

**THE INFLUENCE OF SCHOOL INFRASTRUCTURE ON PERFORMANCE OF
KENYA CERTIFICATE OF PRIMARY EDUCATION IN CENTRAL DIVISION OF
MACHAKOS DISTRICT**

**BY
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A Research Project Submitted in Partial Fulfillment of the Requirement for the Award of a
Master of Arts Degree in Project Planning and Management of the University of Nairobi.

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DECLARATION

This Research project is my original work and has not been submitted for any of the study programs in any other university.

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This Research project has been submitted for examination with my approval as university supervisor.

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DEDICATION

I dedicate the project to my late father Joseph Kamula Ngwala for his great belief in the liberating power of education especially for the girl child, my husband Nicodemus Muting'au and my children; Jacinta, Lucy, Paul and Grace.

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TABLE OF CONTENTS	PAGE
Declaration.....	ii
Dedication	iii
Acknowledgements.....	iv
Table of contents	v
List of tables.....	ix
List of figures	xi
List of abbreviations	xii
Abstract.....	xiii
 CHAPTER ONE: INTRODUCTION.	
1.1 Background of the study	1
1.2 Statement of the problem.....	4
1.3 Purpose of the study	5
1.4 Research objectives	5
1.5 Research hypotheses.....	6
1.6 Significance of the study.....	6
1.7 Limitations of the study.....	7
1.8 Delimitations of the study.....	7
1.9 Assumptions of the study.....	8
1.10 Definition of terms	8
1.11 Organization of the study.....	9

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction.....	11
2.2 Historical back ground of school infrastructure.....	11
2.3 Influence of a protected school environment.....	12
2.4 Influence of school buildings on performance.....	16
2.5 Health and hygiene promoting school and performance	20
2.6 A nutrition promoting school and performance.....	22
2.7 Influence of learning equipment on performance.....	24
2.8 Theoretical framework.....	25
2.9 Conceptual framework	26
2.10 Summary of literature review and research gaps.....	

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction	30
3.2 Research Design	30
3.3 Target population.....	30
3.4 Sample size and sampling procedure	31
3.5 Research instruments.....	33
3.5.1 Questionnaires	33
3.5.2 Interview schedule.....	34
3.5.3 Observation schedule.....	34
3.6 Pilot study.....	34
3.7 Data collection procedures.....	35
3.8 Data analysis techniques.....	36

3.9 Ethical issues.....	36
3.10 Operational definition of variables.....	36

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction.....	39.
4.2 Questionnaire return	39
4.3 Demographic information of respondents.....	39
4.4 Learner protected environment.....	43
4.4.1 Safety measures in place.....	43
4.4.2 State of the learning environment.....	45
4.5 School buildings in relation to performance.....	48
4.5.1 Number of pupils per class.....	48
4.5.2 Pupil- desk ratio.....	51
4.5.3 Availability of libraries.....	52
4.5.4 Pupil- toilet ratios.....	53
4.6 Health and hygiene in the school.....	55
4.6.1 Availability of safe drinking.....	55
4.6.2 Availability of health services.....	59
4.7 Nutrition promotion in the school.....	59
4.7.1 Availability of a feeding program in the school.....	59
4.8 Teaching and learning materials.....	62
4.8.1 Textbook-pupil ratio	62
4.8.2 Adequacy of learning materials.....	64

CHAPTER FIVE: SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS

AND RECOMMENDATIONS

5.1 Introduction.....	64
5.2 Summary of findings.....	64
5.3 Discussions of the findings.....	70
5.4 Conclusion of the study.....	72
5.5 Recommendations of the study.....	73
5.6 Suggestions for further research.....	74
REFERENCES	75
APPENDICES.....	80
Appendix I: Table 1.1 Muvuti zonal KCPE performance (2007-2011).....	80
Appendix II: Table 1.2 Mutituni zonal KCPE performance (2007-2011).....	81
Appendix III:Table 1.3 Mumbuni zonal KCPE performance(2007-2011).....	82
Appendix IV: Transmittal Letter.....	83
Appendix V: Teacher’s Questionnaire.....	84
Appendix VI: Pupil’s Questionnaire	87
Appendix VII: Head teacher’s interview schedule.....	90
Appendix VIII: Researcher’s observation schedule.....	94
Appendix IX: Sample size for teachers per school.....	96
Appendix X: Sample size for pupils per school.....	98
Appendix XI:Introductory Letter	

LIST OF TABLES

Table 1.1: Central Division KCPE performance from 2007 to 2011.....	5
Table 3.1: Distribution of schools per zone.....	32
Table 3.2: Operational definition of variables.....	37
Table 4.1: Gender of participants.....	42
Table 4.2: Distribution of pupils by age	42
Table 4.3: Teachers professional qualifications.....	43
Table 4.4: Head teachers' duration of stay in current school.....	44
Table 4.5: Teachers report on schools KCPE average for or last 5 years.....	45
Table 4.6: Teachers report on safety measures in the school.....	46
Table 4.7: Pupils report on safety measures in the school.....	47
Table 4.8: Teachers report on the learning environment.....	48
Table 4.9: Relationship between learning environment KCPE performance.....	49
Table 4.10: Number of pupils per class.....	50
Table 4.11: Relationship between number of pupils per class and KCPE performance	52
Table 4.12: Number of pupils per desk	53
Table 4.13: Teachers report on availability of a library	54
Table 4.14: Pupils report on availability of a library.....	54
Table 4.15: Girls' toilet ratio in the school.....	55
Table 4.16: Boys' toilet ratio.....	54
Table 4.17: Pupils report on availability of safe drinking water.....	55
Table 4.18: Teachers report on availability of safe drinking water.....	56
Table 4.19: Relationship between availability of safe water and KCPE \performance.....	57

Table 4.20: Availability of health services in the school.....	59
Table 4.21: Teachers report on feeding program.....	60
Table 4.22: Pupils report on feeding program.....	60
Table 4.23: Relationship between nutrition promotion and KCPE performance.....	61
Table 4.24: Teachers report on textbook-pupil ratio in the school.....	62
Table 4.25: Relationship between teaching/learning materials and KCPE performance.....	63
Table 4.26: Adequacy of teaching aids in the school.....	65

LIST OF FIGURES

Figure 1: Education system as a process	26
Figure 2: Conceptual framework	27

LIST OF ABBREVIATIONS AND ACRONYMS

EARC - Educational Assessment Resource Centre

FPE – Free Primary Education

GOK- Government of Kenya

ICT- Information and Communication Technologies

KCPE- Kenya Certificate of Primary Education

KSES-Kenya School Equipment Scheme

MOE – Ministry of Education

NGO- Non-Governmental Organization

SMC - School Management Committee

SIMSC-School Instructional Materials Selection Committee

TAC – Teachers Advisory Centre

TPR-Textbook- Pupil Ratio

UNICEF - United Nations Children Funds

UNESCO-United Nations Educational, Scientific and Cultural Organization

WFP- World Food Program

WHO- World Health Organization

ABSTRACT

The topic of the study was 'The influence of school infrastructure on Kenya Certificate of Primary Education performance in Central Division of Machakos District. The purpose of the study was to investigate the influence of school infrastructure on Kenya Certificate of Primary Education (KCPE) performance in Central Division of Machakos District.

The study had five objectives in which it sought to establish the extent to which a learner protected school environment influences performance in KCPE. The study also sought to establish to what extent school buildings influence performance in KCPE. The study was also aimed at establishing the extent to which a health and hygiene promoting school influences KCPE performance. The study further sought to find out the influence a nutrition promoting school had on KCPE performance. The influence of school equipment on KCPE performance was also looked into in the study. The study employed descriptive survey design from randomly selected public primary schools in Central Division of Machakos district. Since all school could not participate in the study a sample size was determined using the formulae according to Taro Yamane's (1967) Formulae for determining sample size. The sample size for the study comprised of 52 head teachers, 161 classroom teachers and 195 standard eight pupils. The total respondents in the study were 408. The instruments for data collection included questionnaires for the class eight pupil and the classroom teachers, an interview schedule for the head teachers and an observation guide which was used by the researcher in assessing the schools physical infrastructure. The research instruments were piloted in 2 public primary schools for reliability. The pilot schools were not part of the sampled schools. The split half method was used to determine the reliability of the instruments. The validity of the instruments was determined by experts in the department of Extra Mural Studies among them the researchers supervisor. The data was coded manually and later analyzed quantitatively and qualitatively using descriptive statistics and Excel computer program (SPSS). Pearson's Product Moment Correlation Coefficient was used to analyze data from inferential statistics. The findings were presented on frequency tables and percentages. The findings revealed that most of the schools in Central Division lacked safe and protective environment for learning, the school buildings were inadequate and did not adhere to the safety standards manual in government institutions from the Ministry of Education (MOE 2001) as in most schools the doors opened to the inside and windows had grills. Most of the schools lacked water for drinking and hand washing, only 5 schools out of the 69 schools in the Division had a feeding program in place and most learners had to learn on empty stomachs especially in the afternoons. The text books were inadequate with majority of the pupils sharing books in the ratio of 1:3 or 1:4 in most schools resulting to a below average KCPE performance trend in public primary schools in the area therefore necessitating the Governments' and policy maker' intervention for quality school infrastructure in order to achieve quality education in Central Division. The researcher came up with the following recommendations;-a supportive environment should be created in order to upgrade the physical condition of the schools with respect to safety and protection of both teachers and learners to facilitate increased learner enrolment, retention and completion, funds should be availed to upgrade the school infrastructure in public primary schools to address the issues of overcrowding and congestion in the classes, health education with a focus on personal hygiene and life skills should be integrated into the school curriculum and teachers should be trained in health and hygiene and should work in cooperation with the parents so that health and hygiene are extended home, it should be ensured that children in public schools access feeding program on regular basis as

this is an intervention that affect not only their health but also their academic performance, the current disbursement of capitation of Ksh. 1,020 per child for FPE should be reviewed upwards to reflect the rate of inflation as this will improve the text book pupil ratio as well as physical infrastructure and especially this time when primary schools are expected to embrace ICT.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

More than 40 years ago the nations of the world, speaking through the Universal Declaration of Human Rights, asserted that ‘everyone has a right to education’. Education is a human right (Constitution of Kenya 2010). Koffi Annan (2010), further stated that; Education is a human right with an immense power to reform, on its foundation rests the cornerstones of freedom, democracy and sustainable development. He further argues that there is no higher priority, no mission more important than education. Education is a major contributor to economic growth .It is the route to national development and individual upward social mobility. It is the most effective weapon in fighting ignorance, poverty and diseases (Atkinson, 1987).

Globally countries are striving towards achieving the goal of providing education to its citizens, Education For All (EFA) without any discrimination. Participants in the World conference on Education for All assembled in Jomtien Thailand from 5th to 9th March 1990, recalled that education is a fundamental right for all people, women and men of all ages throughout the world. They agreed to universalize primary education and massively reduce illiteracy by the end of the decade (Radiki, 2002).

In the year 2000, ten years later, the international community met again at the World Education Forum in Dakar Senegal and agreed on the Dakar Framework for Action which re-affirmed their commitment to achieving Education For All by the year 2015. Six key measurable goals which aimed at meeting learning needs of all children, youth and adults by 2015 were identified in the conference.

In Kenya, a conference, Kenya Country National Conference on Education for All Kisumu (1992) was conducted to review Jomtien conference of 1990 and to prepare for implementation of the Education For All framework. The Kisumu conference marked Kenya's climax of the preparations and looked at the Jomtien expanded vision of Basic Education. Free Primary Education (FPE) was introduced in Kenya in the year 2003 by president Kibaki in an effort to provide education for all.

The major goal of the Ministry of Education in Kenya is to provide equitable and quality education at the primary and secondary levels. Educational outcomes in Kenya is measured through national examinations which are very competitive at the end of the first eight years cycle leading to Kenya Certificate of Primary Education (KCPE) and with the second cycle culminating with Kenya Certificate of Secondary Examination (KCSE). Eshiwani (1993) cited that the quality of education is seen in terms of the number of students passing national examinations.

It should be noted that Universal Primary Education is not only about getting to school and that whether or not children learn is no different from achieving Education For All. There are several factors that need to be addressed so as to achieve Education For All (EFA). Focus has to be made to ensure that the school infrastructure provides a conducive environment for teaching and learning to take place. The whole school environment should be safe and protective so that both teachers and learners are ensured of safety.

According to MOE (2001), school infrastructure is a key base for learning in schools. School infrastructure in primary schools includes classrooms, libraries, dormitories for boarding schools, open fields for games, games equipment, sanitation facilities among

others. It is in the classrooms that the day to day formal teaching and learning takes place, in the libraries where learners get opportunity to conduct their own personal studies; it is in the fields that extracurricular activities take place. Learners and teachers need sanitation facilities like toilets, waste disposal services and clean water.

The physical spaces have to be enough with up to date infrastructure per the ministry of education safety and standards manual (MOE 2001). The doors should open to the outside and windows without grills still opening to the outside. This will help evade serious accidents like it was witnessed in Kyanguli secondary school in Machakos County on 21st March 2001 and Mbombolulu at the coast. When doors and windows without grills open to the outside, the pupils will be able to escape with ease in case of any fire breakout (MOE, 2008).

In terms of health and sanitation the school infrastructure should be in line with the ratios in the safety and standards manual in government institutions by MOE of one toilet for every 30 boys (1:30) and one for every 25 girls (1:25), There should be separate toilets for girls and boys as this ensures privacy to the girls especially during their menstrual flow days (Sommer 2011). Running water and a number of water points per pupil are a key concern in maintaining basic hygiene standards. The school infrastructure should seek to promote equity and equality, health and nutrition and it should be gender sensitive (Unicef, 2010).

The average standard as recommended by the MOE is one water point for every 50 pupils. Most of the schools in the study area have four times the number of pupils per water point and this is the major reason for not washing hands in schools due to lack of water facilities. Inadequate hygiene as a result of lack of water resources, water

contamination and lack of soap are risk factors for worm infection. Most of the children do not use soap when washing hands in school and about half do not do so at home (Unicef 2010). Nokes. et. al (1992) observed that children with worm infection have lower marks in schools than uninfected children. Such children also have low attendance which may lead to increased dropout rate hence poor performance.

The World Health Organization, WHO (1997) argued that lack of adequate water and sanitation facilities in schools create an unsafe environment where diseases are transmitted. Since much had not been documented on availability on physical facilities in schools especially as far as safe and protective learner environment is concerned a study on the same was of paramount importance to ensure good performance in the schools.

Central Division is one of the administrative divisions in Machakos district. It has three Educational Zones i.e. Muvuti Zone, Mutituni Zone and Mumbuni Zone. Data on the academic performance of the public primary schools from the three Educational Zones show that most of the schools have mean scores of below 250 marks which is the average mark. This means that Central Division is below average in performance. The schools performance in the three Educational Zones for the last five years (2007-2011) is tabulated in appendix 1-111.

1.2 Statement of the problem

The government of Kenya has introduced Free Primary Education (FPE) grants to Kenyan primary schools and also staffed most of the public primary schools with professionally trained teachers in an effort towards achieving the Education For All(EFA) by 2015. The Ministry of Education MOE (2001) also issued a circular on safety standards in educational institutions to ensure that the schools' infrastructure is safe and

protective but little has been done to analyze the influence school infrastructure has on academic performance in our public primary schools. Most of the schools in Central Division have very poor infrastructure and this has had adverse effect in the performance of the division as it has always been below average over the years despite the fact that the schools have been receiving the Free Primary Education (FPE) grants since 2003. Below is a tabulation of the average performance of the Division in KCPE in the last five years (2007-2011).

Table 1.1 Central Division KCPE performance from 2007 to 2011

YEAR	2007	2008	2009	2010	2011
MEAN					
SCORE	214.63	221.94	221.72	220.77	217.18

From Table 1.1 above it is evident that the division performs below average as the average mark is 250 marks out of the total 500 marks. This study therefore seeks to investigate the influence of school infrastructure on KCPE performance in the Division. However since performance is not only influenced by school infrastructure, issues of safety and protected school environment, health , nutrition and school equipment were included in the study.

1.3 Purpose of the study

The purpose of the study was to investigate the influence of school infrastructure on Kenya Certificate of Primary Education performance in Central Division in Machakos district.

1.4 Research objectives

The main goal of the study was to identify how school infrastructure enhances performance in the Kenya Certificate of Primary Education (KCPE). The specific objectives of the study were to:

1. Establish the extent to which a learner protected school environment influences performance in Kenya Certificate of Primary Education.
2. Establish the extent to which school buildings influence performance in Kenya Certificate of Primary Education.
3. Establish the extent to which a health and hygiene promoting school influences performance in Kenya Certificate of Primary Education.
4. Find out the influence a nutrition promoting school has on performance of Kenya Certificate of Primary Education.
5. To establish the extent to which school equipment influences performance in Kenya Certificate of Primary Education.

1.5 Research hypotheses

1. H_0 : There is a significant relationship between the learning environment and pupils' performance in the Kenya Certificate of Primary Education (KCPE).
 H_1 : There is no significant relationship between the learning environment and pupils' performance in the Kenya Certificate of Primary Education (KCPE).
2. H_0 : There is a significant relationship between the number of pupils per class and pupils' performance in KCPE.

H₁: There is no significant relationship between the number of pupils per class and pupils' performance in KCPE.

3. H₀: There is a significant relationship between the availability of safe drinking water and the pupils' performance in the KCPE.

H₁: There is no significant relationship between the availability of safe drinking water and the pupils' performance in the KCPE.

4. H₀ : There is a significant relationship between nutrition promotion in a school and pupils' performance in the KCPE.

H₁: There is no significant relationship between nutrition promotion in a school and pupils' performance in the KCPE.

5. H₀: There is a significant relationship between the teaching learning materials and pupils' performance in KCPE.

H₁: There is no significant relationship between the teaching learning materials and pupils' performance in KCPE.

1.6 Significance of the study

Findings of the study will lead to full access to new bright, well ventilated, durable and safe classrooms thus improving the learning environment, enhancing the lifespan of the buildings and promoting a learning culture. Findings of the study will be used by the school management committees to improve infrastructure thus promoting the pupils health and well being and developing a safer and protective spaces for children. There will be expected positive effects on enrollment, attentiveness as conducive learning environment will be created. There will be safe access to school sanitation facilities especially for girls as there is usually a strong correlation between

children's health and their learning ability. This is because children in poor health are more likely to learn less as they are unable to concentrate.

Findings of the study will help curriculum developers to include life skills education programmes, related co-curricular activities, hygiene and sanitation education in the curriculum as of late they are being recognized as key interventions to promoting child's right to a health and a clean environment thus influencing a generational change in health promotion behaviour and attitudes.

1.7 Limitation of the study

One limitation of the study was traveling to remote schools in the Division and weather conditions. There was a possibility of the respondents sharing information as the respondents are teachers and some of them have negative attitudes towards adult learning and would only fill the questionnaires for the sake of doing it and would therefore provide similar answers to the questionnaire items.

1.8 Delimitations

This study was carried out in Central Division in Machakos District. It was limited to public primary school in the three zones that make up central division i.e. Muvuti zone, Mumbuni zone and Mutituni zone. The private schools in the area were not included in the study since their management is different and does not include ALL learners as they are commercially based. This is because non-performers are not admitted in the private schools as they will likely lower the mean score, hence do not adhere to the principal of inclusive learning and Education for All. The private schools infrastructure

cannot be compared to the public schools as most of them are magnificently build. The study did not also include the special schools in the area of study as each complies with the kind of challenge it addresses.

1.9 Assumptions of the study.

1. The study assumed that the sampled schools provided the required data and that they represented the entire population.
2. The study assumed that all the respondents would cooperate and provide reliable responses.
3. The study also assumed that KCPE is an acceptable, reliable and accurate measure of academic performance. It was assumed that school infrastructure influences the academic performance at KCPE.

1.10 Definition of significant terms

Infrastructure; - It is the basic systems and services that are necessary for a country or an organization to run smoothly e.g. buildings transport, water and power supplies

Learning environment; - it is a formal or non-formal safety where children gain knowledge and the skills to use that knowledge in their daily lives and in their learning environment.

School -means any formal or learning environment where pre-school, primary, or secondary level education takes place.

Influence- It is to have an effect on a particular situation and the way it develops

Performance- This refers to the scores which are below average, average or above average measured through an examination at KCPE for this particular study.

Nutrition-It is the science of food and its effects on health and growth.

Health- It is a state of physical, mental and social well being and not merely the absence of disease or infirmity.

1.11 Organization of the study

The study is organized into five chapters. Chapter one consists of the background of the study, statement of the problem, purpose of the study, objectives of the study, research hypotheses, significance of the study, assumptions of the study, limitation of the study, delimitation of the study, definition of terms and organization of the study.

Chapter two consists of literature review under the following sub-topics, historical background of school infrastructure, a learner protected school environment, appropriate school buildings in relation to performance, influence of health and hygiene promoting school on performance, influence of a nutrition promoting school on performance, school equipment in relation to KCPE performance. A conceptual framework is also drawn to show the influence of school infrastructure on the Kenya Certificate of Primary Education performance.

Chapter three which is research methodology includes the research design, target population, the sample and sampling technique, research instruments, instrument validity, instrument reliability, data collecting procedures and data analysis techniques.

Chapter four comprises of data analysis, presentations, interpretation and discussions.

Chapter five consists of summary of findings of the study, discussion of findings, conclusion of the study and recommendations for further study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The literature review in this section was discussed under sub-headings such as historical background of school infrastructure, influence of a learner protected school environment on performance in KCPE, relationship between school buildings and KCPE performance, how health and hygiene promoting school infrastructure influences KCPE performance, the influence of nutrition promotion in a school on performance in KCPE and how school equipments influence KCPE performance. Theoretical and conceptual frameworks were drawn to show the influence of school infrastructure on the performance of KCPE.

2.2 Historical background school infrastructure.

The right to education does not only entail granting access to education but the quality of education and the learning environment are equally critical (Unesco 2007). It is important to access equitable and quality basic education as it is within the context of Education For All (EFA) goals and the Millennium Development Goals. They call for achieving full primary enrolment and completion as well as gender parity and equality in education by 2015 (Unicef, 2009).

School infrastructure is a key base for learning in schools. School infrastructure in primary schools include classrooms, libraries, dormitories if the school is a boarding school, open fields for games, games equipment, sanitation facilities among others. It is in the classrooms that the day to day formal teaching and learning takes place. In the libraries where learners get opportunity to conduct their own personal studies and it is in

the fields that extra-curriculum activities take place. Learners and teachers need sanitation facilities like toilets, waste disposal services and clean water.

In Eastern and Southern Africa, Kenya included, various efforts including the school fee abolition, establishment of effective education sector-wide approaches and the acceleration of the School infrastructure modification have all been contributing to the overarching goal for ensuring Education For All. Documenting the emerging good practices within the region is useful in forming evidence based programming and advocacy to enable us to achieve better results for children in the KCPE which marks the end of the eight years course.

2.3 A Learner protected school environment.

According to Unicef (2009), the learning environment should be healthy, safe and protective. The Rwanda National Building Code states that the school must be a healthy, clean, secure and learner protecting environment (Unicef, 2010). It should have adequate water and sanitation facilities, access to health and nutrition services, policies and code of conduct that enhances physical, psychological and emotional health of the teachers and the learners and education content and practices leading to knowledge, attitudes, values and life skills needed for self-esteem, good health and personal safety.

2.3.1 School safety

These are measures undertaken by the learners, staff, parents and other stakeholders to either minimize or eliminate risky conditions or threats that may cause accidents, bodily injury as well as emotional and psychological distress. Nelson Mandela (2002) stated that safety and security don't just happen but are results of

collective consensus and public investments and parents owe their children a life free from violence and fear. A child's ability to attain her or his full potential will largely depend on a safe and protective learning environment. (UNESCO, 2001).

Safe and protective policies in schools will lead to: increased school attendance and reduction of truancy as parents have no fear of violence or abuse to their children on the way to and from school, enhanced retention rate as safe and protected children are able to pursue their education to completion, enhanced access to education as more learners can share the resources equitably and enhanced parents and community confidence in having more children in school as this will help their investment in education to pay off (Unicef, 2010).

2.3.2 Hazard in school

A hazard can be defined as a natural or human made event that threatens to adversely affect human life to the extent of causing disaster. Meaningful teaching and learning takes place in an environment that is safe and secure to both learners and teachers. It is therefore important for education stakeholders to foster safe and secure school environment to facilitate increase in learners enrolment, retention and completion with good grades in the KCPE. According UNICEF (2010) in their manual on child friendly schools, the following factors which may contribute to hazardous situation should be prevented in the schools; Wet greasy spots, cluttered floors, poorly placed furniture such as desks, benches and tables, Insufficient lighting, Sitting carelessly on benches, rails or balconies and sharp instruments.

According to UNICEF (2010) and the department of education (1999), the indicators for guaranteeing safe and protective spaces for children include;

Schools should have proper ventilation and lighting and enough space for 35-40 pupils. Classroom desks and other furniture should be sized to the age of the pupils. In the case of shared desks, each pupil to have enough space to do seatwork. The classrooms, facilities and premises should regularly be maintained and kept clean. The school should have a library for reading and studying, facilities and equipment of recreation and sports. There should be duly assigned personnel in charge of securing its premises, its properties and those of its pupils and teachers. Coordination with the local authorities to ensure the safety and protection of pupils should be ensured. The school should have a policy against discrimination with regard to gender, cultural origin, social status, religious belief and others. Teachers in the school should use non-threatening styles of discipline MOE (2001)

2.3.3 Safety against school violence and harassments

According to a TSC/Circular No. 3/2010 on protection of pupils from sexual abuse, it affirms that sexual abuse against pupils affect them physically and psychologically and interfere negatively with their learning process. It therefore calls upon all teachers to protect pupils against sexual abuse and do everything possible to offer assistance to them in the event of abuse. It is the high time the silence on child sexual abuse was broken in order to create a conducive learning atmosphere in our schools thus raising the academic standards.

The use of corporal punishment may hinder learning, encourage or lead children to drop out of school and generally undermine the purpose of education. The school management should therefore ensure that such forms of violence and harassment is minimized if not

completely eradicated thus enhancing improved performance as many children would like to be in school.

2.3.4 Safety against drug and substance abuse.

The increasing problem of drug abuse has become a major concern to school. According to Olsen et.al (1984) drug abuse has a major effect on learners which includes poor mental health, withdraw symptoms, hallucinations and anxiety suicidal tendencies among others. Ultimately academic performance of learners abusing drugs will be adversely affected. This in turn will result to poor performance in the KCPE as most of the drug abusers when noticed are expelled from school only to come to sit for the exam at the end of the year. This affects the performance and lowers the mean scores as the concerned learners have not been attending classes.

Cigarette smoking is a pandemic among the youth. Statistics from the National Campaign Against Drug Abuse (NACADA) estimates that close to one million school children smoke cigarette (Nacada, 2006). This figure is alarming in view of the young age of the smokers involved and the serious health problems they are exposed to at such a tender age. Githinji (1995) states that cigarette smoking pose severe health problem to the users some of which are painful. It can result to cancer of the mouth, throat, larynx or lungs, heart attack and stroke. Medical practitioners point out that the lungs are slowly and progressively destroyed and this leads to suffocation and continuous chesty coughs. It is evident that a school with smokers cannot perform as the learners mental performance is reduced in relation to judgment, moral reasoning and abstract thinking. The school must

endeavor to create a safe and caring environment where learners and staff know the dangers of drug abuse and strive to make the school a drug free environment.

According to Escandon.et .al (2005) drug users remember less than ten percent (10%) of what they have studied. This will have an adverse effect in the KCPE performance as this particular examination needs a lot of recalling. Research has also shown that there is a direct correlation between absenteeism from school and drug use. Such absenteeism can easily result to truancy and eventually dropping out of school. It is therefore important to note that if learners have to perform well, drug and substance abuse has to be discouraged both in school and at home.

2.4 Influence of school buildings on performance.

In most public primary schools, the school buildings would include structures such as classrooms, offices, toilets, kitchen if the school has a feeding programme, water tank, playground equipment among others. These facilities should be appropriate, adequate and properly located devoid of any risks to users or to those around them. They should also comply with the provision of the Education Act (Cap 211), Public Health Act (Cap 242) and the Ministry of Public Works building regulations and standards. The school management should ensure that classes, offices, kitchen, toilets and other physical facilities are clean and well maintained, safe and properly utilized (MOE 2001).

In a school, the buildings should be well planned with spacious and ventilated rooms with all facilities. The architectural design should allow free movement in and out of the classroom for both pupils and teachers. In regard to the various school buildings the following guidelines should be observed:

2.4.1 Classrooms.

Classrooms are important infrastructure in a school setting since learners spend most of their time in these facilities. They are the backbone of any school physical infrastructure. Every school should have adequate number of classrooms to accommodate 40 pupils each. However schools in Rwanda targets a classroom size of 46 pupils per classroom (UNESCO 1987).The front wall should have a blackboard and appropriate length. The classroom should be well lighted so that learners seated at different corners are able to see the teachers and the blackboard. The Ministry of Education specifies that the length and width of a classroom should be 7.5m by 6.0m respectively. Such a classroom should accommodate a maximum of 40 learners in two seater desk. This is in line with the provisions of the Ministry of Education circular on health and safety standards in educational Institutions (MOE, 2010).

According to the MOE (2010) construction and safety manual, an appropriate school infrastructure leads to full access to new bright, well ventilated, durable and safe classrooms which are able to accommodate the recommended number of 40 pupils. This in turn improves the learning environment thus enhancing the lifespan of the building and promoting a learning culture.

The doorways should be adequate for emergency purposes, open outward and should not be locked from outside at any time when learners are inside. The classroom windows must have no grills and be easy to open (Daily Nation June 2013). Floors should be level and be kept clean always to avoid falls. Efforts should be made to cement all the classrooms floors to prevent the generation of dust that can pose risk to the health of both

teachers and learners. A healthy and safe environment will promote teaching and learning and eventually the learner's performance in the KCPE will improve (Rimer, et.al.2003).

The furniture in the 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 and roundness of shoulders. Such deformities will lower the learners' self-esteem and will adversely interfere with teaching and learning leading to poor performance in class and eventually poor mean grades in the KCPE.

2.4.2 Sanitation infrastructure

Sanitation infrastructure includes all the structures constructed for the purpose of disposal of human waste and for cleanliness. In most public schools, latrine to pupil ratio is a core concern with hundreds of pupils sharing a single toilet thus affording inadequate privacy especially for the girls. This is in contrast to recommendations by the Ministry of Public Health and Sanitation and Ministry of Education (2009) which recommend a ratio of 1 toilet for every 25 girls (1:25) and 1 toilet for every 30 boys (1:30) in order for the sanitation facilities to provide adequate privacy to all pupils.

According MOE (2010) safety and standard manual on government institutions, the following must be observed to ensure high standards of hygiene are maintained; In case where pit latrines are used, these structures should be built at least 10 metres away from tuition and boarding facilities and on the downwind side. The pit latrines should be 6 metres deep and should be regularly and well disinfected to ensure high standards of hygiene. It should be constructed at least 15 metres away from the water supply point.

During the World Summit on Sustainable Development which was carried out in the year 2002, the executive director of UNICEF recommended that every public school in the world should be equipped with separate sanitation facilities for boys and girls. Such facilities would ensure privacy to all pupils. Girl's sanitation areas must be separate from boys to offer complete privacy to the girls.

According to Sommer (2011) lack of separate toilets for girls and boys is a major cause of absenteeism for girls in schools as the girls are not assured of privacy especially during their menstrual flow days. In Rwanda girls are advised to skip school during their menstrual period days and sometimes it may lead to increased school drop rate (Unicef, 2007). Some girls result to being absent for those days which results to almost a whole week being out of school. This will eventually lead to poor performance as the girls miss classes a lot. The absence of separate toilets for girls does not only affect school attendance but also contribute to the denial of their rights to dignity and quality education.

According to Macharia et.al (2004), failure to have separate toilets for boys and girls would make the girls not make the best use of their time in school and may not be well prepared for the Kenya Certificate of Primary Education examination. This is because much time would be wasted after morning assembly and during the 11am break as the girls would wait for the boys to leave the toilets for them to make long queues and as a result they would be late for lessons.

According to WHO (2004), schools should ensure safe and effective disposal of sanitary wear. All closets must be clean, well ventilated and properly maintained. One third of the fittings for boys should be closets and the rest urinals (MOE 2001). In all schools,

appropriate provisions should be given to learners with special needs and very young learners in pre-unit and lower classes. For example passage ways should be accessible and toilet facilities should be suitable for use by special needs learners and very young school children (UNESCO 2001).

Soap and tap water cans fitted with taps should be set outside the toilet for washing hands after use of these facilities. However, Kay et.al. (2005) states that in most African countries hand washing after visiting the toilet is poorly practiced. The situation in Kenya is equally pathetic even though the Ministry of Education (MOE) has recommended an average standard of one water point for every 50 pupils. An assessment conducted by the Schools Sanitation and Hygiene Working Group in public schools in Machakos, Nairobi and Kiambu found that 90% of schools in rural Kenya do not have a source of water and lack even the simplest hand washing facilities. Out of the 10% of the schools where water was available, only a few pupils washed hands after visiting the toilet. In one of the schools where safe running water was available, the study found out that only about 20 out of 400 pupils washed hands after visiting the toilet (Osnat et. al, 2008). Siwolo (2004), who conducted a study in public schools in Machakos found out that most students did not wash their hands after visiting the toilet. He observed that the few tippy taps that were available for hand washing were located near the teachers' toilets and none were found near the pupils toilets. Sanitation facilities should be inspected regularly to ensure compliance with standard hygiene requirements including proper learner toilet ratio. When there is a threat of any epidemic outbreak, immediate steps to close down the school should be undertaken (WHO 1999).

2.5 Influence of health and hygiene promotion on KCPE performance

A health and hygiene promoting school strives to build health into all aspects of life in school and in the community. A health promoting school initiative is a national goal around the world that has great impact in improving children's healthy behavior and academic performance.

According to Unicef (2010) studies have shown that there is a strong correlation between children's health and their learning ability. Children in poor health are more likely to learn less as they are unable to concentrate. This in turn will lower their learning achievements and will likely cause class repetition and possibly eventual drop out. The high levels of repetition leads to learners being over aged at the primary level and may in turn lead to learners dropping out of school before reaching class eight. This poses a severe challenge in ensuring universal quality primary education and realization of the EFA goals by 2015.

One critical health problem among primary school aged children nationwide is the infection of roundworms. Nokes et.al. (1992) observed that children with worm infection have lower marks in school than uninfected children and have also low school attendance which may lead to increased dropout cases. The Ministry of Education (MOE) and the Ministry of Health (MOH) in a joint effort to strengthen the capacity of primary schools to improve children's health conditions and deliver basic health and hygiene related messages have come up with de-worming campaigns (WHO 2003). Through these campaigns many primary schools have benefited from the de-worming interventions. The immediate effect has been improved health of children which eventually enhances

children's learning achievements and helps keep them in school thus contributing to a reduction of repetition and dropout (WHO 1999).

2.5.1 Improving sanitation and hygiene infrastructure

Hygiene education should be introduced as it is an important component of hygiene improvement. Curtis and Cairncross (2003) stated that improvement of sanitation, safe water supplies as well as personal and food hygiene greatly reduces illnesses and diseases. This ensures that all learners learn under a clean environment and learning is not interrupted. The use of skills based approach to hygiene education helps learners to; identify and avoid behaviours and environmental conditions that are likely to cause water and sanitation related disease and this improves their problem solving and decision making skills. Running water and number of water points per a given number of pupils is a key concern in maintaining basic hygiene standards. The average standard as recommended by the MOE is one water point for every 50 pupils (Unicef, 2008).

Insufficient number of water points, lack of soap and sometimes complete lack of water is pronounced in most schools in the study area and this poses a big challenge in general. Most of the schools have four times the number of pupils per water point and this is the major reason for not washing hands in schools due to lack of water facilities.

According to Unicef (2008), data and information on the situation of school water, sanitation and hygiene (WASH) and associated interventions in Tanzania are inadequate. This is because the recent accelerated enrolment has not been matched by a corresponding acceleration of basic services especially those related to school water, sanitation and hygiene. Most children do not use soap when washing hands in school and

about half do not do so at home. Inadequate hygiene as a result of lack of water resources, water contamination and lack of soap are risk factors for worm infection.

2.6 A nutrition promoting school and KCPE performance

According to Claudia. et. al (1993), all children need adequate nutrition to grow up healthy and without developmental problems. Eating is considered a sociable happy time and food should neither be used for reward nor withheld as punishment (Bredenkamp, 1986). Nutrition deprivation can lead to cognitive and other developmental deficiencies delayed or stunted growth, weakened resistance to infections and increases a child's vulnerability to environmental poisons like lead. This goes a long way in affecting the child's learning and eventually yield poor performance in academic work and eventually poor results in the KCPE.

Schools offer an ideal setting for implementing health programmes that promote health. It is an essential part of the school infrastructure to ensure that all learners are healthy and able to learn. A child's ability to attain her or his full potential largely depends on good health and good nutrition and safe learning environment. Sally McGregor (1992) states that children who are stunted, anaemic, experience hunger or have poorer dietary intakes tend to have poorer school performance including late enrolment and poor attendance, behaviour and cognitive and achievements levels. They are more likely to drop out of school early and repeat classes.

According to Kilemi Mwiria on 16th March, 2011 the then Assistant Minister of Education, improved nutritional status among children contributes to higher enrolments, better school attendance, and lower rates of drop out, improved performance in academic work and social equity and economic growth. A child has to be well fed not only to grow but to concentrate on learning while at school hence improving their academic performance and eventually better grades in the KCPE. The school infrastructure should ensure that basic nutrition and health services as well as adequate safe water and sanitation facilities are offered.

2.6.1. School food and nutrition programmes in school infrastructure

A hungry child cannot learn well. In school infrastructure a school feeding programme should be initiated so that when learners cannot get enough food at home the school could be an important source of additional food. A school feeding programme is mainly meant to give renewed energy to tired and hungry school children thus making them more receptive to learning (Macharia 2004). Through such programmes malnourished learners are assured of at least one nutritious meal a day.

Moreover, providing nutritious food at school is a simple but effective way of improving literacy rates and helping learners break out of poverty. When school meals are offered enrollment and attendance rates increases significantly. This will in turn improve class performance and eventually as the learners get to class eight a marked improvement is expected.

In traditional culture where girls are expected to stay at home, school feeding and “take home rations” often convince parents to send their daughters to school. The

school feeding programme provides a critical source of nutrition and ensures that education is not interrupted thus making the school to be more child friendly. The nutritious meals offered in schools ensures that learners receive all the nutrients they require for healthy growth and development which include proteins, fats and carbohydrates as well as important micronutrients such as vitamin A, iron and iodine (Finan, 1987).

In terms of nutrition a regular school meal improves the health of children, reduces the incidences of illnesses of pupils in the classroom as learners are fed with fresh food which is at the right temperature. School meals ensure that there is net safety of the learners especially those in the urban areas as they will not meet with accidents as they rush out of the school compound over the lunch hour break to look for lunch. A school feeding program allows the parents to leave their children in school during the entire day and they are free to embark on income-generating activities during the day.

2.7 Influence of school equipment on KCPE performance

In this study school equipment will largely refer to teaching and learning materials that aid the teaching and learning process. According to Purves, (1973) there is apposite association between availability of educational materials and pupil achievement. The teaching learning materials includes text books, wall charts, chalk and other reading materials. The availability of such materials has a positive effect on school effectiveness as it shows a direct and positive correlation with pupil's achievement in developing countries (Farrell J.P et.al 1989).

In Kenya the government began providing textbooks in schools immediately after independence as one of the measures to support children from poor families. Under the Kenya School Equipment Scheme (KSES), there was a provision of sh.20 per child at the primary level for provision of learning materials. This led to increased enrolment in the subsequent years thus constraining the government's ability to fully meet the needs of the schools and pupils. The KSES was abolished in 1989 and a cost sharing program which shifted the entire burden of book provision to the parents was started.

However with the introduction of Free Primary Education (FPE) in 2003, out of the FPE funds of sh.1020 per pupil about two thirds which is sh.650 are earmarked for the purchase of text books, supplementary readers and reference materials among other items. Each school has a School Instructional Material Select Committee (SIMSC) that oversees the selection and procurement process to ensure that they select the appropriate books per the syllabus. The government's policy on textbook- pupil ratio is as follows: In lower primary pupils ought to have a ratio of at most 1:3, while in upper primary the textbook-pupil ratio ought to be at most 1:2 in the core subjects. This is because missing out in learning experiences during the lower classes could mean that such pupils would be disadvantaged in terms of achievement for the rest of their schooling life. Availability of textbooks positively influences performance of pupils in examinations. When the textbook-pupil ratio (TPR) is high i.e. 1:1 and 1:2 and the textbooks are properly used by the pupils, the pupils' performance is expected to increase drastically. The researcher therefore sought to evaluate the situation on the ground as far as teaching and learning materials provision was concerned.

2.8 Theoretical framework

This study is based on theoretical model developed by Shavelson;McDonwell and Oakes (1987). The model presents education system in terms of inputs, processes and outputs.

The inputs in this study may include, structural features which comprises of the school infrastructure, school resources both human and physical and any other resources that schools are provided with to do their work. The school processes would be the policies and practices in the education system. The outputs also seen as outcomes in this study would mean good performance in national examination leading to greater achievements and positive attitudes towards schooling.

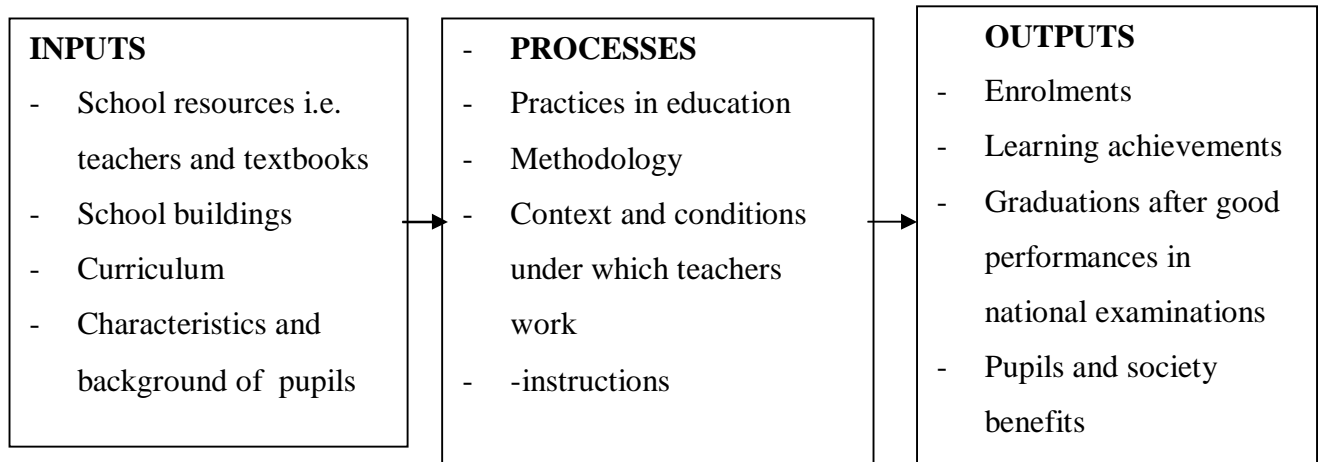


Figure 1: Education as a process

2.8 Conceptual framework

According to Kombo (2006), a conceptual framework can be defined as a set of broad ideas and principles taken from relevant fields of inquiry and used to structure a subsequent presentation. He further says it is a researcher's tool intended to assist the researcher to develop awareness and understanding of the situation under study and to communicate it. Below is a model of the conceptual framework of the study in question.

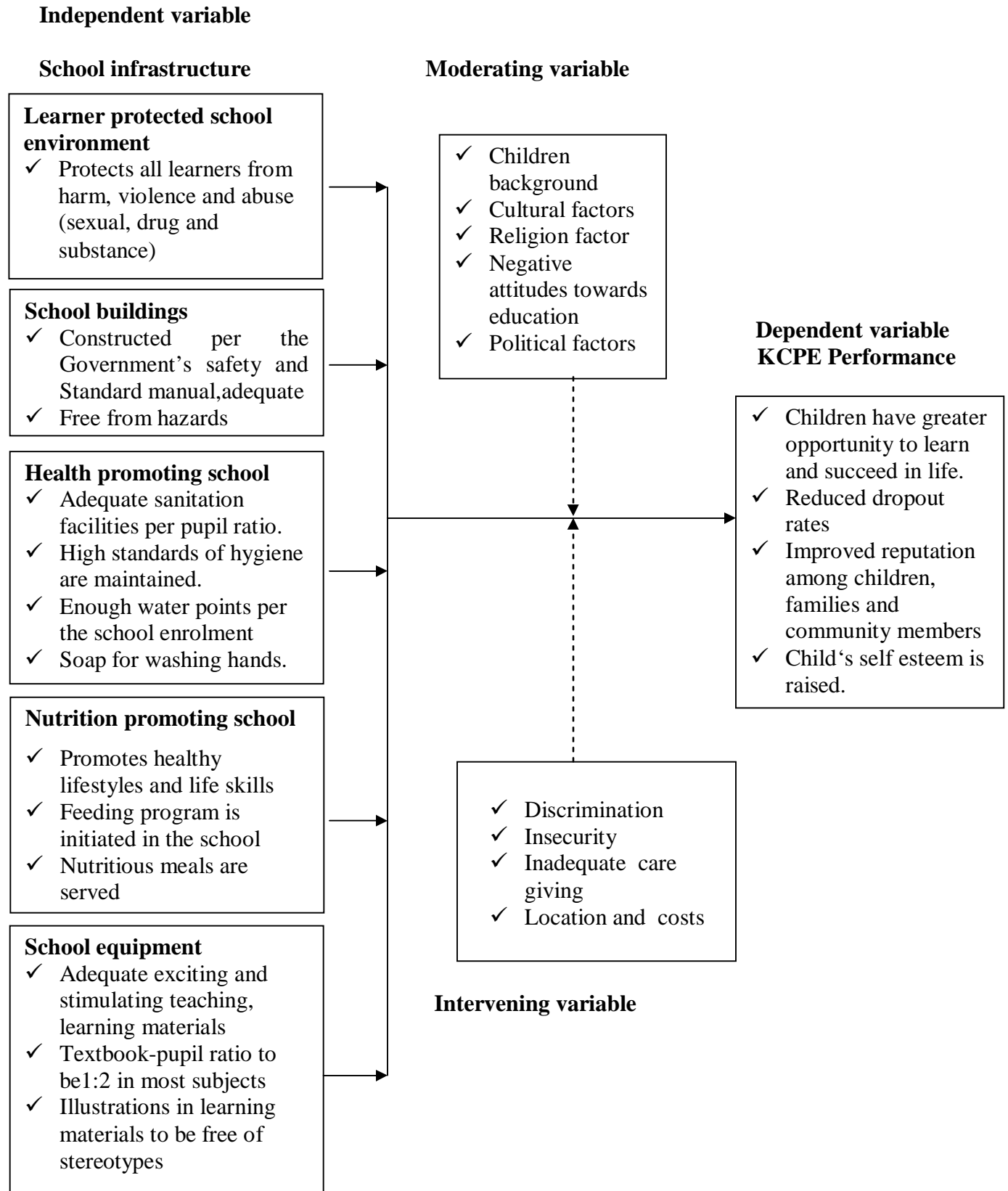


Figure 2: Conceptual Framework

From the conceptual framework model the independent variable is school infrastructure.

School infrastructure should have the following qualities:

Safe and protective environment: Should ensure that all children learn in a safe and protective environment. Learners should be protected against harm, violence and all sorts of abuse (sexual, drug and substance)

School buildings: School buildings should be constructed according to the Ministry of Education (MOE) Construction and Safety Manual in terms of measurements and ratios depending on the school enrolment. They should also be modified to cater for physically challenged learners and teachers.

Health and hygiene promoting school: It should have adequate sanitation facilities per pupil ratio. High standards of hygiene should be maintained with enough water points per the school enrolment. Water cans should be fitted outside the toilets along with soap for washing hand after visiting the toilet. This will promote healthy lifestyles and life skills in the school.

Nutrition promoting school: It should promote the physical emotional health of children by addressing their key nutritional needs. If possible a school feeding program should be initiated as this will ensure that all learners can at least access one nutritious meal that is well balanced per day.

School equipment: The teaching/learning materials should be adequate, exciting and stimulating. The textbook-pupil ratio should be 1:2 in major subjects. All illustrations in the learning materials should be free from stereotypes.

On the other hand the dependent variable is KCPE performance which will be expected to improve if the schools' infrastructure is improved per the Ministry of

Education Health and Safety manual. There will be improved teaching and learning leading to children having greater opportunities to learn and succeed in life. There will be reduced drop outs as the learners are in a conducive environment and their self-esteem is raised. This will lead to improved reputation among children, families and the community members.

Intervening variables are variables that may affect the relationship of the independent and dependent variables but are difficult to measure or see the nature of influence. In this study the intervening variables to improved KCPE performance could include discrimination, insecurity, inadequate care giving, location of school and costs involved in learning. Moderating variables are variables that affect the outcome but the researcher may not be able to control them. They could include poverty, children's background, cultural and traditional beliefs, religious beliefs, political factors and negative attitudes towards learning by either the learners or their parents.

2.9 Summary and Research Gaps

The reviewed literature reveals that the government through the Ministry of Education MOE (2001) came up with a safety and standards manual in government institutions. Literature reviewed has shown that in most schools the regulations have not been adhered to and most of the school infrastructure remains as it was as most schools have doors still opening to the inside and windows with grills just to mention a few. Sanitation and hygiene standards remains a great challenge in most public schools with very high toilet pupil ratios and most schools lacking safe water for drinking and hand washing after visiting the toilet. The reviewed literature also revealed that when the government

introduced FPE in 2003 it was marked by increased enrolment but the school infrastructure remained constant leading to overcrowding and congestion in the classes. Since the inception of FPE the parents have shown great laxity in supporting development projects in the schools as they have the notion that education is free. This has led to poor school infrastructure hence poor performance in most public primary schools and it is against this background that this research intends to fill this gap by investigating the influence of school infrastructure on performance of Kenya Certificate of Primary Education in public primary schools in Central Division of Machakos District.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research design, target population, sample size, sampling procedure, research instruments, validity and reliability of research instruments, data collection procedures and data analysis techniques.

3.2 Research design

According to Orodho (2005), research design refers to all the procedures selected by a researcher for studying a particular set of question or hypothesis. It is a program to guide the researcher in collecting, analyzing and interpreting observed facts. In this study, the researcher adopted an explanatory approach using the descriptive survey to investigate the influence of school infrastructure on performance of KCPE in public primary schools in Central Division of Machakos District.

The descriptive survey design is the most appropriate design as it collects data from groups of people and in this study head teachers, classroom teachers and class eight pupils were used to fill questionnaires. Descriptive studies are not only restricted to fact finding but may often result in the information of important principles of knowledge and solutions to significant problems as stated by Kerlinger (1986).

3.3. Target population

According to Mugenda and Mugenda (1999), a population refers to an entire group of Individuals, events or objects having a common observable characteristics. Kombo and Tromp (2006) define a population as a group of individuals, objects or items from which samples are taken for measurement. The study targeted 69 public primary schools in

Central Division of Machakos District which has a total of 2660 pupils in standard eight and 691 classroom teachers who formed the target population of the study.

The standard eight pupils were chosen because they were in their last year in primary school and were in a better position to provide accurate information on influence of school infrastructure on KCPE as had familiarized them with the school environment. On the hand classroom teachers were included in the study as they are the ones who interact most with the pupils and they are also familiar with the school infrastructure that enhances performance.

3.4 Sample size and sampling procedure

Orodho and Kombo (2002), defines a sample as part of large population which is thought to be a representative of the larger population. Sampling is a process of selecting a number of individuals or objects from a population such that the selected group contains elements representative of characteristics found in the entire group.

Since the population is large, for the purpose of this study a smaller group this is the sample size was determined using the formulae according to Taro Yamane's (1967) Formulae for determining sample size. The formula for determining sample size is shown below:

$$n = \frac{N}{1 + N(e)^2}$$

Where: n=sample size, N=population size, e= level of precision/sampling error at 0.069. The sample size of the class eight pupils was computed as follows.

Population size N=2660 therefore:-

$$n = \frac{2660}{1 + 1646(0.069)^2}$$

$$n = \frac{2660}{1 + 2660(0.00476881)}$$

$$n = 2660 / 1 + 12.66426$$

$$n = 2660 / 13.66426$$

$$n = 195$$

Therefore 195 class eight pupils out of 2660 pupils in the 52 sampled schools were selected to respond to the questionnaires. The same formula was used to sample 161 classroom teachers out of the 691 in the sampled schools. All the head teachers from the 52 sampled schools participated in the study and this brought the total respondents in the study to 408 which comprised of 52 head teachers, 161 classroom teachers and 195 standard eight pupils.

Stratified random sampling procedure was used to achieve appropriate representation of each of the three Educational zones that make up Central Division. The formulae for selecting the number of schools from each zone was the total number of schools in the zone multiplied by the sample size and then divided by the total number of public schools in the Division

$$\text{Schools per zone} = \frac{\text{Total no. of school in the zone} \times \text{Sample size}}{\text{Total no. of schools in the Division}}$$

Table 3.1: Distribution of schools per zone

<u>Name of zone</u>	<u>Number of schools.</u>
Muvuti Zone	29
Mutituni Zone	18
Mumbuni Zone	22

As per the above formulae zonal representation was as follows;

1. Muvuti zone $\frac{29 \times 52}{69} = 21.855$ (22) Schools
2. Mutituni Zone $\frac{18 \times 52}{69} = 13.462$ (13)Schools
3. Mumbuni Zone $\frac{22 \times 52}{69} = 16.579$ (17) Schools

The schools to participate in the study were selected by writing numbers 1 to 69 on separate pieces of paper to represent each school. The papers were then be folded, put in a box and shuffled after which each head teacher picked a paper randomly and the schools represented by numbers 1 to 52 were selected as the sample for this study.

Individual respondents from each school were selected through simple random sampling in which the researcher prepared coupons equal to the total number of pupils in standard eight in each school. Random sampling was used since it allows generalizability to a larger population with a margin of error that is statistically determinable A number of the coupons equal to the total number of boys and/or girls to be included in the study in each school was labeled “yes” while the rest were labeled “No”. Those who selected coupons labeled “yes” participated in the research as the respondents.

3.5 Research instruments

The research instruments in this study included questionnaires for the classroom teachers and the standard eight pupils, interview schedules for the head teachers and observation schedule for the researcher.

3.5.1 Questionnaires

According to Borg (1996), a questionnaire is a document that asks the same question to all individuals in the sample. Orodho (2005) observed that a questionnaire helps to save time and has no interview bias. This instrument was meant to gather information from the classroom teachers and standard eight pupils since they formed the majority of the respondents. The questionnaires comprised mainly of closed-ended questions with only a few open-ended questions. Closed ended questions were easier to analyze because they were in an immediate usable form and were economical in terms of time and money (Mugenda and Mugenda, 2008)

3.5.2 Interview schedule

According to Mutai (2001), an interview avails information which could otherwise not be availed by a questionnaire or through observation. Interview schedule are more adaptive and questions can be rephrased to achieve the objective. Structured questions were used to gather information from the head teachers .The instrument was best suited to this category of respondents as administrators may lack time to fill in the questionnaires

3.5.3 Observation schedule

This instrument was used by the researcher to determine the nature of classes, and adequacy of physical facilities which includes toilets, playgrounds and water points among others. The researcher carried the observation in person.

3.6 Pilot study

Piloting involves testing of research instruments to ensure their reliability. The researcher used purposive sampling method to select 2 public schools within the Division, one school with an average school population while the other had a small population. The two schools were not part of the schools sampled for the study.

3.6.1 Instruments validity

Validity refers to ascertaining whether an item measures what it intends to measure. It is therefore the degree to which the instruments measures what it purports to measure and consequently permits appropriate interpretation of scores (Orodho, 2005).

To determine the validity of the instruments the lecturers in the Department of Extra Moral Studies who are experts went through the instruments to check the content coverage and clarity of the questions on the issues that are being investigated.

3.6.2 Instrument reliability

In research, the term reliability means "repeatability" or "consistency" of measures (Kasomo, 2006). In the piloting process split-half method was used by administering the questionnaires' closed-ended items which was subjected to a pilot study utilizing a sample of 8 randomly selected respondents. These respondents were not included in the study. The data values collected were operationalized and the numerical scores were split into two using 'odd number versus even number items' process to get two sets of values which was correlated using Pearson Product Moment Correlation Coefficient to calculate the coefficient of relationship. A correlation coefficient of 0.8 was obtained which was

sufficient enough for these questionnaires to have high pretest reliability as ascertained by Kasomo (2006), who argued that a reliability of at least 0.75 is sufficient.

3.7 Data collection procedures

Permission for time off to collect data by the researcher was obtained from the District Education office Machakos through the head teacher Muthini primary school. The authority to collect data and permit was then applied from the Ministry of Education. Data was collected through the use of questionnaire after obtaining permission from the Ministry of Education. The time duration to fill the questionnaires and collect them back was three weeks.

3.8 Data analysis techniques

According to Kerlinger (1986), data analysis is categorizing, manipulating and summarizing of data in order to obtain answers to research questions. Descriptive statistics was used to analyze the data collected. Frequency tables were used to report the descriptive survey. The data collected was analyzed both qualitatively and quantitatively where necessary the computer was used to analyze the data using the statistical program for social sciences (SPSS). Data from inferential statistics was analyzed using Pearson's Product Moment Correlation Coefficient.

3.9 Ethical issues

This study applied the principles of voluntary participation. The researcher fully informed the research respondents the procedures involved in the research and they were required to give their consent to participate. The researcher treated the respondents with respect and courtesy. The research procedures were reasonable, non exploitative,

carefully considered and fairly administered. All responses were treated with utmost confidentiality.

3.10 Operational definition of variables

To achieve its objectives, this study sought to establish the influence of school infrastructure on performance of Kenya Certificate of Primary School Education in Central Division of Machakos District. The table below shows how the variables were operationalized in the study to make them measurable.

Table 3.2: Operational definition of variables

Objective	Variable	Indicator	Measurement scale	Tools of analysis	Type of tools
To establish the extent to which a learner protected environment influences KCPE Performance	Independent variable. Safe and protective environment Dependent variable KCPE Performance	Protects all learners from harm, violence and abuse (Sexual, drug and substance).	Nominal Ordinal	Descriptive statistics. Inferential statistics.	Frequency distribution tables, Percentages, Pearson's Product Moment Correlation Coefficient.
To find out the extent to which school buildings influence KCPE performance	Independent variable Adequate school buildings adhering to the safety manual from MOE Dependent variable K.C.P.E Performance	Doors and windows opening to the outside. Modified to cater for challenged learners. Sanitation facilities kept clean with high standards hygiene.	Nominal Ordinal	Descriptive statistics. Inferential statistics.	Frequency distribution tables, Percentages, Pearson's Product Moment Correlation Coefficient.

To establish the extent to which a health and hygiene promoting school influences K.C.P.E performance.	<p>Independent variable Health and hygiene promoting school</p> <p>Dependent variable KCPE Performance</p>	<p>Adequate sanitation facilities per pupil ratio.</p> <p>High standards of hygiene are maintained.</p> <p>Enough water points per the school enrolment.</p> <p>Availability of soap and water for washing hands after visiting the toilet.</p> <p>Promotes healthy lifestyles and life skills.</p>	Nominal Ordinal	Descriptive statistics, Inferential statistics.	Frequency distribution tables, Percentages, Pearson's Product Moment Correlation Coefficient.
To find out the influence a nutrition promoting school has on KCPE performance	<p>Independent variable Nutrition promoting school</p> <p>Dependent variable KCPE performance</p>	<p>Enrollment and attendance increases significantly.</p> <p>School feeding program is initiated. Availability of well balanced nutritious meals.</p>	Nominal Ordinal	Descriptive statistics, Inferential statistics.	Frequency distribution tables, Percentages, Pearson's Product Moment Correlation Coefficient.
To establish the extent to which school equipments influence KCPE performance.	<p>Independent variable Teaching/learning materials</p> <p>Dependent variable KCPE performance</p>	<p>Adequate, exciting and stimulating. Textbook – pupil ratio to be 1:2 in most subjects. Illustrations should be free from stereotypes.</p>	Nominal Ordinal	Descriptive statistics, Inferential statistics.	Frequency distribution tables, Percentages, Pearson's Product Moment Correlation Coefficient.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter focuses on the questionnaire return rate, demographic information of the respondents, data presentation, interpretation and discussion of findings. The presentation was done based on the research objectives.

4.2 Questionnaire return rate

This refers to the proportion the sample that participated in the survey as intended in all the research procedures. All the 356 questionnaires administered were returned as the researcher delivered the questionnaires personally and waited for the respondents to fill them after which she collected them thus ensuring 100% return rate.

4.3 Demographic information of the respondents

This section dealt with the demographic information of the respondents who constituted the school head teachers, teachers and the pupils .This information helped to establish the relationship between personal characteristics of the head teachers, teachers, and pupils and the influence school infrastructure has on KCPE performance in Central Division of Machakos District.

4.3.1 Gender of the respondents

The respondents were asked to indicate their gender which was aimed at establishing if the study was gender sensitive and to establish the influence of gender on school infrastructure in relation to KCPE performance in Central Division of Machakos District. The responses are as indicated in Table 4.1.

Table 4.1 Gender of the Respondents

Gender	Head teachers		Teachers		Pupils	
	Frequency	%	Frequency	%	Frequency	%
Female	13	25.0	106	65.8	91	46.7
Male	39	75.0	55	34.2	104	53.3
Total	52	100	161	100	195	100

Data on Table 4.1 indicate that majority of the head teachers are males at 75.0 % against 25.0% females as well as the pupils at 53.3 % males against 46.7% females. However, for the classroom teachers, the females were the majority at 65.8% against 34.2% males. These shows that the study was gender balanced as there was no single gender that dominated the study and school infrastructure had impact on both genders

On the other hand the study sought to establish the age of the pupils. This was aimed at establishing whether the pupils were of age to give information on the school infrastructure.

The responses are as tabulated in Table 4.2 below.

Table 4.2: Distribution of Pupils by Age

Age	Frequency	Percent	Valid Percent	Cumulative Percent
13yrs	54	27.7	27.7	27.7
14yrs	84	43.1	43.1	70.8
15yrs	35	17.9	17.9	88.7
Above15yrs	21	10.8	10.8	99.5
Below13yrs	1	.5	.5	100.0
Total	195	100.0	100.0	

Data obtained as indicated on Table 4.2 above shows that the majority of the pupils were aged 14 years at 43.1%, 27.7 % were aged 13 years, 17.9 % were aged 15 years while 10.8% were above 15 years of age while 0.5% was below 13 years. These results are quite normal since the Kenyan system of education is that pupils join standard one at 6 years and by the time they are in standard eight, they are at 14 years.

The study further sought to establish the professional qualification of the teachers. This was aimed at finding out whether there is a relationship between teachers' professional qualifications and performance in KCPE. Table 4.3 below shows responses from the teachers.

Table 4.3: Teachers' Professional Qualifications

Professional Qualifications	Frequency	Percent	Cumulative Percent
Bed	19	11.8	11.8
Diploma	72	44.7	56.5
Med	2	1.3	57.8
P1	68	42.2	100.0
Total	161	100.0	

The information obtained as tabulated in Table 4.3 shows that all teachers are professionally trained with the majority being Diploma holders at 44.7% while 11.8% were degree holders and 1.3% had masters' degree. The least qualified had P1 Certificate at 42.2%. This shows that they have adequate training to be effective in their teaching career.

Head teachers' length of stay in the current school

The study sought to establish how long the head teachers had been in their current schools. It was aimed at establishing whether the duration of stay for a head teacher has any influence on infrastructure and performance in the KCPE in the particular school. The responses are as tabulated in Table 4.4.

Table 4.4: Head teachers Duration of Stay in Current School

Duration of Stay	Frequency	Percent	Valid Percent	Cumulative Percent
1 - 3 yrs	25	48.1	48.1	48.1
4 - 6yrs	11	21.2	21.2	69.2
7 - 9yrs	9	17.3	17.3	86.5
Below 1 yr	5	9.6	9.6	96.2
Over 10 yrs	2	3.8	3.8	100.0
Total	52	100.0	100.0	

Table 4.4 shows that a greater percentage of 48.1% of the sampled head teachers had been in the current schools for a period of 1-3 years and 9.6% were newly posted in their current schools. Those who had stayed in the schools for 4-6 years were recorded at 21.2% while those who had been in the school for 7-9 years and over 10 years were at 17.3% and 3.8% respectively. This shows that head teachers in central division do not stay for long in schools. The frequent transfers could be a contributing factor to poor infrastructure as most head teachers are transferred before completing some of the started projects in the schools. Such projects will remain as white elephants in the school because the incoming head teacher may not support the started project by his/her predecessor. Such transfers interfere with the consistence of leadership and administration of the schools hence poor performance.

Average score in the Division in the last five years

The study sought to find out the average performance of the schools in the division in the last five years (2007-2011). The scores were grouped in to four categories; schools below 200 marks, 200-249 marks, 250-299 marks and those scoring 300 marks and above. Table 4.5 below shows the distribution of the schools per their mean scores.

Table 4.5: Schools Average Score for last 5 years (2007-2011)

Average Score	Frequency	Percent	Valid Percent	Cumulative Percent
200 – 249	91	56.5	56.5	56.5
250 – 299	20	12.4	12.4	68.9
Above 300	6	3.7	3.7	72.7
Below 200	44	27.3	27.3	100.0
Total	161	100.0	100.0	

Data obtained as tabulated in Table 4.5 indicates that most of the schools in the Division are below the average mark which is 250 marks with 27.3% below 200 marks and 56.5% between 200 to 249 marks. The findings have also shown that those schools above the average mark are only 16.1% with 12.4% between 250 to 299 marks and a very minimal percentage of 3.7% scoring above 300 marks. This is what prompted the researcher to carry out the research since all the schools were getting the FPE grants and all the schools were expected to be at par in terms of performance.

The head teachers on the other hand attributed the poor performance to large classes that were realized after the introduction of Free Primary Education. The introduction of the Free Primary Education did not take into account the school infrastructure. This led to congestion and overcrowding in the classrooms and high teacher- pupil ratios and as a result performance was compromised. The researcher observed that the worst mean scores were recorded in the rural schools where infrastructure was pathetic and understaffing was acute. Due to poor infrastructure, most teachers would not like to teach in such schools and will keep on seeking for transfers to move to the town schools where infrastructure is up-to-date and the performance is good. Most teachers if not all would like to be associated with performing schools as in such schools chances of promotion are high.

4.4. Learner protected environment.

The study sought to find out if the learning environment was protective enough to be conducive for learning. The study looked at the learning environment in terms of the kind of safety measures that have been put in place to provide security to the learners and teachers in the school and the state of the learning environment.

4.4.1 Safety Measures in place in the school.

The study sought to find the number of schools with fences, first aid kits and those without any safety measure. Table 4.6 shows the responses as stated by the teachers.

Table 4.6 Teachers report on the safety measures

Safety Measures	Frequency	Percent	Valid Percent	Cumulative Percent
Fence	40	24.8	24.8	24.8
First aid kit	34	21.2	21.2	46.0
Not available	87	54.0	54.0	100.0
Total	161	100.0	100.0	

Table 4.6 shows data obtained from the teachers which indicate that 54.0% of teachers from the sampled schools did not have any safety measure in place in their schools while 28.8% and 21.2% cited that they had fences and first aid kits respectively as their safety measures to ensure security of learners while in school

The study further sought to find the pupils responses on the kind of safety measures in their schools. The pupils' report is tabulated in Table 4.7.

Table 4.7:Pupils Report on Safety Measures

Safety Measures	Frequency	Percent	Valid Percent	Cumulative Percent
First Aid Kit	45	23.1	23.1	23.1
No safety measure	91	46.6	46.6	69.7
School Fence	59	30.3	30.3	100.0
Total	195	100.0	100.0	

Table 4.7 shows data obtained from the pupils which indicate that 30.3% of the sampled schools had permanent fences around them which were close to the teachers who recorded 24.8%. Other schools had first aid kits as their safety measures and this was recorded by 23.1% of the sampled pupils which was close to the teacher's record of 21.2%. Those pupils who said that their schools had no safety measures were 46.6% which was not very far from the teachers' record of 54.0%.

Data obtained from the teachers, pupils, the head teacher's interview guide and also the observation schedule by the researcher shows that schools in central division were not very secure for learners as a greater percentage did not have any safety measure in place to secure both the learners and teachers while in school.

From the observation schedule carried out by the researcher it was noted that only the town schools had first aid kits and permanent fences round them .Most of the rural schools had just a thorn fence round and each corner of the school could be used as an entrance. Other schools had through ways through them where even outsiders passed by as classes were on. This shows that most of the schools in the rural areas of central division did not provide safe and protective environment for learning and this could be a contributing factor to the poor performance in the division.

4.4.2 State of the learning environment

The study sought to assess the state of the learning environment in the schools through rating it as excellent, satisfactory, not sure, unsatisfactory and poor depending on the respondents view. It was aimed at finding out if the state of the learning environment has influence on the performance of KCPE. Table 4.8 below shows the responses as stated by the teachers.

Table 4.8: State of Learning Environment (teachers report)

Learning environment	Frequency	Percent	Valid	
			Percent	Cumulative Percent
Excellent	1	0.6	0.6	0.6
Not sure	7	4.4	4.4	5.0
Poor	32	19.9	19.9	24.9
Satisfactory	15	9.3	9.3	34.2
Unsatisfactory	106	65.8	65.8	100.0
Total	161	100.0	100.0	

In Table 4.8 data obtained indicate that 65.8% and 19.9% of the respondents which is above three quarters said that the learning environment was unsatisfactory and poor respectively meaning that there were important weaknesses in the environment thus being insufficient for learning. On the other hand a minimal 0.6% said that their schools had excellent learning environments and possibly this teacher who had this view is from the town schools whose learning environment cannot be compared in terms of infrastructure with the rural schools. Satisfactory learning environment was recorded by 9.3% of the respondents who meant that their environment was good but still more could be done. 4.4% were not sure of the learning environment. They possibly were not aware of how to rate their school environment as the surrounding schools were the same.

Information got from the head teachers revealed that poor learning environment was a contributing factor to understaffing as teachers when posted to such schools kept on seeking for transfers to move mostly to the town schools where the environment is conducive to teaching and learning. In some schools visited by the researcher acute understaffing was noted as some schools had seven teachers against the minimum eight classes. This has contributed to the poor performance in the division.

4.4.3 Relationship between learning environment and KCPE performance

The study sought to test the hypothesis that there is a significant relationship between a learner protected environment and performance in the KCPE. This was established by using Pearson's correlation coefficient to test the hypothesis below:-

H₀: There is a significant relationship between the learning environment and pupils' performance in the Kenya Certificate of Primary Education (KCPE).

H₁: There is no significant relationship between the learning environment and pupils' performance in the Kenya Certificate of Primary Education (KCPE). The results were presented in table 4.9 below.

Table 4.9: Relationship between learning environment and KCPE performance

		Learning environment	KCPE performance
Learning environment	Pearson Correlation	1	0.8
	Sig. (2-tailed)		0.084
	N	161	161
KCPE performance	Pearson Correlation	0.8	1
	Sig. (2-tailed)	0.084	
	N	161	161

Table 4.9 shows a very strong positive correlation (+ 0.8) between learning environment and KCPE performance. We do therefore accept the hypothesis and conclude that there is a significant relationship between learning environment and KCPE performance.

4.5. Influence of school buildings on performance

The study sought to access the adequacy of facilities such as classrooms, libraries, toilets and desks in the schools. It was aimed at establishing the extent to which the state of school buildings influences performance. It basically looked into the number of pupils per class, the seating arrangement i.e. number of pupil per desk, availability of libraries and pupil toilet ratios for both boys and girls.

4.5.1 Number of pupils per class.

The study sought to establish the number of pupils on average in each class in the school. Data obtained from the pupils is tabulated below in Table 4.10.

Table 4.10: Number of Pupils Per Class

Pupils per class	Frequency	Percent	Valid Percent	Cumulative Percent
41 – 50	95	48.7	48.7	48.7
10 – 40	36	18.5	18.5	67.2
51 – 60	44	22.6	22.6	89.8
Above 60	20	10.2	10.2	100.0
Total	195	100.0	100.0	

The data as tabulated in Table 4.10 shows that most of the classes are overcrowded as an average class should have a maximum of 40 pupils. The findings indicate that 18.5% of the sampled schools are the ones that have the recommended enrolment per class from the

Ministry of Education (MOE 2001). The other 81.5.8%% have 41 pupils and above with the majority being at the range of 41-50 pupils in a class as recorded at 48.7% by the pupils respectively. Reacting to the situation 80% of the head teachers cited that the situation was caused by inadequate classrooms in the school. The head teachers attributed the inadequacy of the classrooms as a result of the introduction of the Free Primary Education in 2003. They argued that the numbers have gone up but the infrastructure has remained constant. On the other hand the head teachers cited that from the amount got from the government the fault head slotted is for repair, maintenance and improvement (RMI). This means that the amount got could not be used to construct more classrooms to counter act the large number of pupils in the classes. The head teachers expressed concern over parent's laxity since the inception of FPE; the parents were no longer willing to support any development projects in the schools leading to non performance in division generally.

4.5.2 Relationship between number of pupils per class and KCPE performance

The researcher sought to establish the relationship between the number of pupils per class and pupils' performance in KCPE. The researcher use Pearson's correlation coefficient to test the hypothesis below:-

1. H_0 : There is a significant relationship between the number of pupils per class and pupils' performance in KCPE.

H_1 : There is no significant relationship between the number of pupils per class and pupils' performance in KCPE. The results were presented in table 4.11.

Table 4.11: Relationship between number of pupils per class and KCPE performance

		Number of pupils per class	KCPE performance
Number of pupils per class	Pearson Correlation	1	-0.73
	Sig. (2-tailed)		0.080
	N	161	161
KCPE performance	Pearson Correlation	0.73	1
	Sig. (2-tailed)	0.080	
	N	161	161

Table 4.11 revealed that the correlation coefficient between the number of pupils per class and pupils' performance in KCPE is -0.73. This implies that there is a strong negative correlation between the number of pupils per class and pupils' performance in KCPE. This means that when pupils are more in a class the performance is likely to drop and vice versa. We therefore accept the hypothesis and conclude that there is a significant relationship between the number of pupils per class and pupils' performance in KCPE.

4.5.3 Number of pupils per desk.

The study sought to access the seating arrangement by finding out the number of pupils sharing a desk in the classrooms. It was aimed at finding out if there is any impact of the seating arrangement on the performance of the learners in the KCPE. Data obtained from the pupil is shown on Table 4.12.

Table 4.12: Number of Pupils per Desk

Pupils per Desk	Frequency	Percent	Valid Percent	Cumulative Percent
Four	50	25.6	25.6	25.6
Three	98	50.3	50.3	75.9
Two	47	24.1	24.1	100.0

Table 4.13: Teachers Report on Availability of a Library

Library

Frequency Percent Valid Percent Cumulative Percent

The findings on Table 4.12 indicates that 24.1% of the pupils said that their schools had a pupil desk ratio of 1:2 while the remaining 75.9% of the schools had a ratio of between 1:3 and 1:4. Reacting to this 80% of the head teachers cited that this was caused by the high enrolments in classes and the fact that new desks were not being purchased due to lack of funds. The researcher on the other hand observed that over 80% of the sampled schools had poor furniture and some desks were too high to be used by the lower primary pupils. The pupils in lower primary had to write while standing and still squeezed and this resulted to poor hand writing and hence poor performance.

4.5.4 Availability of a library in the school.

The study sought to find out the availability of a library in the sampled schools. It was aimed at finding out if the availability of the school library as part of the school infrastructure has any influence on performance of KCPE. Responses obtained from the teachers are as tabulated in table 4.13.

Table 4.13: Teachers Report on Availability of a Library

Library	Frequency	Percent	Valid Percent	Cumulative Percent
Available	13	8.1	8.1	8.1
Not available	148	91.9	91.9	100.0
Total	161	100.0	100.0	

Data obtained in Table 4.13 indicate that 91.9% of the sampled teachers cited that their schools did not have a library while a minimal 8.1% cited that their schools had libraries. Responses from the teachers are as tabulated in Table 4.14 below.

Table 4.14: Pupil Report on Availability of a Library

Library	Frequency	Percent	Valid Percent	Cumulative Percent
Available	19	9.7	9.7	9.7
Not available	176	90.3	90.3	100.0
Total	195	100.0	100.0	

The pupil's findings in Table 4.14 indicate that 90.3% did not have a library in place. However a very minimal percentage of 9.7% of the pupils cited that their schools had libraries. According to the head teachers interview with the researcher, books were stored in cartons or shelves, either in the deputy head teachers' or senior teachers' offices or in a book store. However from the researcher's observation, although about 9.0% said they had libraries, the libraries existed just as buildings but were not equipped with the reference books as required of a library. Lack of a library in majority of the schools denied the pupil access to learning materials for further reference hence poor performance in most schools.

4.6 State of sanitation facilities in the schools

The study sought to assess the state of sanitation facilities in the schools in accordance with the World Summit on Sustainable Development carried out in 2002 where the director UNICEF recommended that every public school in the world be equipped with separate sanitation facilities for boys and girls. All the sampled schools had separate toilets for boys and girls although the pupil toilet ratio was alarming for both genders. According to the safety standards manual from the Ministry of Education (MOE, 2008), the recommended toilet ratio for girls was 1:25. The Table 4.15 shows response on the girl toilet ratio. It is aimed at finding whether the schools have attained the ratio recommended by the Ministry of Education for the girls of one hole for every 25 girls and the influence it had on performance of KCPE.

Table 4.15: Girls' toilet ratio.

<i>Girls' toilet ratio.</i>	Frequency	Percent	Valid Percent	Cumulative Percent
1 : 20 – 25	6	3.7	3.7	3.7
1 : 26 – 30	35	21.7	21.7	25.5
1 : 31 – 45	68	42.2	42.2	67.7
1 : 46 >	52	32.3	32.3	100.0
Total	161	100.0	100.0	

The above data as tabulated in Table 4.15 indicates that most of the schools had a high pupil toilet ratio for girls as only a minimal 3.7% of the sampled schools had attained the recommended ratio from the Ministry of Education. On the other hand about 96.3% of the schools did not adhere to the recommended ratio and as a result this could lead to poor performance as time could not be managed well. However, it should be noted that although there were separate toilets for boys and girls there was no separation between those for lower and upper primary. This could discourage adolescent girls and may result to truancy.

On the other hand, the researcher observed that along with the insufficiency of the girl's toilets, the cleanliness of the few toilets was wanting. In some schools especially town schools that had inadequate supply of water or where water had been disconnected due to un payment the toilets were horrible as maggots were all over. This posed a healthy hazard to the learners thus quality of hygiene infrastructure remained a great challenge in most schools and this could lead to contamination of diseases resulting to absenteeism hence poor performance. On the other hand, the study sought to find out the boys toilet ratio, It was aimed at finding out if the schools had adhered to the Ministry of Education policy on the toilet ratio for boys and if it had any influence on the performance in KCPE. Table 4.16 below show the responses as given by the teachers.

Table 4.16: Boys' toilet ratio

Boys' toilet ratio	Frequency	Percent	Valid Percent	Cumulative Percent
1 : 25 – 30	5	3.1	3.1	3.1
1 : 41 – 50	74	46.0	46.0	49.1
1 : 51 >	55	34.2	34.2	83.2
1 : 31 – 40	27	16.8	16.8	100.0
Total	161	100.0	100.0	

Data obtained as indicated in Table 4.16 shows that 96.9% of the sampled schools did not comply with the recommended ratio for the boys' toilets of 1:30. From the table only 3.1% of the sampled schools had attained the government standards from the Ministry of Education (MOE 2008). The boys are worse hit but sediments from over 95% of the head teachers shows that the boys had separate urinals for short calls. On the other hand the researcher found out that most of the boys' toilets had no doors. The boys said when visiting the toilet

they had to go in two's for one to act as a door. However, such situations were very rare and mostly were in the rural schools. The head teachers to such schools claimed that boys never required much privacy and attributed such conditions to lack of funds to construct new toilets. The researcher observed that most of the schools had toilets at risk of subsiding and a few schools had the existing latrines already full. However, on average; all the sampled schools had a pupil-toilet ratio of 1:46 for both boys and girls and this was a contributing factor to poor performance as time was not effectively utilized.

4.7 Health and hygiene in schools.

The study sought to assess the state of hygiene in the schools. Specifically it looked into availability of safe water for drinking and hand washing after visiting the toilet and the availability of health services in the schools.

4.7.1 Safe drinking water in the school.

The study sought to find the availability of safe drinking water in the sampled schools. It was aimed at finding out if availability of safe water in the schools could influence performance in the KCPE. Table 4.17 below shows responses as given by the pupils.

Table 4.17:Pupils' report on safe drinking water

<i>Safe Drinking Water</i>	Frequency	Percent	Valid Percent	Cumulative Percent
Available	44	22.6	22.6	22.6
Not available	151	77.4	77.4	100.0
Total	195	100.0	100.0	

Data obtained from the pupils as shown in Table 4.17 indicate that 77.4% of the sampled pupils cited that their schools lacked safe water for drinking and they did not wash their hands after visiting the toilet. The pupils had to carry water from their homes for drinking. The safety of the water carried remained as a challenge for the cleanliness of the water

bottles was not ensured. Water for hand washing remained a challenge to most of the sampled schools and as cited according to Kay et al (2005) hand washing after visiting the toilet in most African countries was poorly practiced. Failure to wash hands after visiting the toilet poses a great challenge as it leads to the outbreak of diseases like dysentery, diahorrea, typhoid and cholera which may lead to emergency closure of the school. Such illnesses could result to poor school attendance hence poor performance in examinations.

However, a minimal percentage of 22.6% cited that they had water in tanks for drinking and hand washing after visiting the toilet. On the other hand the researcher observed that the schools that had water did not comply with the average standards by the MOE (2010) of one water point for every 50 pupils. It was observed that those schools had almost four times the number per water point and this was a major reason for not washing hands in school thus being a risk factor for worm infection.

The teachers on the other hand had their own responses pertaining the availability of safe drinking water in the schools. Table 4.18 shows their responses.

Table 4.18: Teachers Report on Safe Drinking Water

<i>Safe drinking water</i>	Frequency	Percent	Valid Percent	Cumulative Percent
Available	31	19.3	19.3	19.3
Not Available	130	80.7	80.7	100.0
Total	161	100.0	100.0	

Data shown on Table 4.18 indicate that 80.7% of the sampled teachers cited that their schools did not have safe water for drinking and hand washing after visiting the toilet while 19.3% cited that their schools had water. About 25% of the head teachers who possibly were the ones whose schools had water cited that they had received tanks for water harvesting from

Rotary International. A few schools still had the tanks not yet connected for water harvesting. Such observations of unconnected water tanks were mostly noted in the schools with newly posted head teachers as observed earlier that rate of transfers of head teachers in central division is high and this could hinder proper learning leading to poor performance.

4.7.2 The relationship between availability of safe drinking water and KCPE performance

The researcher sought to establish whether there is a relationship between availability of safe drinking water and the pupils' performance in the KCPE by testing the hypothesis that ;

H_0 :There is a significant relationship between the availability of safe drinking water and the pupils' performance in the KCPE.

H_1 : There is no significant relationship between the availability of safe drinking water and the pupils' performance in the KCPE. The results were presented in table 4.19.

Table 4.19: Relationship between availability of safe water and KCPE performance

		Availability of safe drinking water	KCPE performance
Availability of safe drinking water	Pearson Correlation	1	0.69
	Sig. (2-tailed)		0.059
	N	161	161
KCPE performance	Pearson Correlation	0.69	1
	Sig. (2-tailed)	0.059	
	N	161	161

Table 4.19 shows a strong positive correlation coefficient of + 0.69. We do therefore accept the hypothesis and conclude that there is a significant relationship between the availability of safe drinking water and the pupils' performance in the KCPE. This means that availability of safe drinking water is likely to improve performance.

4.7.3 Availability of health service

The study sought to find out if health services were available in the sampled schools. It was aimed at finding out if availability of service in a school could influence performance in KCPE. Table 4.20 below show data as given by the teachers.

Table 4.20 :Availability Health Services

Health services	Frequency	Percent	Valid Percent	Cumulative Percent
Available	47	29.2	29.2	29.2
Not Available	114	70.8	70.8	100.0
Total	161	100.0	100.0	

Data obtained from the teachers on Table 4.20 indicates that 29.2% of the sampled schools offered health services in the school. However, the services offered were for minor ailments like headache and stomachache whereby the teacher in charge of first aid could administer paracetamols and actals respectively. In case of a major ailment, the parent is called upon to take the child to the hospital for treatment. On the other hand 70.8% of the sampled schools do not have any healthy services and learners were referred back home to be taken to the hospital for treatment. Lack of health services in the school could lead to poor performance as learners could miss classes due to minor ailments which could be managed in school.

4.8 Nutrition promotion in the school

The study sought to find out if the school has a lunch program in place to provide fresh and nutritious food to the learners.

4.8.1 Availability of a feeding program

The study sought to find out if schools in Central Division have a feeding program to provide at least the lunch meal to its pupils. It was aimed at finding out if the provision of meals in the schools could influence performance in the KCPE. Table 4.21 shows data obtained from the teachers on the availability of a feeding program in their various schools.

Table 4.21 :Teachers Report on Feeding Program

Feeding Program	Frequency	Percent	Valid Percent	Cumulative Percent
Available	31	19.3	19.3	19.3
Not available	130	80.7	80.7	100.0
Total	161	100.0	100.0	

Data tabulated on Table 4.21 indicate that 80.7% of the sampled teachers cited that, there is no feeding program in their schools while a very minimal percentage of 19.3% had a feeding program in place in their schools. On the other side the researcher observed that those schools that had the feeding program were schools in town where the parents had organized it for their own convenience as most of them are workers and would like their children to stay in school until evening. However, most of the rural schools could not be able to organize a feeding program due to their social economic status and the fact that the area is rather dry and highly populated and they do not have high crop yields to ensure food security.

On the other hand, responses on the availability of a feeding program were got from the pupils. Their responses are as indicated on Table 4.22.

Table 4.22: Pupils Report on Feeding Program

	Frequency	Percent	Valid Percent	Cumulative Percent
Available	27	13.8	13.8	13.8
Not available	168	86.2	86.2	100.0
Total	195	100.0	100.0	

Data obtained from the pupils indicated that 86.2% of the sampled schools did not have a feeding program in their schools which was closely related to the teacher's record of 80.7%. Schools with feeding programs in place were 13.8% per the pupils record and still close to the teachers record of 19.3%.

Most of the head teachers in the rural schools cited that feeding program existed some 4-5 years ago when schools were supplied with food by the World Food Program (WFP) as the area experienced acute scarcity of food following prolonged drought. However, after the withdrawal of the feeding program project by the WFP, the parents could not sustain the project due to their low economic status. Lack of feeding program in schools is a very big blow to academic performance as most of the learners have to attend afternoon classes with an empty stomach leading to non attentiveness hence poor performance.

4.8.2 Relationship between nutrition promotion in a school and pupils' performance in the KCPE.

The researcher sought to establish whether there is a relationship between nutrition promotion in a school and pupil's performance in KCPE by testing the hypothesis that;

H₀: There is a significant relationship between nutrition promotion in a school and pupils' performance in the KCPE.

H₁: There is no significant relationship between nutrition promotion in a school and pupils' performance in the KCPE. The results were presented in table 4.23.

Table 4.23: Relationship between nutrition promotion and KCPE performance

		Nutrition promotion	KCPE performance
Nutrition promotion	Pearson Correlation	1	0.69
	Sig. (2-tailed)		0.059
	N	161	161
KCPE performance	Pearson Correlation	0.69	1
	Sig. (2-tailed)	0.059	
	N	161	161

Table 4.23 shows that the correlation coefficient between nutrition promotion in a school and pupils' performance in the KCPE is + 0.69. This is a strong positive correlation and therefore we accept the hypothesis and conclude that there is a significant relationship between nutrition promotion in a school and pupils' performance in the KCPE.

4.9 Teaching/ learning materials in the schools.

The teaching/ learning materials are materials that aid the learning process. The study mainly embarked on assessing the textbook- pupil ratio in the various subjects taught in primary schools. Since the introduction of free primary education in 2003, schools receive funds to procure text books and other learning materials twice every year.

4.9.1. Textbook-pupil ratios.

The study sought to find out textbook-pupil ratios in the sampled schools .it was aimed at finding out if the schools had adequate teaching and learning materials and if the adequacy of the learning materials had influence in the performance of KCPE. Table 4.24 shows responses as obtained from the teachers.

Table 4.24: Teachers report on Textbook- Pupil Ratio

Textbook-pupil ratio	Frequency	Percent	Valid Percent	Cumulative Percent
1 : 2	13	8.2	8.2	8.2
1 : 3	74	45.9	45.9	54.1
1 : 4	74	45.9	45.9	100.0
Total	161	100.0	100.0	

Table 4.24 show findings on the textbook-pupil ratio in the sampled schools as cited by teachers. The responses indicate that 91.8% of the teachers from the sampled schools had a high text book pupil ratio of 1:3 and 1:4 despite the fact that funds are disbursed twice yearly since 2003. It is expected that eleven years down the line the ratios could be at least at 1:2 in major subjects like Mathematics, English and Kiswahili. However, a minimal percentage of 8.2% of the sampled schools had attained the required ratio of 1:2. Lack of adequate teaching and learning materials was a major contributing factor to poor performance since learners could not complete their assignments on time. On the other hand 85.0% of the head teachers cited that the higher ratios was as a result of loses of textbooks by the learners which were never replaced. The researcher on the other hand observed that most of the books were carelessly stored in torn boxes due to lack of libraries.

4.9.2 Relationship between textbook pupil ratio and KCPE performance

The researcher further sought to establish the relationship between the teaching learning materials and pupils' performance in KCPE. This was done by testing the hypothesis below.

H₀: There is a significant relationship between the teaching learning materials and pupils' performance in KCPE.

H₁: There is no significant relationship between the teaching learning materials and pupils' performance in KCPE. The results were presented in table 4.26.

Table 4.25: Relationship between teaching/ learning materials and KCPE performance

		Teaching/ Learning materials	KCPE performance
Teaching/learning materials	Pearson Correlation	1	0.89
	Sig. (2-tailed)		0.066
	N	161	161
KCPE performance	Pearson Correlation	0.89	1
	Sig. (2-tailed)	0.066	
	N	161	161

Table 4.26 shows that there is a strong positive correlation coefficient between teaching/ learning materials and pupils' performance in KCPE of +0.89. We therefore accept the hypothesis and conclude that there is a significant relationship between the teaching/ learning materials and pupils' performance in KCPE.

4.9.3: Adequacy of teaching aid.

The study also sought to assess the adequacy of teaching aids in the sampled schools. It was aimed at finding out the extent to which the adequacy of teaching aids influence performance of KCPE. The teachers' responses are tabulated in Table 4.26.

Table 4.26: Adequacy of Teaching Aid

Teaching Aid	Frequency	Percent	Valid Percent	Cumulative Percent
Adequate	48	29.8	29.8	29.8
Inadequate	101	62.7	62.7	92.5
More adequate	12	7.5	7.5	100.0
Total	161	100.0	100.0	

Data obtained from the teachers as indicated in table 4.26 above show that 62.7% had inadequate teaching aids while the head teachers attributed the inadequacy as a result of lack of manila papers and mark pens which most schools never purchased. Lack of teaching aids made the teachers resort to lecture method in most of their lessons forgetting the Chinese proverb that says; “Tell me and I will forget, show me and I may remember, involve me and I will understand” .Failure to use teaching aids as expected has resulted to poor teaching methods hence poor performance.

On the other hand the researcher observed that charts, diagrams and maps were very few especially in the upper classes. There were a number of counting charts and multiplication table charts displayed in the lower classes. However, a few schools had gone an extra mile to have talking walls. Diagrams of the body systems i.e. reproductive system, blood circulation system, breathing system among others were drawn on strategic walls to aid learning of Science. Maps of Africa, Eastern Africa and Kenya showing drainage, physical features and other concepts in Social Studies were drawn on the walls. Schools that had such drawings are among the few performing schools in the division. In such schools learning continues even outside the classroom.

CHAPTER FIVE.

SUMMARY, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS.

5.1 Introduction.

In the preceding chapter the collected data was analyzed and reported. This chapter summarizes the findings of the study and presents conclusions, recommendations and suggestions for further research.

5.2. Summary of the findings

The purpose of the study was to investigate the influence of school infrastructure on Kenya Certificate of Primary Education (KCPE) performance in Central Division of Machakos District. It was guided by five objectives which revolved on influence of learner protected environment on performance, the extent to which school buildings influence performance of KCPE ,influence of health and hygiene on performance, influence of nutrition promotion on performance and the influence school equipment has on performance .

The study applied survey research with the target population being public primary schools in central division in Machakos District particularly focusing on head teachers, classroom teachers and standard eight pupils. Data was collected by use of questionnaires, interview schedules and observation schedules. Through data analysis the study revealed the following findings.

5.2.1 Demographic details of the respondents

There are more male head teachers than females head teachers at 75.0% and 25.0% respectively. On classroom teachers the females were the majority at 65.8% against 32.2% males while on the side of the pupils, males took the lead at 53.3% against 46.7% females. This shows that the study was gender sensitive as there was no gender that dominated the

study completely. On the standard eight pupils age data obtained showed that majority of them were of school going age where 27.7% of the learners were aged 13 years and those aged 14 years were at 43.1%. Among the slightly aged learners 17.9% were aged 15 years while those above 15 years were at 10.9% and a 0.5% was below 13 years which straight away was an underage case.

Data obtained on the professional qualifications indicate that 42.2% have P1 certificate as their highest professional qualification while majority of the sampled teachers at 44.7% were diploma holders and very small percentages of 11.8% and 1.3% had bachelor degrees and Master degrees respectively. On the duration of stay by the head teachers, data obtained revealed that almost 60% of the head teachers from the sampled schools had been in the current schools for a period of 3 years and below while the rest had been in the schools for a period of 4-10 years. This means that head teachers are regularly transferred which is a very big blow to school infrastructure as most of them leave unfinished development projects. On schools average performance for the last five years, data obtained indicate that most of the schools are performing below average with 27.3% below 200 marks and 56.5% between 200-249 this means that over 80% of the schools perform below the average mark of 250 marks out of the 500 total marks. Those schools that score between 250-299 were recorded at 12.4% while a very minimal percentage of 3.7% scored 300 marks and above.

5.2.2 Learner protected environment

As far as the learning environment was concerned most of the schools in central division did not have safety measures in place which was recorded at almost 50% by both the pupils and the teachers. The rest of the schools some had first aid kit as their safety measures which was

approximately 20%.The rest who were almost 30% as recorded by both the teachers and pupils had permanent fences as safety measures to secure their compounds.

On the learning environment over 85.7% of both the teachers and pupils cited that the condition of their environments was unsatisfactory and poor while 4.4% were not sure and the rest 9.9 % said that their environments were satisfactory and excellent. When the learning environment was compared with the performance it was found that there was a significant relationship between the learning environment and performance in KCPE.

5.2.3 School buildings in relation to performance

As far as the buildings were concerned, learners were congested due to lack of adequate classrooms. An average class should have a maximum of 40 pupils and this was recorded by only about 18.7% of the pupils as the others had 41 pupils and above with the highest class having 71 pupils. Findings got through testing of hypotheses revealed that there is a significant relationship between the number of pupils in a class and performance in KCPE.

The pupils were seated in fours and threes due to inadequate furniture. The head teachers attributed all these to parents' laxity in supporting development projects since the inception of Free Primary Education. This is because despite of the increased enrolment the infrastructure remained constant and parents had the notion that education was free.

The researcher also noted that over 90% of the sampled schools had not adhered to the safety standards manual from the Ministry of Education as most of the buildings had doors that opened to the inside and the classroom windows had grills.

On the side of the availability of libraries in the schools only less than 10% had buildings they had called libraries despite the fact that they were not equipped with enough reference

books. The rest who were over 90% did not have libraries and books were kept in torn boxes in the staffroom and in the deputy teacher's office that doubled as a store.

Sanitation infrastructure remained a great challenge in most schools as only 3.7% had attained the right pupil toilet ratio for girls of 25 girls per one hole. The rest had more than the recommended ratios with the majority having one hole used by between 31-45 girls. On the side of boys the state was no better as 3.1% only had attained the recommended ratio of one hole per 30 boys. The rest had more than the expected with the majority sharing one hole per between 41-50 boys.

5.2.4 Health and hygiene in the schools.

Health and hygiene was not observed as most schools lacked safe water for drinking and hand washing after visiting the toilet. The schools that had water were averagely recorded by the teachers at 22.6% while the rest 77.4% had completely no water and pupils had to carry water from their homes with bottles whose hygiene standards were not ensured. Findings obtained through testing hypotheses relating availability of safe drinking water and performance revealed that there is a significant relationship between the two variables as availability of safe drinking water was found to improve performance. Most of the schools did not have health facilities in place. However, 29.2% were recorded to provide health facilities for minor ailments where paracetamols and actals are administered. The rest which were recorded at 70.8% did not have health facilities and parents were to be called upon to take their children to the hospital in case of sickness.

5.2.5 Nutrition promotion in the schools.

On the side of nutrition promotion in the schools, very few schools recorded at 19.3% and 13.8% by the teachers and the pupils respectively had a feeding program in place that offered

lunch meal to the learners. The rest recorded at 80.7% and 86.2% by the teachers and pupils respectively did not have a feeding program in place. A few pupils carried food from home where else the rest went without lunch. Findings got through testing a hypothesis that related the availability of feeding program in a school and performance in KCPE revealed that there is a significant relationship between the two variables as schools which had feeding program were performing better than those without.

5.2.6 Teaching /learning materials in the schools

Lastly on the issue of teaching/ learning materials, data obtained indicated that over in 91.8% of the schools, learners were still sharing books in the ratios of 1:3 and 1:4. Only a minimal 8.2% had attained the right ratio of 1:2 as recommended by the government. Teaching aids were inadequate as recorded by the teachers and also observed by the researcher. The teachers cited that 62.7% of the schools had inadequate teaching aids and this concurred with what the researcher observed as many upper classes did not have any chart on the walls. A few charts were seen displayed in the lower classes. However, 29.8% of the teachers recorded that they had adequate teaching aids in their schools where some of those schools had talking walls with diagrams of the body systems and various maps drawn. This ensured that learning took place all over in the school compound when children are in the class or outside over break time, lunch hour and games time. Findings obtained through testing the hypotheses that there a relationship between teaching/learning materials and performance in the KCPE revealed that there is a significant relationship between teaching /learning materials and performance in KCPE.

5.3. Discussions of findings.

The findings of the study are discussed below under the respective objectives.

5.3.1 Learner protected environment

Findings of the study have revealed that most schools in Central Division of Machakos District are not learner protected as indicated in Table 4.6 and Table 4.7 with 50.2 % of the sampled schools not having any safety measure in place leading to insecurity to learners when in school. However, 22.1% and 27.7% had first aid kits and permanent fences respectively as safety measures in their school. This has led poor learning environment hence poor performance as good performance in schools will largely depend on the learning environment as stated in the Dakar framework of 2000 in Senegal that, education of good quality would be offered if only educational institutions and programs were adequately and equitably resourced with the core requirements of safe environmentally friendly, and easily accessible facilities, safe and protective learning environments with water and sanitation facilities. This concurs with Rimer et.al. (2003), that a safe and protective learning environment promotes teaching and learning hence good performance.

5.3.2 School buildings in relation to performance

Teachers in the sampled schools cited that they had large and congested classes where 81.5% had more than 40 pupils per class which is the recommended figure by the Ministry of Education. Classes were congested with over 80% of the pupils sitting in 3^s and 4^s and only 20% of the sampled schools were sitting in 2^s. The classrooms, toilets and desks were inadequate. Sanitation infrastructure remained a challenge to most of the schools and learners were prone to diseases as argued by World Health Organization WHO (1997) that lack of adequate water and sanitation facilities in a school creates an unsafe environment where

diseases are transmitted. Over 90% of the schools in Central Division did not comply with the safety standards in government institutions as most of the doorways opened to the inside and the windows had grills. Most of the schools almost 90% did not have a library. Books were kept in cartons and others kept in the deputy head teacher's office which doubled as a book store.

Most of the schools had pupil toilet ratios which were above the expected ratio of 1:25 for girls and 1:30 for boys as indicated in Table 4.15 and table 4.16 and this posed a great challenge to the schools sanitation infrastructure. It was noted that although all the schools had separate toilets for boys and girls there was no distinct separation between those for lower and upper primary as this discourages adolescent girls and may result to truancy.

From the results of the study there is evidence that: - since the inception of free primary education (FPE) the parents have shown a great laxity in supporting development projects in the schools. This has led to poor school infrastructure culminating to understaffing especially in the rural schools in the division. This then results to poor performance in those schools and the division as a whole. As a result most of the able parents have opted to transfer their children to private schools.

5.3.3 Health and hygiene promotion in the schools.

Most of the sampled schools lacked safe water for drinking and hand washing after visiting the toilet. The pupils had to carry water from their homes with bottles whose hygiene standards were not ensured. Pupils in most schools in Central Division of Machakos District did not wash their hand after visiting the toilet and this concurred with Kay et.al.(2005) that hand washing after visiting the toilet was poorly practiced in Africa. In schools where water and sanitation facilities are improved enrolment and completion rates are also improved and

there is less teacher absenteeism hence learning outcomes are improved. This concurs with Curtis and Cain Cross (2003), improvement of sanitation, safe water supplies and food hygiene greatly reduces illnesses hence improved school attendance.

5.3.4 Nutrition promotion in the schools

Over 80% of the sampled school did not have a feeding program in the school as indicated in table 4.21. Learners had to learn on empty stomach especially in the afternoons leading to poor concentration. This was cited as a major contributing factor to poor performance in the rural schools of the division. This concurred with Unicef (2010) where studies have shown that there is a strong correlation between children health and their learning ability It is further argued that children in poor health are more likely to learn less as they are unable to concentrate hence the poor results exhibited in most of the schools. This also concurs with studies by Sally MacGregor (1992) that children with stunted growth, anaemic, poor dietary intake tend to have poor school performance

5.3.5 Teaching/learning materials in the schools

School equipment in terms of teaching and learning materials were inadequate as indicated in Table 4.24. The text book pupil ratio was still at 1:3 and 1:4 in most of the sampled schools which was recorded at 91.8.0% while those with the recommended ratio of 1:2 was recorded at 8.2%. Most schools where learners were sharing books in the ratios 1:3 and 1:4 were performing poorly as the study revealed that there was a significant relationship between the teaching/learning materials and performance in KCPE.This concurs with Purves (1973), that there is a positive association between availability of educational materials and pupil's performance.

Failure of schools to attain the recommended textbook-pupil ratio by now 2013 is rather frustrating as FPE funds are disbursed twice every year since 2003. Head teachers are in turn expected to procure learning materials as soon as they get the funds as an education system cannot function without learning materials otherwise the quality of education offered to children could be compromised.

5.4 Conclusion of the study.

The findings of this study have shown that most school in Central Division of Machakos District have poor infrastructure which is evidenced by the kind of safety measures in schools especially in the rural schools. Most of the school buildings are in pathetic condition with classrooms that have no concrete floors, windows and doors. The cemented classes had so many potholes which were a hazard to the learners in that they can lead to falls and injuries. Most of the classes had leaking roofs with old iron sheets. There was insufficient pupil toilet ratio and complains about the cleanliness of the toilets with some at the risk of subsiding and others already full.

From the results of the study there is evidence that: - since the inception of free primary education (FPE) the parents have shown a great laxity in supporting development projects in the schools. This has led to poor infrastructure resulting to acute understaffing in the rural schools in the division hence poor performance in the KCPE due to lack of personnel. Quality of hygiene infrastructure remained a challenge in the division as most schools lacked safe water for drinking and hand washing after visiting the toilet. Nutrition and personal hygiene were two areas of great health concern identified. Taking into consideration the information from the data collected and the needs as expressed by the school community i.e.

the head teachers, the classroom teachers and the standard eight pupils, personal hygiene with emphasis on washing hands with soap should be recommended as an entry point for school health and hygiene promotion. Hand washing with soap was found effective in preventing and reducing diarrhea in Kenya and should be recommended for implementation in schools in Kenya as this will reduce hygiene related illnesses and curb absenteeism thus improving performance.

In most schools, teaching and learning materials were inadequate as majority of the pupils were sharing textbook in the ratio 1:3 or 1:4. As per the governments' expectation by now the year 2013 most schools were expected to have attained a textbook-pupil ratio of 1:2 in all the major subjects i.e. Mathematics, English, Kiswahili, Science and Social Studies and a ratio of 1: 5 in the minor subjects like Christian Religious Education (CRE), Creative Arts, Physical Education and Life Skills. This poor textbook-pupil ratio has led to the poor performance in the KCPE in the division as many learners do not complete assignments. There were inadequate teaching aids leading to poor teaching methods hence poor performance

5.5 Recommendations.

From the findings obtained from the study, the researcher came up with the following recommendations.

5.5.1 Learner protected environment

Educational stake holders should foster safe and secure school environment to facilitate increased learner enrolment, retention and completion hence attaining better results in national examinations. A supportive environment should be created in order to upgrade the

physical conditions of the school with respect to safety and protection for both the teachers and learners.

5.5.1 The school buildings

The stake holders should ensure that physical structures are appropriate, adequate and properly located devoid of any risk to users or those around them. They should comply with the provision of the Education Act (cap 211), Public Health Act (cap 242) and Ministry of Public Works buildings regulation and standards. Funds should be availed to upgrade the school infrastructure in public schools to address the issues of overcrowding and congestion in the classes.

5.5.3 Health and hygiene promotion in the school

Schools should be connected to water systems and additional water points put in place to allow hand washing. Water points should be re-located so that the learners are able to wash hands after using the toilets and before eating. Health education with a focus on personal hygiene and life skills should be integrated into the school curriculum and health related issues to be integrated into each school policy. Teachers should be trained in health and hygiene and should work in cooperation with the parents so that health and hygiene are extended home.

5.5.4 Nutrition promotion in the school

School authorities in collaboration with parents and members of the community as well as other well wishers should be encouraged to ensure that learners are provided with a hot meal per day as it enhances retention and improves learning. It should be ensured that children in public schools assess feeding program on regular basis as this is an investment that affect not only their health but also their academic performance.

5.5.5 Teaching /learning materials in the schools

The current disbursement of capitation of Ksh. 1,020 per child for FPE should be reviewed upwards to reflect the rate of inflation as this will improve the text book pupil ratio as well as physical infrastructure and especially this time when schools are expected to embrace ICT as standard one pupils come next year January, 2014 will get to school with laptops. In this view then, each school is expected to have a computer lab as part of their school infrastructure.

5.4 Suggestions for further research.

The researcher recommends that;

- i. In order to investigate the influence of school infrastructure in public primary schools, the research should be done in other parts of the country, as every area has its own different social economic and environmental background.
- ii. A research should be carried out to investigate the influence of mobile classes on Kenya Certificate of Primary Education as there are no permanent classes
- iii. A research should be carried out to investigate the impact of school infrastructure on the pupil's outcome and behavior.
- iv. A research should be carried out on the influence of informal neighborhoods on pupil's performance in Kenya Certificate of Primary Education.

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LIST OF APPENDICES

APPENDIX I

MUVUTI ZONE KCPE PERFORMANCE (2007-2011)

Name of primary school	2007	2008	2009	2010	2011
Kimutwa primary school	187.69	224.39	228.40	214.88	224.61
KwaKavoo primary school	220.21	248.55	222.75	229.21	232.22
Iluvya primary school	196.31	226.50	230.37	205.20	200.16
Katumani primary school	212.28	250.81	234.09	235.22	235.22
Kyanzasu primary school	208.59	256.40	200.82	223.67	228.76
Konza primary school	245.32	231.44	255.07	234.89	229.66
Machakos primary school	327.41	340.28	339.32	323.50	304.04
Muthini primary school	243.39	255.50	249.36	242.34	256.30
Mbembani primary school	251.10	252.87	230.28	213.13	242.12
St Marys girls pri. School	258.69	264.78	269.79	270.60	283.36
Kamweleni primary school	260.39	285.52	242.87	241.12	250.57
St Mary's Boys pri. School	265.05	266.31	268.96	271.31	275.56
Baptist primary school	292.33	292.80	288.73	292.26	295.75
Township primary school	281.94	245.50	268.45	285.59	280.93
Love primary school	231.08	240.97	244.71	230.13	231.27
Makakoi primary school	225.32	239.37	244.77	207.11	200.74
Kivandini primary school	197.01	213.14	215.25	205.21	211.30
Kitulu primary school	198.60	190.67	233.37	179.44	180.59
Mikuini primary school	215.16	226.01	214.80	179.31	168.37
Kathayoni primary school	235.28	252.97	221.32	211.41	211.18
Kiimakimwepri school	213.23	217.75	202.24	169.90	194.13
Moi primary school	201.95	192.23	223.75	235.70	218.20
Kyeni primary school	198.00	182.28	201.80	192.48	196.77
Kaseve primary school	215.31	221.14	218.63	231.65	214.70
Kaathi primary school	184.85	179.92	196.17	186.60	186.13
Kakinduni primary school	223.50	198.49	217.24	191.94	208.47
Mangauni primary school	212.22	210.94	201.35	203.76	215.23
Mwanyani primary school	188.20	224.31	231.25	241.33	214.24
Katoloni primary school	233.40	200.98	204.17	205.00	213.50

Source: Machakos District Education (Examination Department)

APPENDIX II:**MUTITUNI ZONE KCPE PERFORMANCE (2007-2011)**

Name of primary school	2007	2008	2009	2010	2011
Kyasila primary school	207.29	248.23	263.99	267.31	248.55
Kyanda primary school	232.47	255.72	241.31	248.36	260.19
Makyau primary school	182.33	198.05	183.04	235.43	245.91
Mbukoni primary school	259.09	200.00	242.76	248.91	234.68
Kithima primary school	220.08	200.60	202.74	217.58	234.32
Kyaani primary school	194.34	205.87	220.45	218.18	221.00
Kasaini primary school	185.32	195.94	197.40	190.60	220.90
Metuma primary school	226.83	232.50	277.50	266.87	218.42
Yakamete primary school	252.85	213.68	203.90	217.68	214.98
Mua farm primary school	201.53	220.58	204.17	217.38	212.11
Kamuthangapri. School	201.51	228.31	211.20	203.99	207.85
Mutituni primary school	180.33	187.50	219.70	227.71	197.87
Kiteini primary school	181.35	240.00	239.21	233.33	196.18
Keaa primary school	195.50	205.95	186.68	223.00	191.47
Kwakitaa primary school	188.17	220.06	232.36	204.89	189.21
Ngelani primary school	177.03	173.31	192.35	202.05	156.32
Ngomeni primary school	203.64	178.54	220.10	214.25	152.05
Kivutini primary school	191.01	215.88	187.77	196.58	201.23

Source: Machakos District Education (Examination Department)

APPENDIX III:**MUMBUNI ZONE KCPE PERFORMANCE (2007-2011)**

Name of primary school	2007	2008	2009	2010	2011
Misakwani primary school	241.75	292.47	261.72	253.21	301.94
Manza primary school	197.49	212.14	238.45	223.65	235.35
Mumbuni primary school	247.10	244.17	219.77	254.15	254.59
Kathimani primary school	216.36	211.11	170.44	174.36	176.43
Kyumba primary school	210.14	228.77	220.42	215.75	238.53
Kimua primary school	178.46	247.88	245.05	241.01	228.14
Kyambuko primary school	224.25	212.77	213.00	216.80	226.99
Ivumbuni primary school	237.52	230.89	229.28	236.28	218.64
Kathese primary school	215.31	221.14	218.63	231.65	214.70
Mikuyu primary school	201.28	232.79	224.61	228.15	210.95
Mung'ala primary school	209.84	220.74	228.40	208.03	207.76
Kyanguli primary school	183.55	178.07	187.77	226.73	207.49
Kitanga primary school	214.89	205.07	182.45	176.29	201.25
Kathekakai primary school	209.38	195.42	184.15	184.85	200.98
Kyemutheke primary school	197.35	235.85	226.49	213.57	200.98
Ikokani primary school	216.36	211.24	192.16	191.43	200.81
Kasinga primary school	193.55	204.23	218.11	191.43	200.44
Kiangini primary school	210.76	213.17	200.25	163.98	200.08
Vota primary school	227.24	204.31	254.01	237.51	196.28
Katelembo primary school	212.12	213.17	200.25	210.49	195.73
Miw'ongoni primary school	188.44	176.10	160.88	170.86	183.98
Kuosyomuomopri. School	209.04	203.37	196.39	218.25	170.63

Source: Machakos District Education (Examination Department)

APPENDIX IV

TRANSMITTAL LETTER

**ANNA WAMUYU MWEU
University of Nairobi,
P.O BOX 30197,
Nairobi.**

To the Respondent,

.....

RE: RESEARCH STUDY

I am a student of the University of Nairobi, pursuing a M.A degree in Project Planning and Management. I am carrying out a research on **the influence of school infrastructure on performance of Kenya Certificate of Primary Education in Central Division of Machakos District**. Your school has been selected to participate in the study and you have been selected as a respondent to assist in providing the required information. My respondents are the head teachers, the classroom teachers and standard eight pupils all in public Primary Schools in Central division of Machakos District. I therefore kindly request you to fill the attached questionnaires. The data collected will be strictly used for academic purposes only and will be treated confidential. Your cooperation will be highly appreciated.

Thank you

Yours faithfully

Anna Wamuyu Mweu

QUESTIONNAIRES

APPENDIX V:

QUESTIONNAIRE FOR TEACHERS.

This questionnaire is designed to collect information on the influence of school infrastructure on Kenya certificate of Primary Education performance in Central Division of Machakos District. You are kindly requested to respond truthfully to the questions. All responses will be treated with utmost confidentiality.

Section 1: Background Information

Please tick/fill in the spaces provided

1. What is your gender?

Male Female

2. What is your highest academic qualification?

KCSE/ KCE Diploma bachelor Degree

3. What is the average score in KCPE in the last five years?

Below 200 200-249 250-299 Above 300

Section 2: Safe and learner protected environment

4. Does the school infrastructure provide security and protection to pupils when in school?

Yes No

If yes, what safety measures are in place in the school?

a) School fence (b) No safety measure (c) First Aid kit

6. Please tick under the level that best represents your opinion as indicated in the key below
 Excellent (Exc) Satisfactory (Sat) Not sure (Nsr) Unsatisfactory (Nsat) Poor (Pr)

Statement	Exc	Sat	Nsr	Nsat	Pr
School provides a safe and protective environment conducive to learning					
The school compound is free from hazardous /risky materials, buildings.					

Section 3: School buildings in relation to performance (Please tick/fill where appropriate)

7. Does the school have adequate buildings to enhance pupil's performance in the Kenya Certificate of Primary Education?

Yes No

If yes, how many classrooms are there in the school?

(a)21-25 (b) 16-20 (c) 11-15 (d) none

8. Do you have a library available in the school? (a)Available (b) Not available

9. Are there separate toilets for boys and girls in the school? (a) No (b) Yes

10. If Yes, what is the ratio of the girl's toilets to the girl's population in the school?

a)1:20-25 b)1:26-30 c) 1:31-45 d) 1:46>

11. What is the ratio of the boy's toilets to the boy's population in the school?

(a) 1:25-30 (b) 1: 31-40 (c) 1: 41-50 (d) 1:51>

12. Is there a distinction between toilets for lower primary and those for upper primary?

(a) Yes (b) No

13. What influence do inadequate toilets have on a school performance?

.....
.....

Section V: Promotion of health and hygiene in the school

14. Is safe water available in the school for drinking and hand washing after visiting the toilet?

a) Available b) not available

15. Are health services available in the school?

a) Available b) Not available

Section V: Nutrition promotion in the school (Please tick/fill where necessary)

16. Are school meals especially lunch available in the school for the pupils?

(a) Available (b) Not available

If available, who sponsors it?

a) parents b) World Food Program (WFP) (c) Non –governmental
Organization (NGO) (d) Any other specify

19. Does the school have adequate instructional material to enhance learning?

(a) Yes (b) No

20. What is the text book pupil ratio in the school?

(a) 1:2 (b) 1:3 (c) 1:4

APPENDIX VI:

QUESTIONNAIRE FOR THE PUPILS

This questionnaire is designed to collect information on the influence of school infrastructure on Kenya certificate of Primary Education performance in Central Division of Machakos County. You are kindly requested to respond truthfully to the questions. All responses will be treated with utmost confidentiality

Section 1: Background Information

Please tick/fill in the spaces provided

1. What is your gender?

Male Female

2. What is your age?

13 years 14 years 15years 16years and above

Section 2: Safe and learner protected environment

4. Are you provided with security and protection when in school?

No yes

If yes, what safety measures are in place in the school?

a) School fence b) No safety measure c) First Aid kit

5. What can you say about the state of the learning environment in the school?

(a) Excellent b) Satisfactory c) Not sure d) Unsatisfactory

(e) Poor

Section 3: School buildings in relation to performance (Please tick/fill where appropriate)

7. Does the school have adequate classrooms to enhance your performance in the Kenya

Certificate of Primary Education?

Yes No

8. If yes, how many pupils are there per class in the school?

(a) 10-40 (b) 41-50 (c) 51-60 (d) Above 60

9. How many pupils sit on one desk?

(a) Two (b) three (c) four

10. Do you have a library available in the school? (a) Available (b) Not available

11. Is there a distinction between toilets for lower primary and those for upper primary?

(a) Yes (b) No

Section V: Promotion of health and hygiene in the school

13. Is safe water available in the school for drinking and hand washing after visiting the toilet?

a) Available b) not available

14. Are health services available in the school?

a) Available b) Not available

Section V: Nutrition promotion in the school (Please tick/fill where necessary)

15. Are school meals especially lunch available in the school for the pupils?

(a) Available (b) Not available

16. If available, who sponsors it?

- a) parents b) World Food Program (WFP) (c) Non –governmental Organization (NGO) (d) Any other specify

17. What is the text book pupil ratio in the school?

- (a) 1:2 (b) 1:3 (c) 1:4

APPENDIX VII

HEAD TEACHERS INTERVIEW GUIDE ON SCHOOL INFRASTRUCTURE.

The interviewer is a post graduate student at the University of Nairobi. You are requested to listen and give relevant answers to the questions. The information you will give will not be disclosed to anybody but will be used for research purposes only. Thank you for accepting to offer the information.

SECTION A.

This section seeks to gather general information. Please feel free to give the relevant information sought for.

1) Gender Male Female

2) What is your academic/professional qualification?

Master degree

Degree

Diploma

P1

Any other (specify)

a) Below 1 For how long have you been a head teacher in the current school?

(a)Below 1 year (b) 1-3 yrs (c) 4-6yrs (d) 7-9 years

(e) Over 10 years

SECTION B

This section seeks to gather information on learner protected school environment, school buildings health and hygiene in schools, nutrition promotion in schools and adequacy of teaching- learning materials all in relation to performance trend in KCPE.

1. Safe and protective learner environment

a) What safety measures are in place in the school?

.....

(b)How can you rate the learning environment in supporting performance?

- (a) Excellent (b) Satisfactory (c) Not sure (d) Unsatisfactory
(e) Poor

2. School buildings in relation to performance

a) Does the school have adequate buildings to enhance pupils' performance in Kenya

Certificate of Primary Education Yes No

(b) How many pupils are there per class in your school?

- (a) 10-40 (b) 41-50 (c) 51-60 (d) over 60pupils

c) What is the average pupil- desk ratio per class (Tick where appropriate)

Class 1-3

1:2 () 1:3() 1:4()

Class 4-6

1:2 () 1:3() 1:4()

Class 7-8

1:2 () 1:3() 1:4()

d) What is the pupil toilet ratio in the school for girls (Tick where appropriate)

a) 1:20-25 b) 1:25-30 c) 1:31-45 d) 1:46>

e) What is the pupil toilet ratio in the school for boys (Tick where appropriate)

a) 1:25-30 b) 1:31-40 c) 1:41-50 d) 1:51>

f) In your own opinion what influence does inadequate toilets have on the school performance?
.....
.....

(g) Does your school have a library?

.....

(h) Where are textbooks and other reference materials kept in the school?

.....

3. Health and hygiene in the school.

a) Does the school have adequate supply of clean water for drinking, hand washing and latrine use (tick one) Yes No

(b) Are health services accessible in the school?
.....

4. Promotion of nutrition in the school

a) Does the school have a feeding program?

Yes No

b) If yes, who sponsors the program?

- a) Parents b) World Food Program c) Non -Governmental Organization
d) Church Organization

c) What is the impact of having a feeding program in the school?

.....
.....

5. Adequacy of teaching learning materials

a) How adequate are the text books and teaching aids in the schools

- a) Inadequate b) Adequate c) More than adequate

b) What is the text book pupil ratio in the various subjects in the school?

Mathematics	1:2 ()	1:3()	1:4()
English	1:2 ()	1:3()	1:4()
Kiswahili	1:2 ()	1:3()	1:4()
Science	1:2 ()	1:3()	1:4()
Social studies	1:2 ()	1:3()	1:4()
CRE	1:2 ()	1:3()	1:4()

c) What impact does the ratio in your school have on the teaching- learning process?

.....
.....

APPENDIX VIII
OBSERVATION SCHEDULE ON SCHOOL INFRASTRUCTURE AND LEARNING
MATERIALS

Location:.....

Number of streams:.....

Learning resources and physical facilities:

a)

Type of materials class is built of	Tick below
Mud wall & grass thatched roof	
Timber wall & iron sheet roofing	
Stone wall& iron sheet roofing	
Bricks &iron sheet roofing	
Iron sheets wall &iron sheet roofing	

(b)Special rooms and amenities (tick were appropriate)

Facility	Excellent	Good	Fair	Poor	Not available
Library					
School hall					
Computer lab					
Kitchen					
Administration block					
Staff room					
Playing field					
Toilet-Boys					
Toilet-Teachers					
Toilet-Girls					
Water point					

Inside the class (Tick where appropriate)

Facility	Excellent	Good	Fair	Poor	Not available
	5	4	3	2	1
Furniture					
Roofing					
Floor					
Ventilation					
Lighting					
Space					
Shutters ie doors, windows					
Wall charts					
Chalkboard					

APPENDIX IX

SAMPLE SIZE FOR TEACHERS PER SCHOOL

School	Total population	Sample size	Total
MumbuniPri school	32	$(32/691) \times 161$	7
Ngelani Pri school	9	$(9/691) \times 161$	2
MutituniPri. School	16	$(16/691) \times 161$	4
KamuthangaPri School	14	$(14/691) \times 161$	3
NgomeniPri school	9	$(9/691) \times 161$	2
MoiPri school	12	$(12/691) \times 161$	3
KathekakaiPri school	21	$(21/691) \times 161$	5
KyanguliPri School	20	$(20/691) \times 161$	5
Mung'alaPri school	20	$(20/691) \times 161$	5
KatelemboPri's school	15	$(15/691) \times 161$	3
KyumbaPri school	14	$(14/691) \times 161$	3
KatoloniPri.School	25	$(25/691) \times 161$	5
KyambukoPri school	13	$(13/691) \times 161$	3
IkokaniPri.school	15	$(15/691) \times 161$	3
KiimaKimwePri. sch	7	$(7/691) \times 161$	2
KyasilaPri school	9	$(9/691) \times 161$	2
KyemuthekePri school	15	$(15/691) \times 161$	3
KimutwaPri school	17	$(17/691) \times 161$	4
Muthinipri school	29	$(29/691) \times 161$	7
Katumanipri school	13	$(13/691) \times 161$	3
Kyenipri school	8	$(8/691) \times 161$	2
Kathayonipri school	14	$(14/691) \times 161$	3
Kivandinipri school	17	$(17/691) \times 161$	4
Kyanzasupri school	7	$(7/691) \times 161$	2
Love pri school	8	$(8/691) \times 161$	2
Baptist pri school	20	$(20/691) \times 161$	5

Mwanyanipri school	11	(11/691) x 161	3
Iluvyapri school	10	(10/691) x 161	2
Township pri school	35	(35/691) x 161	8
Kakindunipri school	7	(7/691) x 161	2
Kasevepri school	10	(10/691) x 161	2
Mikuyupri school	8	(8/691) x 161	2
Miwongonipri school	12	(12/691) x 161	3
Votapri school	10	(10/691) x 161	2
Kasinga primary school	17	(17/691) x 161	4
Kivutinipri school	10	(10/691) x 161	2
Kasainipri school	9	(9/691) x 161	2
Kiteinipri school	13	(13/691) x 161	3
Kithimapri school	8	(8/691) x 161	2
Kwakitaapri school	8	(8/691) x 161	2
Kwakavoopri school	8	(8/691) x 161	2
Kaathipri school	8	(8/691) x 161	2
Kitulupri school	11	(11/691) x 161	3
Mikuinipri school	12	(12/691) x 161	3
Makakoipri school	7	(7/691) x 161	2
Ivumbunipri school	12	(12/691) x 161	3
Kitangapri school	9	(9/691) x 161	2
Kimuapri school	10	(10/691) x 161	2
Kathesepri school	11	(11/691) x 161	3
Kyandapri school	10	(10/691) x 161	2
Keapri school	11	(11/691) x 161	3
Mbukoni pri school	15	(15/691) x 161	3
TOTAL	691	TOTAL	161

APPENDIX X

SAMPLE SIZE OF STANDARD 8 PUPILS

	Total population	Sample size	Total
MumbuniPri school	121	$(121/2660) \times 195$	9
Ngelanipri school	47	$(47/2660) \times 195$	4
MutituniPri. School	68	$(68/2660) \times 195$	5
KamuthangaPri School	70	$(70/2660) \times 195$	5
NgomeniPri school	31	$(31/2660) \times 195$	2
MoiPri school	35	$(35/2660) \times 195$	3
KathekakaiPri school	98	$(98/2660) \times 195$	7
KyanguliPri School	84	$(84/2660) \times 195$	6
Mung'alaPri school	82	$(82/2660) \times 195$	6
KatelemboPri' school	77	$(77/2660) \times 195$	5
KyumbaPri school	17	$(17/2660) \times 195$	1
KatoloniPri.School	66	$(66/2660) \times 195$	5
KyambukoPri school	97	$(97/2660) \times 195$	7
IkokaniPri.school	50	$(50/2660) \times 195$	4
KiimaKimwePri. sch	24	$(24/2660) \times 195$	2
KyasilaPri school	27	$(27/2660) \times 195$	2
KyemuthekePri school	53	$(53/2660) \times 195$	4
KimutwaPri school	63	$(63/2660) \times 195$	5
Muthinipri school	77	$(77/2660) \times 195$	5
Katumanipri school	38	$(38/2660) \times 195$	3
Kyenipri school	27	$(27/2660) \times 195$	2
Kathayonipri school	38	$(38/2660) \times 195$	3
Kivandinipri school	50	$(50/2660) \times 195$	4
Kyanzasupri school	33	$(33/2660) \times 195$	2
Love pri school	41	$(41/2660) \times 195$	3
Baptist pri school	89	$(89/2660) \times 195$	7

Mwanyanipri school	42	$(42/2660) \times 195$	3
Iluvyapri school	46	$(46/2660) \times 195$	3
Township pri school	114	$(114/2660) \times 195$	8
Kakindunipri school	36	$(36/2660) \times 195$	3
Kasevepri school	41	$(41/2660) \times 195$	3
Mikuyupri school	37	$(37/2660) \times 195$	3
Miwongonipri school	22	$(22/2660) \times 195$	2
Votapri school	45	$(45/2660) \times 195$	3
Kasinga primary school	90	$(90/2660) \times 195$	7
Kivutinipri school	28	$(28/2660) \times 195$	2
Kasainipri school	22	$(22/2660) \times 195$	2
Kiteinipri school	57	$(57/2660) \times 195$	4
Kithimapri school	24	$(24/2660) \times 195$	2
Kwakitaapri school	27	$(27/2660) \times 195$	2
Kwakavoopri school	28	$(28/2660) \times 195$	2
Kaathipri school	17	$(17/2660) \times 195$	1
Kitulupri school	33	$(33/2660) \times 195$	2
Mikuinipri school	55	$(55/2660) \times 195$	4
Makakoipri school	24	$(24/2660) \times 195$	2
Ivumbunipri school	77	$(77/2660) \times 195$	5
Kitangapri school	36	$(36/2660) \times 195$	3
Kimuapri school	76	$(76/2660) \times 195$	5
Kathesepri school	28	$(28/2660) \times 195$	2
Kyandapri school	30	$(30/2660) \times 195$	2
Keapri school	62	$(62/2660) \times 195$	5
Mbukoni pri school	60	$(60/2660) \times 195$	4
TOTAL	2660	TOTAL	195

APPENDIX XI:

INTRODUCTORY LETTER



UNIVERSITY OF NAIROBI
COLLEGE OF EDUCATION AND EXTERNAL STUDIES
SCHOOL OF CONTINUING AND DISTANCE EDUCATION
DEPARTMENT OF EXTRA- MURAL STUDIES

Telegram: "VARSITY" NAIROBI
Telephone: 245-020-318262
Telex: 28520Varsity KE

P.O Box 30197 NAIROBI
NAIROBI, KENYA
e-mail: acadreg@uonbi.ac.ke

RE:ANN WAMUYU MWEU REG/ NO L50/67885/2011

The above named is a student at University of Nairobi, College of Education and External Studies, Department of Extra- Mural Studies she is undertaking her Degree Masters of Arts in Project Planning and Management. We authorize her to carry out her research on (*The influence of School Infrastructure on Kenya Certificate of Primary Education Performance in Central Division of Machakos County*).

Any assistance accorded to her is highly appreciated by this Department to enable her compile her final document.

Thanks.

DR.DOROTHY KYALO NDUNGE

SNR-LECTURER –UNIVERSITY OF NAIROBI

RESIDENT LECTURER-GARISSA EMC

