



UNIVERSITY OF NAIROBI

COLLEGE OF EDUCATION AND EXTERNAL STUDIES

DEPARTMENT OF EDUCATIONAL STUDIES

**FACTORS CONTRIBUTING TO POOR PERFORMANCE OF SCIENCE
SUBJECTS: A CASE OF SECONDARY SCHOOLS IN BUSIA COUNTY**

BY

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L40/89947/2016

**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE POST-GRADUATE DIPLOMA IN
EDUCATION**

NOVEMBER 2018

CERTIFICATION

The undersigned certify that she has read and hereby recommend for acceptance to the senate of the University of Nairobi the dissertation entitled: Investigation of the factors that contribute to poor performance in science among students in secondary schools in Busia county: A case of secondary schools in Busia county. This study has been submitted by John Jolif Oduol, in partial fulfillment of the requirement for Post-Graduate Diploma in Education University of Nairobi.

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DECLARATION

I, John Jolif Oduol do hereby declare that this dissertation is my original work and that it has not been presented or submitted and will not be presented to any other university for similar or any other awards.

Signature

Date

DEDICATION

This dissertation is dedicated to my parents, family members and friends who sacrificed a lot and inculcated a positive attitude towards my education.

ACKNOWLEDGEMENT

I owe my special appreciation and gratitude to the following; Firstly, I am grateful to my supervisor who was readily available to guide me from the onset of this dissertation .Her guidance and dedication encouraged me and gave me enthusiasm to continue with my studies. Secondly, I am grateful to the University of Nairobi for considering and approving my research proposal. Thirdly, my family members and friends for their significant contribution, support and encouragement in my schooling .Finally, I thank God for giving me wisdom and perseverance during my studies.

ABSTRACT

This study was conceived on realization that despite previous efforts, performance in science subjects is still poor among secondary school students in Busia County. It set to investigate factors that contribute to poor performance in science subjects among students in secondary schools in Busia County, Kenya. The input – output relationship or education production function was used. The study employed a cross – section research design whereby a total number of 110 students from six schools in the county, 15 students from three schools outside the county and 45 teachers were involved. Data collection was achieved through use of questionnaires and structured interviews. Microsoft Excel and SPSS were tools used to analyze the data collected.

Key words: Factors, Subject, Science Learning Environment, Teaching Materials, Performance and Poor Performance. Main findings of this study showed that factors which affect science subjects' performance are; poor methodology in science education, negative attitude toward science subjects among student, unfavorable home environment and family background, chronic absenteeism emanating from lacks of school fees, admission of weak students at form one entry, inadequate instructional material and physical facilities. It is recommended that the government and private school owners must ensure that the government and private schools are well equipped with necessary materials. Government should reduce parental burden in the provision of curriculum materials and teachers should use modern methods of teaching science subjects in order to motivate and sustain student's interest in science subjects.

TABLE OF CONTENTS

CERTIFICATION	ii
COPYRIGHT	iii
DECLARATION	iv
DEDICATION	v
ACKNOWLEDGEMENT	vi
ABSTRACT.....	vi
LIST OF TABLES	xii
FIGURE	xiii
LIST OF APPENDICES	xiv
ABBREVIATIONS AND ACRONYMS	xv
CHAPTER ONE	1
1.0 INTRODUCTION	1
1.1 Background to the Problem.....	1
1.2 Statement of the research problem.....	2
1.3 Research objectives.....	3
1.3.1 General research objective	3
1.3.2 Specific Research objectives.....	3
1.4 Research Questions	4
1.4.1 General research question	4
1.4.2 Specific Research questions.....	4
1.5 Significance of the research	4
1.6 Scope of the study	4
1.7 Theoretical framework.....	5
1.7.1 Organization of the study	5
1.8 Limitations of the study.....	6

CHAPTER TWO	7
2.0 LITERATURE REVIEW	7
2.1 Introduction.....	7
2.2 Conceptual definitions	7
2.2.1 Factors.....	7
2.2.2 Subject.....	7
2.2.3 Science	7
2.2.4 Learning environment.....	7
2.2.5 Teaching materials	8
2.2.6 Performance	8
2.2.7 Poor performance.....	8
2.3 Theoretical literature review	8
2.3.1 Effects of lack of resources on performance.....	9
2.3.2 Negative attitude and performance	10
2.3.3 Teachers’ competency and performance.....	10
2.3.4 Teacher’s in-service training and performance.....	10
2.3.5 Absenteeism.....	11
2.4 Empirical literature review in the world	11
2.4.1 Empirical literature review in Africa	13
2.4.2 Empirical literature review in Kenya	18
2.5 Research Gap Identified.....	19
2.6 Conceptual framework.....	19
CHAPTER THREE	21
3.0 RESEARCH METHODOLOGY	21
3.1 Introduction.....	21
3.2 Research design	21
3.3 Area of the research	22

3.4 Study Population.....	22
3.5 Sampling design and sample size.....	22
3.6 Data collection methods.....	23
3.7 Data collection tools	24
3.7.1 Structured interviews	24
3.7.2 Questionnaires.....	24
3.8 Reliability and validity of data.....	25
3.8.1 Reliability of data.....	25
3.8.2 Validity of data	25
3.8.3 Ethical considerations	25
3.9 Data processing and analysis	25
CHAPTER FOUR.....	26
4.0 DATA ANALYSIS AND DISCUSSION OF THE FINDINGS	26
4.1 Introduction.....	26
4.2 The analysis of data	26
4.3 Students perceptions on poor performance on science subjects	26
4.3.1 Availability of teaching and learning resources.....	26
4.3.2 Employment status of parents.....	28
4.3.3 Education level of parents.....	30
4.3.4 Students' attitude towards science subjects	31
4.4 Teachers' responses on poor performance in science subjects	31
4.4.1 Teachers' response on availability of resources.....	31
4.4.2 Teachers' response on the teaching and learning environment.....	32
4.4.3 Teachers' responses on difficulties faced in teaching and learning	33
4.4.4 Teachers' response on science curriculum.....	34
4.5 Response of heads of science departments and headteachers on the performance of science subjects	35
4.6 Discussion of the findings.....	36

CHAPTER FIVE	38
5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS	38
5.1 Introduction.....	38
5.2 Summary of the main findings.....	38
5.3 Implications of the findings	38
5.4 Conclusion	40
5.5 Recommendations.....	40
5.6 Suggested areas for further studies	42
REFERENCES	43

LIST OF TABLES

Table 3.1 Sample schools that participated in data collection.....	23
Table 4.1: Availability of teaching and learning resources.....	27
Table 4.2: Students' response on effect by other subjects.....	28
Table 4.3: Students' attitude towards science subjects.....	31
Table 4.4: Teachers' response on availability of resources.....	32
Table 4.5: Teachers' response on the teaching and learning environment..	32
Table 4.6: Teachers' responses on difficulties faced in teaching and learning Science.....	33
Table 4.7: Teachers' response on science curriculum.....	34

LIST OF FIGURES

Figure 2.1 Conceptual framework.....	20
Figure 4.1 Employment status of parents.....	29
Figure 4.2 Employment sectors of parents.....	29
Figure 4.3 Education level of parents.....	30
Figure 4.4 Language preference of students.....	34

LIST OF APPENDICES

Appendix 1: Letter to the Principals of secondary schools from where the data was obtained...	47
Appendix 2 : Students' Questionnaire	48
Appendix 3 : Teachers' Questionnaire	51
Appendix 4 : Teachers' structured interview questions	52
Appendix 5: The performance of school candidates at KCSE level and county level from 2010-2016 in Physics,Biology,Chemistry and C.R.E.....	54

ABBREVIATIONS AND ACRONYMS

CSOS	Civil Society Organizations
FAWE	Forum for African Women Educationalists
FEMSA	Female Education in Mathematics and Science
KCSE	Kenya Certificate of Secondary Education
MDGS	Millennium Development Goals
MOEVT	Ministry of Education and Vocational Training
PEDP	Primary Education Development Plan
SEDP	Secondary Education Development Plan
SMT	Science, Mathematics and Technology
TSC	Teachers Service Commission
LATF	Local Authorities Transfer Fund
CDF	Constituency Development Fund
NECTA	National Examination Council of Tanzania
I C T	Information and Communication Technology

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Problem

Long before the coming of Arabs and Europeans to Africa, the African people had developed their own system of education, although the systems varied from one community to the other, their goals were often strictly similar (Sifuna and Otiende, 1980). At independence in 1963, education was viewed as a means to eradicate poverty, ignorance and diseases from Kenya hence adopted an education system that follows 7-4-2-3. But late in 1983, education system of 8-4-4 was implemented which included eight years of primary education, four years of secondary education and after which students were expected to sit for the Kenya certificate of secondary education examination (KCSE) and later join various tertiary education institutions for specialization in various professions. Such institutions include: universities, technical and vocational institutions, health education colleges, business education institutions and teacher education colleges. The essence of teaching is to bring about a positive change in the behavior, attitude and thinking of the learner. The teaching approach that the teacher adopts in order to bring about this positive change is very important. The traditional teacher-centered lecture (chalk and talk) approach, which emphasizes the transfer of knowledge and skills and rewards memorization, is the predominant teaching format in Kenyan secondary schools as well as most of the sub-Saharan countries (SMASSE 2012). In this approach, the teacher talks most of the time, while a student writes down notes mainly for the purpose of passing exams. This method does not allow much room for critical analysis of issues but it makes students to duplicate the notes given back to the teacher. In this teaching approach, there is very little interaction between the teacher and the students or among the students themselves in the classrooms. Students hardly ask any questions and the teachers rarely provoke students by asking critical questions. Various studies have reported outdated teaching practices and lack of basic content knowledge have resulted in poor teaching standards in secondary schools in Kenya (SMASSE 2012). These poor standards have been contributed extensively by the high number of unqualified teachers who teach in schools which lack the necessary equipment to impart knowledge to the learners. There has been an acute shortage of qualified mathematics and science teachers in secondary schools

since 1960s. This forced the government to train former sixth leavers for few months in order to try and cover this gap. Currently many schools (Boards of Management) are employing Bachelor of Science graduates to teach science subjects in order to reduce teacher shortage problem.

The Kenyan education system faces a major challenge in ensuring quality education to create a competent human resource base. This is clear due to the poor performance of students in examinations, and especially in science subjects. The annual education sector review provides an opportunity for all key stakeholders to assess and contribute to the development of education. Kenyan education network acknowledges that noticeable progress has been made in education in Kenya and that much more remains to be done to meet education for all goals and the millennium development vision 2030 goals and targets. Since science and technology plays a major role in any country's development, the impact of failure in science subjects will heavily affect the economy of that country. In Kenya, we require a clear, well-articulated competence based curriculum, adequate teaching and learning resources and conducive learning environment that will help students develop capabilities, values required, skills and fully maximize their cognitive potential. 'Last year (2017), only 18 percent of the candidates who sat for Biology examination got at least grade C, a drop of more than a half compared to 2015 when 40 percent of candidates attained the grade and in 2014 when 38 percent did the same. In 2016, nearly 50 percent of the candidates recorded grades D and E' Kenyan Daily Nation (2017), October 20th.

History will judge our collective leadership and actions based on the opportunity for the children of Kenya to receive not only education, but an education that truly enables all children to develop the capabilities, values and skills they need to thrive in the 21st century global village. This justifies the importance of ensuring that teaching science in the early years is a foundation for later education.

1.2 Statement of the research problem

The high failure of the learners specifically in the science subjects continues to be a threat in Busia County. Factors leading to poor performance need to be researched as they continue to be detriment of learners of the county. Efforts in trying to improve the performance of science subjects have been witnessed since various efforts have been geared towards improving the pedagogical approach and in shaping of the science subjects curriculum. Such efforts include:

- i. Introduction of **SMASSE** (Strengthening Mathematics and Science Subjects in Secondary School Education) programs in Kenya.
- ii. In-service education, workshops, seminars and training of examiners from science and mathematics teachers.
- iii. Annual science and engineering faire competitions among secondary schools from sub-county level to national level.
- iv. Ministry of education has supplied science course books to all public secondary schools under free or subsidized secondary education system at a ratio of 1:1.

1.3 Research objectives

1.3.1 General research objective

The general objective of this study is to investigate the causes of poor performance of science subjects in secondary schools in Kenya, a case of schools in Busia County.

1.3.2 Specific Research objectives

- (i). To determine school based factors that affect students' performance in sciences in secondary schools in Busia County.
- (ii) To establish student personal factors that affect student performance in sciences in secondary schools in Busia County.
- (iii) To identify the difficulties faced by teachers and students in the teaching and learning of science subjects in Kenyan secondary schools.
- (iv) To establish strategies should be adopted to improve performance in sciences in secondary school in Kenya.

1.4 Research Questions

1.4.1 General research question

What are the factors associated with the poor performance of science subjects in secondary schools in Busia County ?

1.4.2 Specific Research questions

- (i) Do your schools have sufficient teaching and learning materials?
- (ii) What are student personal factors that affect performance in science subjects?
- (iii). which difficulties do teachers and students encounter during the process of teaching and learning science in secondary school?
- (iv). which strategies that should be adopted in order to improve science performance in secondary schools?

1.5 Significance of the research

Science is regarded as a dynamic and important component in the current world. It drives innovations and inventions to higher level .It is through science that technology is enhanced to tackle most of daily challenges.

This study identifies major causes of poor performance in science subjects in secondary schools and suggests major remedies to be taken to save the situation.

1.6 Scope of the study

This study aimed at identifying the factors that cause poor performance among students in science subjects in secondary schools and recommend possible solutions. It examined various factors such as; availability of teaching and learning materials which includes text books and other resources, frequency of practical science lessons in a well-equipped laboratory, availability of these laboratory equipment ,availability of well trained and qualified laboratory technicians, curriculum implementation, syllabus coverage and teachers' qualification.

1.7 Theoretical framework

The study of science is not usually theoretical. Students need to be exposed in practical activities whereby they are supposed to carry out experiments on their own and draw conclusions. The performance depends with every step in the learning process. If the teachers are not competent enough they will not be able to implement the syllabi therefore the content taught will not be what is expected and the methodology will not be appropriate hence the poor performance. It is a two way process; the wrong interpretation of the syllabus will lead to poor results and if the syllabus is not appropriate to the level of learners, they will not be able to apprehend. Lack of enough resources and materials including text books and laboratory equipment, lack of students' exposure to model examination questions which are set according to the KNEC format contributes a lot to poor performance of science subjects in secondary schools.

Among the variables measured in the study are; Teachers' and students' perception towards the science subjects ,students personal effects ,academic environmental conditions and availability of the resources to be used .The resources that will be examined include the textbooks , laboratory equipment, the experiments that are carried on in these laboratories and the quality of examinations administered to these students.

1.7.1 Organization of the study

This study comprises of five chapters. Chapter one contains the introduction where the background of the problem is discussed and objectives of the study stated. Chapter two contains the review of literature where various literatures are reviewed concerning similar studies done in the past, the methodologies and findings in relation to this study. Chapter three discusses research design and methodology. This chapter describes methods used to collect data and analyze the data. It indicates the sampling methods used and how the sample was chosen. Chapter four of this study shows data analysis and discussion of the findings of the study. Chapter five gives the summary, conclusion and the recommendations of the findings. It is in this chapter the researcher gives his own recommendations.

1.8 Limitations of the study

School head teachers and some heads of science departments were not giving accurate information for fear of intimidation on misappropriation of school funds.

Some students in these schools had no idea on practical since they had never stepped or done any experiment in a science laboratory. When responding to the questionnaires, they had a definite answer since they had less experience to handle the equipment.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter reviews Literature on science subjects, Literature on teaching and learning science subjects with resultant performance. The Literature focuses on; Effect of inadequate resources on performance, effect of negative attitude to performance, teachers competence and performance , importance of teachers in-service training and performance finally ,the effect of absenteeism on performance.

2.2 Conceptual definitions

2.2.1 Factors

In this study, *factors* are defined as those elements that can lead to a student to perform poorly in science subjects.

2.2.2 Subject

This is a branch of study. For this research, the subjects are Physics, Biology and Chemistry.

2.2.3 Science

The word *science* comes from Latin word *Scientia*, which means knowledge. It is a systematic enterprise that builds and organizes knowledge in a form of testable explanations and predictions. In modern usage science often refers to a way of pursuing knowledge itself. Science also refers to a body of knowledge itself, of the type that can be rationally explained and reliably applied. A practitioner of science is known as a scientist, Butts D.P (1977).

2.2.4 Learning environment

The *learning environment* includes all the facilities and infrastructure available at the place where the school is located and all that can be found within the school surroundings. For the case of this study, the learning environment refers to the physical location, teaching delivery as well as approaches to learning whereas the term infrastructure is used to refer to things such as classrooms, furniture, laboratory and the library, Chonjo et al (1996).

2.2.5 Teaching materials

These are instructional materials used to support students and teachers in the whole process of teaching and learning. They include; text books, schemes of work, lesson plans and other related resources responsible in facilitating the teaching and learning process, Chonjo et al (1996).

2.2.4 Performance

Performance is the accomplishment of a given task measured against preset standards of accuracy, completeness, cost and speed. Performance in education is always accompanied by an academic certificate to show that the performer has successfully completed the grade or course and has attained the stated grades, Butts (1977).

2.2.5 Poor performance

In this study, *poor performance* means underperforming in sciences or not meeting the minimum requirement.

2.3 Theoretical literature review

Several projects have been working in trying to provide solutions to the causes of poor performance in science subjects in secondary schools an example is the work by Female Education in Mathematics and Science (FEMSA) in Africa. FEMSA was a project under the Forum for African Women Educationalists (FAWE). The project was designed to attract more women into science, mathematics and Technology (SMT).

This targeted girls schools in special pilot areas, which included: Some of them include ; Chakol Girls in Busia County, Ng'inya Girls in Siaya County and Bunyore Girls in Vihiga County. A number of publications have been produced and have presented success and recommended the following; Government should improve equity of distribution of educational facilities throughout the country, it should design subject and examine syllabi taking into account the resources and facilities available in the country so that no school remain disadvantaged by having difficulties following set syllabi that call for use of materials and resources that are unavailable in their school. The drawbacks of these projects are due to the fact that they only concentrated on girls' performance whereby the conclusion was not applicable to all cases.

In his study, Siwel (2008) revealed that there is a close relationship between subject preference and performance. On one side, preference was found to be a factor of performance while on the other hand subject performance influenced preference, so the two variables were found to be independent, each being pre disposed to become dependent or independent variable of the other. The researcher concluded that, preference and poor performance in science subjects were linked to the following factors: Students characteristics, subjects being optional, teachers' characteristics, lack of proper guidance and counseling to students and shortage of teaching and learning materials. It is evident that the performance of science subjects in secondary schools in Kenya has been on the decline, as reported by the ministry of Education and Vocational Training in the recent years.

The percentage of the students who scored grades C to A has been very low in science subjects compared to non-science subjects as observed from appendix 5. The performance has been on the decline since 2016 onwards especially in science subjects. This study will seek to establish the possible root causes of this poor performance in our secondary schools as well as propose solutions to this problem based on the findings. It is widely acknowledged that children's academic achievement is influenced by their home and family background, family income, parental education and occupation, basic home amenities as well as cultural and psychological factors. They have all been studied for their influence on children's academic performance, Kibga (2004).

2.3.2 Effects of lack of resources on performance

Inadequate resources such as test books, physical infrastructure and laboratory has made learners loose interest in the subjects hence poor performance .Schools that have inadequate infrastructural and human resources perform poorly. Learners are taught in theory. It also limits written work as the teacher cannot give assignment because learners share books. Availability of practical lessons classifies and reinforces scientific concepts. It further enhances learners interest in science, increases their manipulative skills and memory of the content. Makes the subject relevant ,helps the learners to acquire skills, it promotes discipline and also assist them in solving problems. Poor capital investment in terms of provision of science learning resources contribute to students low level of academic achievement, Munda(2000).

2.3.3 Negative attitude and performance

Attitude is defined as an idea or thought that is based on certain situation which can indicate persons' like or dislike of an item. Studies show that the general public (non-science majors) does not generally have positive feelings towards science and scientists (Rogers & Ford 1997). They furthermore identify attitude in three categories which are positive, negative and neutral. It is also a mental readiness for certain action which dictates what a person will see, hear, think or do. Positive attitude leads to interest in the subject and interest lead to commitment and yearning for academic achievement. Constructs of attitude are; the perception of science teacher, anxiety towards science, value of science. Self-esteem in respect to science, motivation towards science, attitude of parents towards science, nature of classroom environment, attitude of peer and friends towards science, achievement of science and fear of failure of the course.

2.3.4 Teachers' competency and performance

The impact of the teachers on performance in any subject is very high. The teachers are the facilitators who are to impact the theories and concepts into the students. The teacher is the major manpower saddled with the responsibility of imparting the concepts considered fundamental to technology through the teaching of these basic concepts in the secondary schools. This was why Adeniyi (1993), noted in his study that a country's manpower development depends on the quantity of her well qualified teachers.

The objectives of the education sector of any country cannot be attained when the students are taught by incompetent teachers. Such teachers would not be able to properly and adequately disseminate the concepts to the students. The professional qualities of a well-trained teacher Ajayi (2009), include: Mastery of the subject matter, sense of organization, ability to clarify ideas, ability to motivate students, good imagination, ability to involve the students in meaningful activities throughout the period of teaching, management of the details of learning and frequent monitoring of students' progress through tests and examinations.

2.3.5 Teacher's in-service training and performance

There exists a correlation between the teacher's content knowledge and student academic performance N. Goga(2007), state that teachers play a central role in the effective dispensation of the curriculum. This is emphasized by Okhiku (2005), when he says 'quality of education cannot

exceed quality of a teacher'. The research show that learners taught by unqualified teacher or qualified teachers who do not understand the nature of science that has to be taught produce poor results.

2.3.6 Absenteeism

Absenteeism or being absent means not being in a particular place at a particular time as expected. Weidenman define absenteeism as being absent for the entire day or being absent for the part of the day .Absenteeism is both imperative to both the teacher and the learner. Weiden et al (2007.4) categorizes causes of absenteeism as: Personal factors such as illness, age, gender and learning difficulties .Socio-economic factors such as insufficient food, insecurity, transport problems, teenage pregnancy and child labor. School-based factors such as poor learner-educator relationships and poor facilities.

Absenteeism of a teacher from a school or class may be the cause of poor learners' performance. Such teachers do not cover the syllabus, they don't honor the due dates and they do not give remedial teaching in respect to poor performance.

2.4 Empirical literature review in the world

Research on analysis of factors affecting learner's science achievement (Fabio and Laura 2010) in Italy aimed to examine the relationship between contextual factors at the school level and learners' level and the proficiency scores for science achievement. In the findings 34%of the total variance accounted for is between schools and that the school teacher factors analyzed do not significantly affect student performance in science.The researcher found that non-native students with less cultural resources affects science performance negatively, Furthermore students' performance depends on students positive attitude and self-confidence. The researcher also concluded that teachers can improve students' confidence and self-efficacy by rules of specific teaching methods such as engaging students in creative manner, collaborative learning and inquiry-based activities (Fendr scheel, 2005)

In Wawason Open University a study entitled *Do previous education level, age group and course load matter?* (Liew and Teoh).The objective of the study was to examine whether the students' age or their prior formal education moderated by the semester course load could

influence their performance .Grade Point Average (GPA) of each student in each semester was used to measure their performance .GPA is calculated by dividing the total amount of grade points earned by the total amount of credit hours attempted .The outcome of the study revealed that the number of course registered by each student from different academic backgrounds and age had little significance on the Grade Point Average ,however academic background significantly affect their Grade Point Average.

Department of Mathematics in Barbhag college India in Assam (India Karuna, 2009) in his research *Secondary School Education in Assam India with special reference to Mathematics*, in his study he revealed that mathematics performances of schools are positively correlated with the academic performance of a school indicated by school leaving pass percentage and with the performances in subjects other than mathematics. He also suggested that, student teacher ratio seems not to affect the mathematics performance. Socio-political disturbances involving youth of this region are considered as a yardstick of educational performance then analysis of the existing education system prevailing in this region is imperative. The objectives of his study were; to investigate the academic scenario of secondary schools in Assam with special reference to (i) age (ii) management (iii) teacher student ratio and (iv) result of 10th standard school leaving examination, to compare academic performance in mathematics subject with performances in other subjects of secondary schools as reflected by the scores of students' class examination and to investigate the dependency of students' mathematical performance on some relevant academic environmental factors prevailing in secondary schools in the region. In his conclusion, the financial and managerial status of the schools seems to be the major factors influencing academic performance. Appropriate secondary school knowledge backed by perfect learning in mathematics can make the students competent for future careers.

In the USA, Belinda (2010), carried out a research; academic failure in secondary schools. Her research explores whether the interplay of health problems and school environment predicts academic failure. The study also investigates the connection between health and education in adolescence. The researcher aimed at determining students preferences for science subjects, establish the relationship between students' preference and performance on science subjects, identify the effect of preference on performance then suggest ways to improve such relationship in order to enhance better academic performance and reinforce students' interests on

preferences in science subjects. The researcher recommends that guidance and counseling should be offered to the students particularly to those aspects which affect the future. The government should make science subjects compulsory so as to avoid the possibility of losing some potential future scientists who might have dropped optional subjects and schools are to be guaranteed of enough teaching and learning resources like text books, laboratory equipment and other facilities to make the learning conducive Belinda (2010).

In the United Kingdom, Sutton (2011), in a research titled; improving the impact of teachers on pupil achievement in UK recommended that, improving the effectiveness of teachers would have a major impact on the performance of the country's schools, increasing the attainment of children across the education system. Teachers are by far the biggest resource in schools. Research has found that teachers are the most important factor within schools that policy makers can directly affect to improve student achievement. Having a very effective rather than an average teacher improves pupil's attainment

2.4.1 Empirical literature review in Africa

A similar study has been carried out in Nigeria, Jerry (2009), where the performance in science subjects was very poor in the secondary schools. Among the factors that contributed to this poor performance were; Inadequate learning facilities in the secondary schools which include science equipment and laboratories, shortage of qualified and devoted instructors, lack of ability of the scholars to do well in practical and the teaching methodology used by the teachers, Akinola (2006). Most of the text books used in secondary schools are written by foreign authors who use complex language which is difficult for the learners to comprehend.

In Malawi, poor performance in science subjects has been in the decline due to the following factors: lack of science equipment, lack of enough and quality text books, perception that science subjects are hard, student's laziness and too little time allocated to practical lessons (Dzana, 2012).

In South Africa a study on factors associated with high school learner's poor performance (Andile & Moses, 2011) where education and training during apartheid was characterized by the underdevelopment of human potential and that of blacks in particular.

The teaching and learning of mathematics, science and technology were the hardest hit (Department of Education, DOE, 2001). The researchers classified the factors that led to poor performance into two; direct influences which include: Teaching strategies, content knowledge and understanding, motivation and interest, laboratory usage and syllabus non completion. The indirect influences include parental roles and language, Thomas & Pedersen (2003), argues that a common maxim in the educational profession is that one teaches the way he was taught. This suggests that, for example an educator who was educated in an incompetent manner will have learnt bad practice and is likely to use such in teaching others. These factors relate to this study since the factors are similar despite the environment. Students' and teachers' perception on the causes of poor academic performance in Ogun state secondary schools in Nigeria Asikhia (2009). This study examined the perception of students and teachers on the causes of poor performance among secondary school students in Ogun state, Nigeria.

Responses of teachers showed that teachers qualification and students environment do not influence students poor performance but teachers' methods of teaching influences poor academic performance. Student's response on the other hand showed that teacher's methods of teaching and learning materials contributes to poor performance. The variables that were identified in the study for research questions and data collection instruments were; student's poor or academic performance and teachers' qualifications, students poor academic performance and teachers method of teaching and students environment and poor academic performance. These factors form a basis for comparison with the factors causing poor performance among students in secondary schools in Tanzania.

Students preferences in science subjects; does this affect their performance? Siwel&Kizito, (2008), a case of Udzungwa secondary school, kilolo, Iringa,Tanzania. Their study sought to investigate factors influencing students' preferences on science subjects. The study aimed to determine students' preferences for science subjects establish the relationship between students' preference and performance on science subjects, identify the effect of preference on performance then suggest ways to improve such relationship in order to enhance better academic performance and reinforce students' interests or preferences in science subjects.

The researchers concluded that guidance and counseling should be offered to the students particularly to those aspects which affect their future and should not be given too much freedom to opt on the issues that affect their future ,the government should make science subjects compulsory so as to avoid the possibility of losing some potential future scientists who might have dropped optional subjects and schools are to be guaranteed of enough teaching/learning facilities like books, laboratory tools and other facilities to make learning conducive. These factors are related to the factors being investigated in the current study that are most likely going to cause poor performance in science subjects in secondary schools in Tanzania.

Factors influencing students' academic performance in community and government built secondary schools, (Mlozi and Nyamba, 2008), a case of Mbeya municipality, Tanzania. The research assessed the adequacy of school inputs, examined the learning processes in schools, compared students' academic performance in form 2 and 4 national examination results in 2006-2008, and explored people's perceptions on community funded secondary schools. In their findings, there were no enough teaching and learning materials, teaching and learning processes were poor especially in the community funded secondary schools. Availability of facilities in the schools did not match with the number of students. Teaching was dominated by a mixture of English with Kiswahili whereas the exam was set in English language. Their findings showed that academic performance of community funded secondary schools were poorer than government built secondary schools in form 2 and form 4 national examinations from 2006 to 2008. The researchers recommended that the government should increase the number of teachers, provide teaching / learning materials such as text books, laboratories and classrooms. Their findings are relevant to this research since the factors identified are similar to the factors that contribute to poor performance in science subjects in secondary schools in Busia County.

In a case of selected schools in Moshi district, Tanzania (Cyril & Lucas, 2010), in their research: Factors influencing academic performance in ward secondary schools. The focus of their study was the link between education providers, facilitators and learning environment, which included all facilities and infrastructure, availability of materials and performance of ward secondary schools at the district level.

The study found out that there was no impressive performance among ward secondary schools in the district. Some of the challenges that limit their performance include: limited number of teachers per subject compared to the number of students, lack of conducive teaching and learning environment and shortage of teaching and learning materials. Other factors that were associated with this performance was lack of well stocked libraries and laboratories, poor communication between teachers, parents and students and poor classroom attendance by teachers and students as well. According to their findings they concluded that there is need to collect more information in order to have a good generalization and better understanding of factors affecting academic performance in the ward secondary schools in Tanzania. In the department of Education psychology and curriculum studies UDSM, (Mkumbo, 2010), and Haki Elimu Tanzania, carried out a research; Relationship between examination practice and curriculum objectives in Tanzania. Tanzania follows a competency based curriculum where use of textual materials (poor or low) is a problem to the implementation of this kind of curriculum. The researchers used the following tools to collect data; Content analysis of curriculum materials and examination papers to establish the linkage and synergies between the two aspects of education processes in Tanzania. Focus group discussions, this was done with teachers who have been involved in setting, invigilating and marking examinations as well as subject teachers.

The focus group discussions explored how these informants perceive examination processes in Tanzania and how these are linked to the implementation of the curriculum. A questionnaire was used for the purpose of soliciting views and opinions of teachers on the linkage between curriculum practice and examination performance. One interview was conducted with a senior official working with NECTA. According to the study, the resources used to implement the competency based curriculum should be effective; textbooks, modules and manuals, reference books, charts and maps, newspapers and journals. Teachers should be encouraged to use ICT facilities in schools, use of scientific and creative teaching facilities such as samples, actual materials, prototypes and laboratory apparatus. These results are relevant to this study since they are similar factors being investigated believed to cause poor performance among students in science related subjects in secondary schools. Students' preferences on science subjects: Does this affect their performance? A case of Udzungwa secondary school, Kilolo, Iringa, Tanzania, Siwel & Kizito, (2012).

Their study arose from the fact that over the years students have shown marked differences on their interest to study science subjects. Specifically, they aimed at determining the students preferences for science subjects, examine both teachers and students perception on students preferences on science subjects, establish the relationship between students' preference and performance on science subjects, identify the effect of preference on performance then suggest ways to improve such relationship in order to enhance better academic performance and to reinforce students' interest or preferences in science subjects.

The researchers found out that the common reasons for student's preference and poor performance on science subjects at ordinary level in secondary schools included: age of learners, sex, ignorance, shortage of learning materials, gender bias by subject teachers and lack of guidance to students on the future importance of science. The researchers recommended that secondary schools be guaranteed of enough teaching/learning facilities like books, laboratory tools and other facilities to make learning conducive. These are similar factors that contribute to the current trend in science subjects in Kenyan secondary schools currently.

2.4.3 Empirical literature review in Kenya

Wabuke,(2009),in her study *The role of student-related factors in the performance of Biology subject in secondary schools in Eldoret municipality* carried out a research targeting secondary schools in Eldoret municipality .She sampled ten secondary schools and the target respondents were form three students and teachers of Biology(those teaching form three) . The researcher found that student-related factors affecting performance of Biology in the municipality are; primary school science which provides a requisite background for Biology at secondary school level, interest in Biology (theory and practical) provides a force for learners to participate in the learning process, their ability to carry out the practical effectively, students' ambition and attitude towards Biology, availability of reading materials, student using study timetables to organize their work, study discussion groups, science symposiums, field trips and exhibitions. On the contrary, the study also established that absenteeism, indiscipline and truancy in students posts poor performance.

The relationship between availability of teaching/ learning resources and performance in secondary school science subjects in Eldoret municipality, Kenya, (Ambogo, 2010). In his study, he examined the relationship between availability of both human and non-human resources for teaching/ learning and performance in the science subjects in Kenya Certificate of Secondary Education (KCSE) examination. From his findings availability of text books, laboratory chemicals and equipment was higher in the high performing schools than in the low performing schools. The findings show that two out of the seven low performing schools that had a science laboratory, all the five low performing schools that had a science laboratory did not have a laboratory technician and only one was fully equipped. There were differences in the availability of teaching and learning resources. The author recommended that the ministry of Education should initiate more training programs in provision, improvisation and utilization of teaching/learning resources and should help enhance the ongoing science programs like SMASSE.

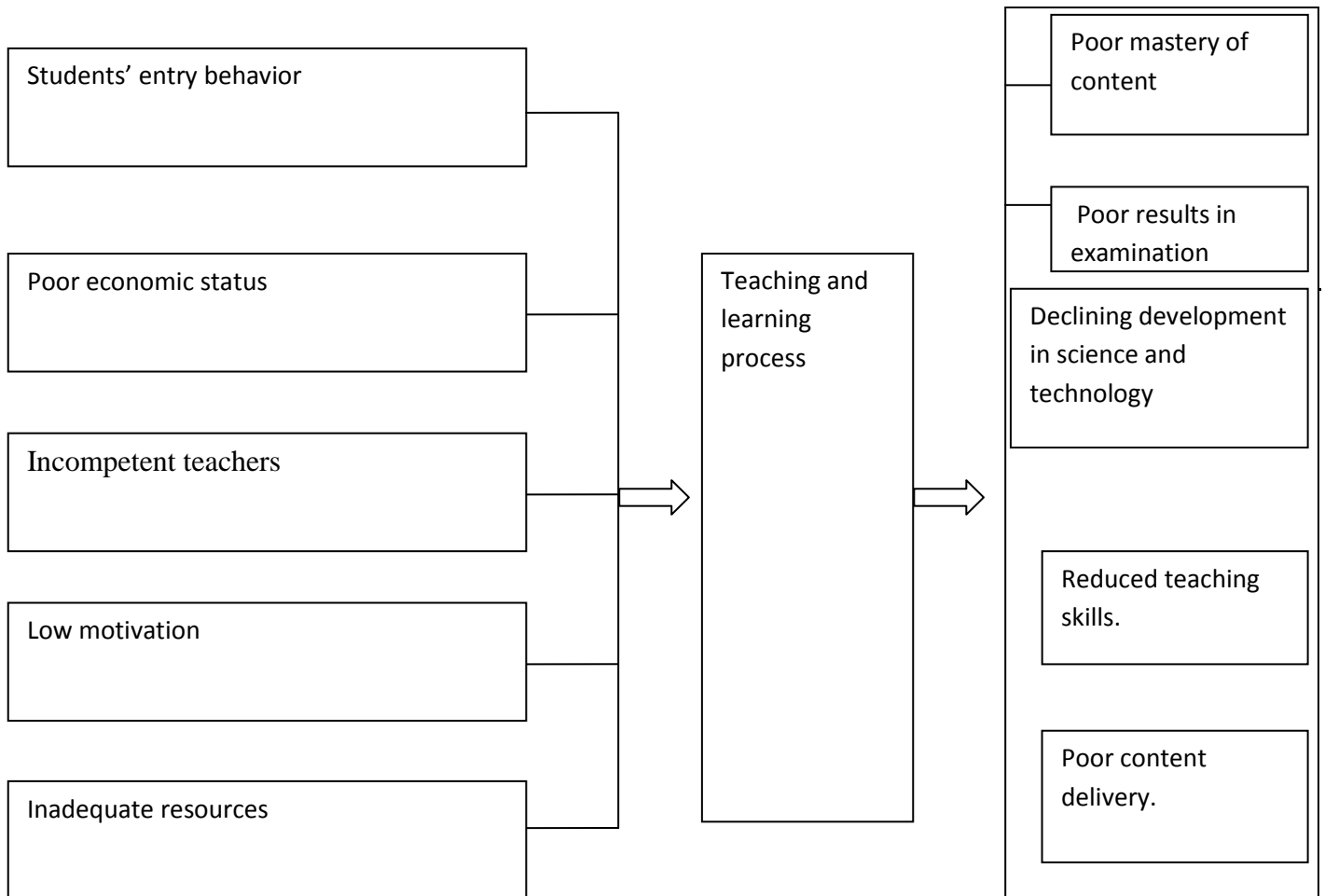
2.5 Research Gap Identified.

Other than Poor performance of students in science subjects in secondary schools ,there is a great concern in mathematics performance that need to be solved .For the previous 5 years; 2013,2014,2015,2016and 2017 average mean score at national level has been below 30% and nearly 90% of students scored below grade C in 2016(Daily Nation2017,October 20 .Nation Media Group Ltd)

2.6 Conceptual framework

Conceptual framework below illustrates factors affecting performance and resultant effects during teaching and learning process .The factors can be grouped into student factors, socio economic factors and school based factors. Inadequate stationary such as books in schools leads to poor students' mastery content, inadequate laboratory rooms and equipment leads to poor examination results, students negative attitude declines development in science and technology, incompetent teachers reduces teaching skills and lack of in-service training leads to poor content delivery. The intervening factor is government policy.

Figure 2.1 conceptual framework on factors contributing to poor performance of science subjects in secondary schools.



CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methodology and procedure that the researcher adopted in the study. The areas discussed included research design, target population size and sampling techniques, data collection instruments, validity of the instruments, reliability of instruments, data collection procedures and data collection techniques.

3.2 Research design

This study used both primary and secondary sources of data. Primary data was obtained through questionnaires while secondary data was obtained from other sources such as National examinations body and the ministry of education offices at county level. The study was designed with the objective of establishing the causes of poor performance in science subjects with Busia county secondary schools as a reference. The study involved designing of students' questionnaires which were answered by the science students in the selected secondary schools. Teachers were also given questionnaires and interviews were conducted with the heads of science departments and head teachers of the sample schools. The same questionnaires were given to other three selected schools outside the study area and were filled by science students of the same level and their teachers and interviews were conducted with the heads of the science departments of the selected schools. Investigative research approach was adopted where science students and science teachers were involved. The strength of investigative research in this study lies on its applicability in curriculum implementation in a secondary school context. In addition, investigative research will give the researcher an opportunity to realize the appropriate structuring and organization of effective teaching and learning of science subjects in secondary schools.

3.3 Area of the research

This research was conducted in Busia County in Kenyan western region. The research was conducted in an area where we have a mixture of schools; both public and private secondary out of which can be grouped into County, extra-county and national schools or government and non-government secondary schools.

3.4 Study Population

The Participant schools were drawn from six schools; Butula boys (national boys school), Nangina girls (extra-county girls school), Busibi girls (county girls day school), Budalangi boys (county mixed boarding school), Musoma secondary (county mixed day school) and Bunyala Model secondary (private school). The schools were selected through random sampling taking into consideration the availability of science laboratories and other learning materials in schools. The population included secondary students and teachers. A sample of 110 students and 45 teachers participated. Cluster sampling was used to provide the researcher with a cross sectional population study which might have influenced the findings due to availability of extra learning materials like text books at home.

3.5 Sampling design and sample size

Sampling design covers all aspects of how the samples in the study was specified and selected. Sample size determination is the act of choosing the number of observations to be included in the statistical sample. A cross sectional research design was used to collect data at a single point of time. The study population involved forms four, form three science students, science teachers and the heads of science departments in the selected schools as shown in table 3.1

The researcher wrote letters to the principals of the schools that participated requesting permission to conduct research in respective schools. Pilot testing was done using form one and two students (appendix 1)

Table 3.1: Sample size

Name of the school	Number of students	
	Boys	Girls
Butula boys	17	-
Nagina girls	-	15
Budalangi secondary	08	15
Bunyala model school	15	10
Busibi girls	-	08
Musoma secondary	15	07
TOTAL	55	55

Source: Field data

Busia County has a total of 92 Secondary schools; 11 are private secondary schools and 81 are public (government and ward) secondary schools. 10% of the private secondary schools and 5% of the public schools were selected to comprise the sample of the whole population. The selected students were involved in this research through answering a questionnaire. The science students and the science teachers from these schools answered questionnaires and the heads of science departments were interviewed. Nine schools (six schools from Busia county and three schools outside the county) participated in data collection. Three teachers from every science subject, heads of science department from each school and head teachers (principals) gives a total of 45 teachers who participated.

3.6 Data collection methods

This study required both secondary and primary data. The secondary data was obtained from the ministry of education and vocational training on the analysis of quality of performance of all school candidates in the science subjects. The primary data was obtained from the sample population after they answered the questionnaires and participated in the interviews.

3.7 Data collection tools

This study employed two major tools to collect the relevant data; structured interviews and questionnaires; science teachers and heads of science departments and head teacher or principals in the various schools were interviewed while the students answered the questionnaires.

3.7.1 Structured interviews

A structured interview is essentially a questionnaire which is mediated or administered by the researcher. In this study, the structured interview was used to increase response rates and to help the researcher get an in-depth understanding of the student's responses in the questionnaires. Interview schedules were conducted with the participants of the sample group. This helped the researcher to determine the motivation level that makes students opt for science subjects instead of other art related subjects. This study aimed at interviewing science teachers and heads of science departments of the selected secondary schools within the county. The aim of these interviews was to establish the main cause of poor performance of science subjects and get their views regarding what should be done in order to improve the performance. Some of the advantages of interviews are; They enabled the researcher to obtain useful information about personal feelings, perceptions and opinions, they also gave room for more detailed questions to be asked, they enhanced a high respond rate, the respondents' own words were recorded, and it was easy to clarify ambiguities and follow the incomplete answers. The disadvantages include; They at time consume a lot of time during setting up, interviewing, feedback and reporting is a long process, they tend to be costly and the interviewer may understand and translate the interview in a different way.

3.7.2 Questionnaires

Questionnaires were prepared for the participants to collect data on the students and teachers .They were preferred since they are not time consuming and are easy to administer to a large population. They also simplified the task of categorizing, tabulating and summarizing reactions or responses from the respondents. Questionnaires contained both open ended items and closed ended ones.

3.8 Reliability and validity of data

3.8.1 Reliability of data

Reliability is the degree to which an assessment tool produces stable and constant results. The idea behind reliability is that any significant results must be more than a one off finding and be inherently repeatable. Other researchers must be able to perform exactly the same experiment under the same conditions and generate the same results (Moskal et al, 2000).

3.8.2 Validity of data

Validity refers to how well a test measures what it is purported to measure. Validity encompasses the entire experimental concept and establishes whether the results obtained meet all the requirements of the scientific research method. To test the reliability and validity of the data, the same questionnaires were taken to other three selected schools, outside the research area. The students and teachers filled the questionnaires and the results were compared to ensure that the results were replicable if applied elsewhere. This was in order to ensure that there is consistency with the results if a similar methodology is used elsewhere. The three schools were; Kisumu boys (Kisumu), St. Joseph boys (Kitale) and Marel academy (Bungoma). The schools were chosen from different Counties. Five students (two in form three and three in form four) from each school participated in data collection. With the help of the Principals, the data was collected on 11/6/2018, 18/6/2018 and 25/6/2018 respectively.

3.8.3 Ethical considerations

Ethical consideration was ensured by obtaining permission from principals of participant schools (appendix 1). The information was relayed to heads of science departments, teachers and students. The schools were ensured that the research was not going to disturb their normal teaching and learning proceedings.

3.9 Data processing and analysis

Qualitative data analysis was used to analyze the data collected. Statistical analysis and calculations were done through the computer program of SPSS and MS-Office excel data analysis package. The next chapter presents detailed data analysis and discussion of the findings.

CHAPTER FOUR

4.0 DATA ANALYSIS AND DISCUSSION OF THE FINDINGS

4.1 Introduction

This chapter presents the data analysis and discussion of the findings of the study on investigation of the factors that contribute to poor performance in science subjects among students in secondary schools in Kenya with focus to Busia County.

4.2 The analysis of data

Qualitative data collected through the questionnaires and the structured interviews was analyzed through the computer program of SPSS and MS-Office Excel data analysis package.

4.3 Students perceptions on poor performance on science subjects

4.3.1 Availability of teaching and learning resources

Table 4.1: Resources available at home and school

The table below indicates items and resources that may assist learners and teachers at home and at school. The learner and the teacher had to indicate with a 'yes' if the resources were available or with a 'no' if the resource was not available.

Resources available at home and school

Home	School
Water	Teachers
Electricity	Laboratories
Radio	Textbooks
Sufficient food	Library
Television	Computers with internet
Computer	Enough classrooms
Study room	Electricity
Motorcar	Supplementary revision materials
Books	

The data obtained about resources at home was that; 21.8% (24 students) take clean treated water, 13.6% (15 students) have electricity, 22.7% (25 students) have televisions, 4.5% (5 students) are accessed to computer, 8.2% (9 students) are accessed to a motor vehicle 45.5% (50 students) have study rooms, 98.2% (108 students) have radio and 96.4% (106 students) can afford basic food. These findings showed that learners do not have luxury resources to enhance their learning at home. Therefore they are unable to improve their knowledge except when they are at school where most schools have resources.

Table 4.2: students' response on availability of teaching and learning resources at school

Rating	Frequency	Percent
Strongly disagree	14	12.7
Disagree	20	18.2
No opinion	18	16.4
Agree	25	22.4
Strongly agree	33	30.0
Total	110	100

Source: Field data

The highest percentage (30.0%) of the students who answered the questionnaires strongly agreed that the poor performance which is being experienced now is due to lack of resources the laboratories are not well equipped and the books are also not enough. The teachers also cited these as major factors since students and teachers lack the relevant information they require in order to enable them perform well in their examinations. The text books are not enough and the supplementary books were not available even in the schools that had a library.

Science subjects are adversely affected by other subjects. This is due to the fact that science subjects are not given extra lessons in the timetable as compared to subjects like languages (Kiswahili and English). Therefore the curriculum designers should adjust this in consideration of the practical part of these subjects.

Questionnaire to the students examined the social-economic backgrounds of the learners .The following aspects were investigated; the employment status of parents, sectors where parents were employed and education level of parents

4.3.2 The employment status of the parent

Figure 4.1 indicates the employment status of the parents of the learners. Out of 110 students; parents of 32 students (29%) were employed while parents of 78 (71%) students were not employed.

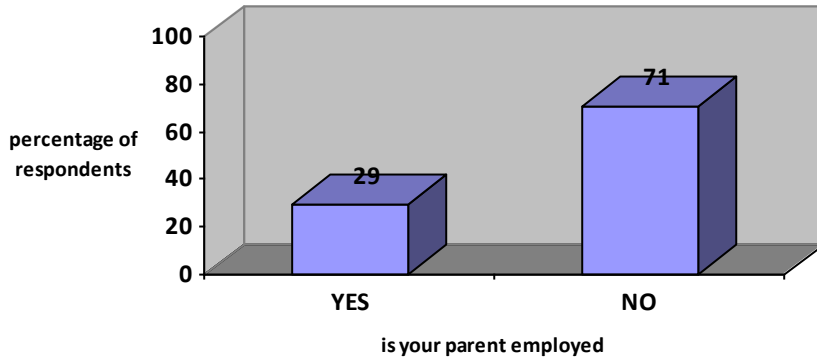


Figure 4.1 Employment status of parents

The employment status of the parents from the figure above implies that majority of the learners come from poor families where there is no constant income hence learners struggle to afford some educational expenses such as buying study material and trips.

Sectors where parents are employed are shown below.

Figure 4.2 indicates different sectors where parents of the participants are employed

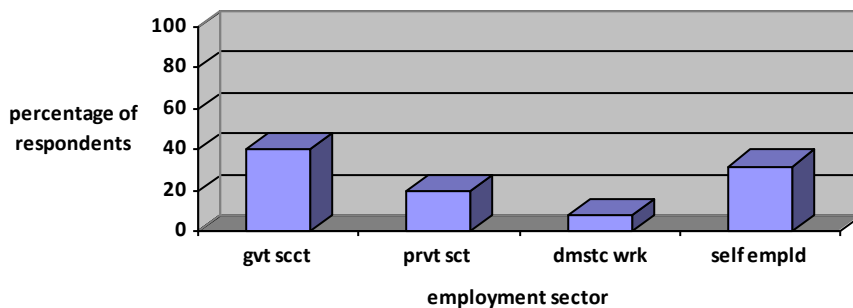


Figure 4.2 Employment sectors

Feedback from participants indicates that among the employed parents, 40% are employed by the government, 20% in private sectors, 08% as domestic workers and 32% are self-employed. This emphasizes the incidence of poverty because most of the parents don't have formal or consistent income.

4.3.3 Education level of parents

The graph below represents educational level of the respondent students' parents

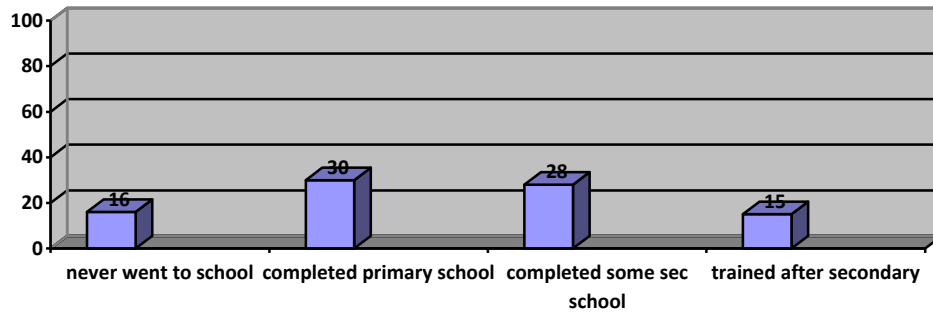


Figure 4.3 Education levels of parents

Feedback from student participants indicated that 16% of their parents never went to school, 30% completed primary school, 28% learned at secondary school to a given level, 15% were trained after secondary school and 11% of the respondents were not sure of the academic level of their parents. From the data more than 50% of the parents had not gone beyond secondary education meaning that they have lower insight towards education.

4.3.4 Students' attitude towards science subjects

Table 4.3 : Students' attitude towards science subjects

Rating	Frequency	Percent
Strongly disagree	21	19.1
Disagree	15	13.6
No opinion	20	18.2
Agree	27	24.5
Strongly	27	24.5
Total	110	100

Source: Field data

The highest percentage (24.5%) of the students who were involved in the research agreed that the attitude that students have towards science subjects is seriously affecting their performance in the science subjects. Most students believe that science subjects are always very tough and they require a lot of time and hard work for one to pass, the practical part of it makes many run away from them. Students always believe that sciences are very difficult and they shy away from them. Other students do not devote their time for learning science due to the fact that they believe it's tough. This really affects their performance in the internal and national examinations. Therefore teachers, parents and the society should educate the children on the importance of science subjects in today's world.

4.4 Teachers' responses on poor performance in science subjects

4.4.1 Teachers' response on availability of resources

Appendix 3 shows the teachers' questionnaire which was developed by the researcher to investigate the reasons that contribute to poor performance in science subjects. The questionnaire had 10 closed items which used 1 to 5 rating Liker scaling. (1-strongly disagree, 2-disagree, 3-no opinion, 4-agree, 5-strongly agree). The responses of the teachers were analyzed through the computer program SPSS and the teachers responses are as shown in table 4.4

Table 4.4: Teachers' response on availability of resources

Rating	Frequency	Percent
Strongly disagree	16	36
Disagree	14	31
Agree	15	33
Total	45	100

Source: Field data

The teacher's response on the availability of resources was at close range. This was due to the fact that some schools had enough and variety of text books, a well-equipped laboratory and a laboratory technician while other schools had a laboratory and few books with no laboratory technician and other two schools had few books a laboratory with little equipment with no laboratory technician. Inadequate of these resources results to students not preparing well for their examinations hence poor results.

4.4.2 Teachers response on teaching and learning environment

Table 4.5: Teachers' response on the teaching and learning environment

Rating	Frequency	Percent
Strongly disagree	16	35.5
Disagree	14	31.5
No opinion	07	15.6
Agree	08	17.8
Total	45	100

Source: Field data

The teachers' response on the teaching and learning environment shows that the highest percentage (35.5%) disagreed that despite the environment being not conducive the student can still perform well in science subjects. The teachers argue that as long as the student has the relevant resources he or she can perform well despite the environment that the student is in. The teachers also felt that parents and the society must create a conducive environment for the students to learn. Students hardly concentrate in a noisy environment or in an environment where they do not get the prerequisites they need for learning to take place, this will affect their concentration hence poor results.

4.4.3 Teachers response on difficulties faced in teaching and learning

Table 4.6 : Teachers (H.O.Ds)responses on difficulties faced in teaching and learning

Rating	Frequency	Percent
Strongly disagree	2	33.3
Disagree	2	33.3
No opinion	1	16.7
Agree	1	16.7
Total	6	100

Source: Field data

Heads of Science Department (H.O.Ds) in six schools said that among the difficulties which teachers face is the negative attitude that the students have towards the science subjects. The students have a feeling that the science subjects are too hard for them and also the language used is too hard to understand hence the teachers encounter difficulties when teaching. Another difficulty that the teachers face is lack of enough resources in terms of text books and other laboratory equipment. During the examination period the students get to see the equipment for the first time hence poor results since they had never practiced nor had a chance to handle them.

When the type of language preferred by students during class lessons was investigated, out of 110 students; 22 students (20%) preferred English only as a language of teaching, 74 students (67%) preferred a mixture of English and Kiswahili while 14 students (13%) preferred their home language.

Figure 4.4 shows language preferred by learners in class environment

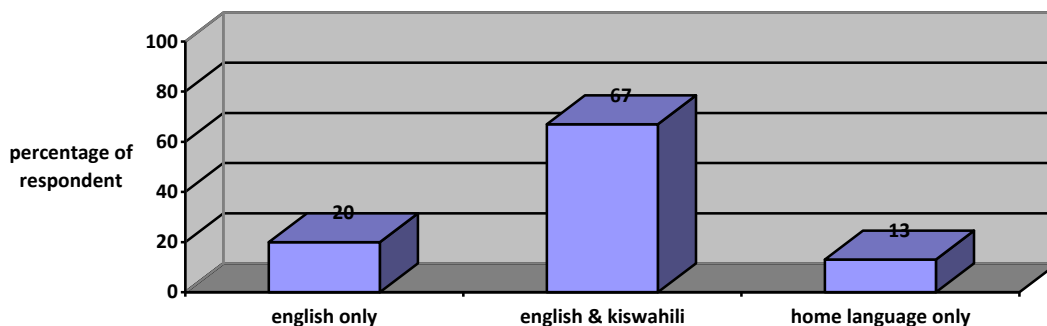


Figure 4.4 Language preferred by learners

4.4.4 Teachers' response on curriculum

Table 4.7: Teachers response on science curriculum

Rating	Frequency	Percent
Strongly disagree	24	53.3
Disagree	12	26.7
No opinion	04	08.9
Agree	05	01.1
Total	45	100

Source: Field data

The highest number of the teachers interviewed said that curriculum content is not the genesis of low results. Curriculum caters for the needs of the learners, however the curriculum is required to be updated regularly. Most of the science syllabi were last updated in the year 2006 and twelve years down it has not yet been revised. The teachers had a feeling that the syllabi should be revised regularly in order to improve on some areas which might be having problems in implementation. The curriculum should regularly be updated in order to cater for the changes in technology and upcoming challenges. This will ensure that the teachers are always updated and given ample time to prepare hence improvement in the science subjects. When the teachers were

asked to respond on the status of science subjects in their schools, half of the teachers admitted that it is very poor. The reasons were more or less the same ranging from students attitude towards science subjects to lack of teaching and learning resources. On the preparedness of the teachers, they agreed that science teachers are always prepared to teach both theory and practical. In some of the schools, the teacher acted as the laboratory technician whereby he or she was expected to prepare and demonstrate as well as guiding the students through the practical lessons. When the teachers responded on the appropriateness of the teaching methodology, some teachers agreed that the methodology used is appropriate while others disagreed. They argued that teachers are still applying the chalk and talk methods of teaching instead of using the modern methods of teaching where computer based methods can be used to demonstrate some concepts in a clear and easier way for the learners to understand the concept easily. According to the response given by the science teachers of the selected schools, half of the teachers interviewed agreed that performance of science subjects affects other subjects. They argued that a good student who does well in science subjects will most likely do even better in other arts related subjects. When responding on whether science subjects are given special attention few teachers agreed that in their schools, the science subjects are given preference compared to other subjects. This was due to the fact that the science subjects are usually allocated more time as remedial classes and at times taught during the weekends. Science teachers are at times rewarded highly if their students score good grades in the final examinations.

4.5 Response of heads of science departments and head teachers' on the performance of science subjects

Interviews with the heads of science departments of the selected schools was conducted whereby the researcher prepared ten questions and provided an answer where teachers were to select. In this study, six heads of science departments from the selected schools participated in the interview (three of the heads of departments were held up with other school duties hence were not interviewed). Three of them said that the status of science performance in their schools was good while three others said it was poor. This was due to reasons like availability of resources such as books and laboratory facilities. The attitude of students towards science subjects had four of the HOD's saying it was negative while two said it was positive. This is due to the students' perceptions that science subjects are always hard and involve a lot of time. When the heads of

departments were asked whether they face any difficulties when teaching science subjects, all of them agreed that they are faced with difficulties. Among the reasons given were; lack of enough resources, poor students' attitude and lack of enough resources to enable them implement the science curriculum fully. Four heads of departments responded positively that the science curriculum is well designed to cater for the needs of students and that the examination body follows the curriculum while setting the national examination.

The researcher encountered two principals from the sample schools, From their interaction both principals said that they don't have enough science teachers and they are compelled to employ Bachelor of science graduates to reduce teachers shortage .It was noted that some schools did not have a laboratory technician and the science teachers were doing all the teaching and preparation of the practical lessons. Lack of current science textbooks and other related material were also lacking in some of the schools. Four out of the nine sampled schools (six schools from Busia county and the three schools outside Busia county) had trained laboratory technicians while the rest had none. When asked whether the laboratories were equipped, three teachers said yes while six said no. The reasons given included having malfunctioning equipment and some being too old to carry out an experiment to give out accurate results. Three of the teachers said that they usually get support from parents and their school administration when it comes to teaching science subjects while three said limited support is given. At some schools, the teachers said that some parents were not even following up how their children perform at school. When asked whether science subject performance affects other subjects, five said yes while one said no. The teachers said that a student who performs well in science subjects is most likely to excel in other non-science subjects and vice versa.

4.6 Discussion of the findings

Poor performance in science subjects among secondary school students in Busia county is due to various factors: Negative attitude towards science subjects, poor exposure of both teachers and students, inadequate revision and course books required during the process of teaching and learning sciences, student personal factors, lack of laboratories, few laboratory equipment and untrained laboratory technicians. Science students are not well equipped with the relevant knowledge they require in order to pass their examinations and even practice science related activities after graduating. Various studies cited similar reasons as causes of poor performance in

science subjects .(Dzana, 2012) said that students fail science due to lack of enough and quality textbooks, their perception on science subjects that sciences are hard subjects and too little time which is allocated to practical lessons. The findings of this study compared to other previous studies done in different areas of the world, it is evident that students attitude towards sciences contributes a lot to their success or failure. The quality and availability of the materials and text books also contributes a lot to the performance of the learners. Many researchers have also found out that the instructional time allocated to the science subjects should be adjusted in order to give the teacher's ample time so that they can complete their syllabus.

Teachers are by far the biggest resource in schools (Sutton, 2011), improving the teachers effectiveness would have a major impact on the schools performance hence increasing the attainment of children across the education system. This is similar to the results of this study where the researcher found that the students fail science subjects due to lack of competent science teachers. A teacher is the most important factor within schools that policy makers can directly affect to improve students' achievement. Schools which have text books, laboratory equipment and other necessary resources perform much better than schools which do not have these resources (Ambogo 2010, Cyril & Lucas 2010). In this study, the schools which do not have these resources were found to be performing poorer than the schools which had the resources in place. The teachers and students strongly agreed that if provided with the necessary materials and equipment they require they will definitely post good results in the national examinations in science subjects. There are marked differences in the students interests in science subjects (Siwel&Kizito, 2012). Some of the students have a feeling that the science subjects are tough for them hence they shy away and do not select them. In this study, the responses showed that students' negative attitude towards science subjects really affects their performance. They feel that those who take sciences are doomed to fail. Students need to have a positive attitude and this will make them change the perception towards science subjects which will eventually make them like the subjects .They should also devote some extra time for revision and discussions for better results..

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This study was set out to investigate the factors that contribute to poor performance in science subjects in secondary schools in Busia County. This chapter presents a summary, conclusion and recommendations of the researcher. The summary of the main findings are discussed in section 5.2, section 5.3 presents implications of the findings while 5.4 presents the conclusion. Section 5.5 presents the recommendations, and the suggested areas for further studies is presented in section 5.6.

5.2 Summary of the main findings

Sciences are vital subjects at secondary school level in Kenya. Despite the efforts geared towards improving the performance, the failure rate in science subjects in the recent past has been high. Some of the reasons include:

- (i) School based factors such as inadequate teaching and learning resources.
- (ii) Student personal factors such as negative attitude towards science subjects among students and gender.
- (iii) Social-economic factors such as unsatisfied basic needs at home and high cost of living.

The remedies of these shortcomings include, among others; ensuring that the required materials and resources are availed to all the schools, both public (government) and private secondary schools to embrace technology in teaching and learning process, parents should try to satisfy learners' basic needs and teachers to guide students well during choice of elective subjects at form three level. The performance is still poor and the teaching and learning process is still dominated by chalkboard teaching with most science teachers exhibiting a lot of pedagogical limitations due to poor training. Recent research findings indicate that most science teachers still hold on to the instrumentalists view that Science is looked upon as consisting of an unrelated collection of facts, rules, skills and processes to be memorized. This theory explains the underlying assumptions of most science teachers and further gives us insights on why teachers

treat science learning as a passive reception of knowledge and the consequent unreasonable demands placed on learners to be submissive and compliant in the learning process.

Science learning should be viewed as an active process of construction of knowledge as a meaningful whole. This implies that the teacher will engage in classroom behavior that aims at developing autonomy and the learner's own interest in science. Several studies carried out in the recent past indicate that, for student to construct meaningful knowledge in sciences, the teaching approach should be inquiry oriented. Designing of hands-on materials that are inquiry oriented have shown great potentials in assisting teachers change their attitudes, beliefs and classroom behavior in the teaching learning process. This study focused on investigating the causes of poor performance in science subjects in secondary schools with a view of investigating from teachers and students whether the teaching methods used are appropriate or not. The study was based on the premise that the greater the knowledge of different learning resources and methodology, the more freedom the teacher had in the chosen teaching approach. Methodologies which involve use of computer aided instruction have a great potential in developing interactive teaching and learning. Example of such studies includes the use of MBL in activity based teaching in physics by Tilya, (2003).

5.3 Implications of the findings

The findings of this investigative study imply that a lot has to be done in our secondary schools in order to raise the performance standards of the science subjects. To begin with, the government, parents and the society at large must ensure that schools are well equipped with the necessary materials that they require for effective implementation of the curriculum. The government should provide incentives to encourage more teachers to train as science teachers. In-service training for teachers should also be carried out regularly throughout the country so as to equip the teachers with modern teaching methodologies and train them how to modify the locally available materials to be used as teaching aids.

Good and well equipped laboratories should be constructed in all secondary schools. Some schools have opted for alternative to practical due to lack of these facilities. Science students require knowledge in practical since they are a prerequisite for their future careers. Schools should also establish the office of guidance and counseling to advice the students in order for

them to change their attitude towards science subjects. This should be done by a well-trained and qualified counselor. The curriculum developers must incorporate the views of all the stakeholders in the whole process. The syllabi should be revised regularly instead the current span of more than 10 years (Kenyan syllabi was last revised in 1996) in order to incorporate the current changes in technology.

5.4 Conclusion

The findings of this study indicate that there is significant effect of performance in science subjects due to lack of enough teaching and learning resources. The science performance in our secondary schools can be improved if students are involved in practical lessons under the guidance of well trained and qualified personnel. This will increase their motivation and change their attitude towards science subjects hence raise the performance. The main conclusions drawn from this study are:

- (i) School based factors should be put into consideration .Examples; availability of teaching and learning materials such as enough classrooms, laboratories and library, employment of qualified teachers and laboratory technicians. Laboratory materials should be made available and they should be of good quality in order for them to produce accurate results.
- (ii) Teachers and parents should be concerned with students' personal factors that might make them not to excel in studies. Parents should provide basic needs to the learners while at home, teachers should motivate and encourage learners in schools when they have learning difficulties. The government and the society at large should ensure that the environment is conducive for learning to take place effectively example by enhancing gender sensitivity.
- (iii) Difficulties faced during teaching and learning process should be solved. Some of the difficulties that the teachers face while teaching science subjects is the students' negative attitude towards science subjects. They have a perception that the sciences are always very tough compared to other subjects which discourages them hence affecting their performance.
- (iv) Strategies should be put up in order to improve science performance .Some of the strategies are; The curriculum developers must always involve the curriculum implementers in the process

of revising the curriculum and the syllabus should be revised regularly. This will ensure that the views of the implementers and other stakeholders are incorporated well.

5.5 Recommendations

It is therefore recommended that in this study;

(i)The government, school administrators and parents should work together in order to supplement the school with necessary teaching and learning materials. Government should give out funds through national or local government to schools for infrastructural development. The school stakeholders together with parents should come up with outstanding projects that will make the school resourceful.

(ii)School administrators and parents should come up with ways of handling students' personal problems. Schools should have guiding and counseling departments to handle students' issues like adolescent challenges, fear of examination, subject choices among others. Parents should be ready to support their children at home by providing basic needs.

(iii) Teachers should use modern methods of teaching such as use of computers in teaching science subjects in order to motivate and sustain students' interest in sciences in most science topics.

(iv) Comprehensive enhanced learning and easy remembering is enhanced by inquiry and interactive teaching approach. Therefore, science educators should employ computer, modeling and animations while preparing educational materials. Curriculum material preparation principles should also be observed while preparing these materials.

5.6 Suggested areas for further studies

Following this study we suggest the following areas for further studies;

(ii) Apart from science subjects being investigated, it should be extended to non-science subjects.

(iii) Researchers should investigate impact and come up with ways of modifying student motivation and attitude towards science subjects.

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Appendix 1: Letter to the principals of secondary schools from where data was obtained.

John Jolif Oduol,

P.O Box 274,

Funyula,

Date: 11/6/2018

The Principal,

.....Secondary School

Dear sir//madam,

REQUEST TO CONDUCT RESEARCH IN YOUR SCHOOL

My name is John Oduol, I am doing research with my supervisor Ms. Pamela Nyagaya a lecturer in the department of education at the University of Nairobi.

I hereby request your permission to conduct research in your school. The aim of study is to investigate factors that cause poor performance in science subjects in Busia county the result will be used to complete the dissertation for Post Graduate Diploma in Education .when permission is granted then the research is intended to take place during formal schooling hours preferably during extramural activity time. Interviews and questionnaires will be used to collect data

I will follow the university of Nairobi research ethics and regulations and I will use the information for the purpose of this study alone. Participation is voluntary.

Should you have any question about the research and the content of this letter, please do not hesitate to contact me for further information,

Yours faithfully,

John Oduol

Phone: 0701658011

Appendix 2: Students Questionnaire

Directions

1. This questionnaire asks you to answer the questions in respect to the way you view Science subject performance in your school. It is not a test and there is no right or wrong answer.
2. Please tick your most appropriate answer. Strongly disagree - SD, Disagree – D, No opinion – N Agree – A, strongly Agree - SA

	SD	D	N	A	SA
	1	2	3	4	5
1. The science teachers contributes towards the poor performance					
2. Science teachers are not competent enough					
3. The teaching methods are not appropriate					
4. The examination does not correspond with the content taught					
5. The resources are not sufficient					
6. Science performance is not affected by other subjects					
7. There is no support from parents, teachers and the community					
8. Negative attitudes towards science subjects, contributes to poor performance					

9. The language used in teaching science is difficult to understand						
10. There is a bright future for science students after graduating						

Appendix 3: Teachers Questionnaire

Please tick the appropriate box Strongly Disagree – SD, Disagree – D, No Opinion - N, Agree – A Strongly Agree - SA

	SD	D	N	A	SA
	1	2	3	4	5
1. The status of science subjects performance in school is very poor					
2. Science teachers are always well prepared in teaching both theory and practical					
3. The teaching methods used are appropriate					
4. The examination set by KNEC corresponds to the content in the syllabus					
5. The resources available are enough					
6. There is comfortable learning environment for the learners					
7. Time allocated to cover a topic in the work schedule is realistic					
8. Science curriculum is well designed to cater for the needs of science learning					
9. Attitude towards science affects performance					
10. Parents, teachers and community supports science students fully					
11. Language used in teaching sciences is appropriate					

for the students to understand					
12 There is a bright future for science graduates					

1`Appendix 4 : Teachers' structured interview questions

(Please tick the appropriate answer)

1. What is the status of science performance in your school

Good Poor

2. Are the science subjects given special attention compared to other subjects in your school

Yes No

3. What is the attitude of students towards science subjects?

Positive Negative.

4Do you face any difficulties when teaching science subjects in your school?

Yes No

5. Is the science curriculum designed to cater for the needs of science learning, are national examinations (KNEC) set according to the curriculum?

Yes No

6. Do you have enough resources in the school to facilitate the process of teaching and learning science?

Yes No

7. Does the school have trained laboratory technicians who assist in the preparation of practicals?

Yes No

8. Are there well equipped laboratories in the school?

Yes No

9. Do you get any support from the parents and school administration when it comes to teaching science subjects?

Yes No

10. Does the performance in science subjects affect the performance of other subjects in your school?

Yes No

Appendix 5: The performance of school candidates at KCSE level and County level from 2010-2016 in Physics, Biology, Chemistry and C.R.E

C.R.E results are included in the appendix 5 to help the researcher to gauge performance of science subjects with relation to an art subject.

Subject	Level	gender	Annual Mean score (%)						
			2010	2011	2012	2013	2014	2015	2016
Physics	KCSE								
		Female	17.02	16.11	17.41	18.92	18.98	20.00	14.00
		Male	19.77	18.02	19.22	19.22	22.77	24.66	18.22
		Average	18.40	17.07	18.22	19.07	20.88	22.33	16.11
	Busia county	Female	21.22	27.00	24.00	27.00	30.02	31.00	16.00
		Male	26.77	31.00	32.00	28.77	34.00	31.05	21.00
Average		24.00	29.00	28.00	27.89	32.01	31.03	18.50	

Subject	Level	gender	Annual Mean score (%)						
			2010	2011	2012	2013	2014	2015	2016
Biology	KCSE								
		Female	18.77	24.11	25.77	18.67	20.22	32.00	16.00
		Male	18.92	25.66	30.27	28.25	26.38	36.60	22.66
		Average	18.85	24.89	28.02	23.46	23.30	34.30	19.33
	Busia County	Female	26.80	27.97	25.65	23.95	22.86	35.09	18.22
		Male	34.22	36.11	32.22	34.02	37.00	38.22	23.00
Average		30.51	32.04	28.00	28.44	29.93	36.66	20.61	

Subject	Level	gender	Annual Mean score (%)						
Chemistry	KCSE		2010	2011	2012	2013	2014	2015	2016
		Female	14.06	12.22	15.00	17.22	14.00	16.00	12.01
		Male	15.22	17.00	24.26	24.22	26.66	34.27	18.24
		Average	14.64	14.61	19.63	20.74	20.72	25.16	15.12
	Busia County	Female	15.66	18.44	26.00	24.28	26.22	27.14	16.17
		Male	18.07	19.00	20.55	20.98	19.57	24.01	16.22
		Average	16.87	18.72	23.28	22.63	22.99	25.58	16.20

Subject	Level	gender	Annual Mean score (%)						
C.R.E	KCSE		2010	2011	2012	2013	2014	2015	2016
		Female	34.72	32.80	30.12	37.29	35.43	38.74	32.00
		Male	37.00	34.72	35.67	34.85	29.94	38.57	35.12
		Average	35.86	33.76	32.90	35.07	32.69	38.66	33.56
	BUSIA COUNTY	Female	38.77	40.11	36.32	40.01	37.40	40.80	45.02
		Male	40.22	41.02	39.92	42.22	38.72	41.02	42.00
		Average	39.50	40.57	38.12	41.12	38.06	40.91	43.51