learners?

Yes ☐ **No** ☐

15. Explain your answer

……

……

16. How would you rate the spacing of beds in the dormitories?

(5) Very adequate ☐ **(4) Adequate** ☐ **(3) Average** ☐

(2)Inadequate ☐ **(1) Very inadequate** ☐

17. What challenges do you face in accessing the boarding facilities?

……

……

18. Suggest ways in which the above mentioned challenges can be addressed by the school management.

……

……

Thank you for your participation