

**FACTORS CONTRIBUTING TO GENDER DISPARITY IN SCIENCE ACADEMIC
PERFORMANCE IN KENYA CERTIFICATE OF SECONDARY EDUCATION IN
KAKAMEGA EAST SUB-COUNTY, KENYA.**

By

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of the Degree of Master of Education in Comparative and Contemporary Issues in
Education of the University of Nairobi.**

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DECLARATION

This research project is my original work and has not been presented to any other university for examination or award of any other degree.

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DEDICATION

This work is devoted to my amazing and loving parents Mr Caleb Mackatiani and Mrs Immaculate Imbova who have encouraged when I almost gave up. Further, I dedicate this work to my sisters Mercy, Kathleen, Brenda, Belinda and brother Mathews.

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ABBREVIATIONS AND ACCRONYMS

EFA	Education for All
GoK	Government of Kenya

KNEC	Kenya National Examination Council
KCSE	Kenya certificate of Secondary Education
MDGs	Millennium Development Goals
OECD	Organization for Economic Co-operation and Development
UNESCO	United Nations Education, Scientific and Cultural Organization
UN	United Nation
WAD	Women and Development
WHO	World Health Organization
WID	Women in Development

ABSTRACT

The study investigated the factors that contribute to gender disparities in science in student academic performance in sciences in the Kenya Certificate of Secondary Education (KCSE) examinations. The study was done in Kakamega East Sub-County of Kakamega County, Kenya. Kenya has domesticated international protocols on equal and quality education to

both boys and girls. However, data obtained from the Kenya National Examination Council (KNEC) on KCSE results depicts that boys are performing better than girls in science subjects. Therefore, based on this context, the study examined factors that contribute to gender disparity in sciences. The study further investigated the assumptions underlying gender parity as well as negative influence of gender parity on girls in Kenyan secondary schools. The study identified three research objectives and questions that guided data collection and analysis. The review of the related literature covered three themes, which include pupil's attitude towards science subjects, socio-economic status, and cultural factors, which addressed the study objectives. In addition, other relevant literature for the study included overview of disparity in sciences and policies on gender parity for quality education. The related literature reviewed led to the specification of knowledge gaps that the study needed to fill. More so, the research work addressed three variables, which include pupils' attitudes, socio-economic status, and cultural factors. The study design used was descriptive survey. The target population for the study was 12 secondary schools in Kakamega East Sub-county. The entire study population of students sampled was 72. The teachers involved were 36 while the head teachers were 12. The entire target population was 120. The researcher collected data through questionnaires and interview schedule. The collected data were coded thematically. Frequency analysis and findings revealed that socio-economic status of the family, pupil's attitude, and cultural factors contributed to gender disparity in science performance. The study further concluded that there is need to urgently address matters that will improve education in all dimensions. The government needs to adopt drastic measures that will ensure equity in education. The study further concluded that the students, the teachers, the school, and the parents have a crucial role to play towards successful achievement in science. It was concluded that boys have a relatively more positive attitude towards the science subjects than the girls. The study concluded that failure among lower-class students with low school success rates is attributed to the lack of friends from the high-class. The study recommended that the Ministry of Education should improve primary school pupils' science background through inclusion of more introductory Chemistry, Biology, and Physics concepts in the primary science syllabus. Further, the study recommended that the school administration especially in day mixed and girls boarding secondary should organize motivational talks by Chemistry, Physics, and Biology professionals to help change negative attitude of students towards the sciences. In addition, girls should be encouraged to change their attitude towards sciences so that they will be able to take up science-based careers. This will be guided by the vocational and career guidance counselling.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Gender-related disparities have characterized Kenya education system nationally, between and at the local level and all stages of education from primary to university in favor of men (UNESCO, 2003). For many decades, the top students at national, county, and sub-county level have been male. It is only in a few districts where the academic performance has been in favor of girls' (KNEC, 2011). Academic attainment is the basis of educational success of a learner in the coming days as seen in Kenya and other nations that have taken education as a critical passage to social, economic, and political growth. Academic achievement is the outcome of schooling in which all stakeholders such as learners and teachers have attained their learning objectives. Examinations and continuous assessment tests are used to measure the level of academic achievement. In learning institutions, student's success is measured by excellent and good academic performance. In some instances, it is measured by well a student meets standards that the government has set out.

In the educational sector, it is significant to study gender differences. First, it is crucial to identify the source of biasness or inequalities, construct ways of fostering average academic performance of both men and women, and enhance people's comprehension of how students learn (OECD, 2009). The OECD findings indicated that in the past years the interest by scholars to study gender differentiation in education was driven by absence of success and interests of women in pursuing sciences (OECD, 2009). However, presently, there is a focus on the absence of boy's participation particularly in area of reading. Education policymakers have to be aware of the differences in academic achievement between the sexes to ensure the success of any subsequent policies in achieving quality education and equity.

Eradicating biasness in education between women and men has been a precedence of the international community and development organizations such as the United Nations. One of the Millennium Development Goals (MDGs) objectives is to “eradicate gender disparity in basic education preferably by 2005, and in all phases of education by 2015. This has been reverberated by organizations such as World Bank and the United Nations. World Bank report noted the importance of education girls in attaining development goals. Equality of learning opportunities between men and women is also accredited in the Universal Declaration of Human Rights of 1948. It has been proposed that training women and attaining the MDG objective on gender equity will lead to enhanced results for developing nations including higher social and economic development (Abu- Ghaida & Klasen, 2004).

Poor academic performance by girls in science subjects in Kenyan secondary schools has been a persistent problem. It generally concurs that in the current knowledge economy society; science, technology, and innovation play a primary function towards the attainment of the Millennium Development Goal number 3 (achieve universal primary education). Various aspects contribute to girls poor academic performance in science subjects and technology-based activities in Kenya (UNESCO, 2011). Things make girls lack desire in science-related activities include lack of relevant policies that support them, and negative socio-cultural attitudes and practices. Therefore, the achievement of gender parity in science and technology should depend on a relevant plan based on lessons acquired from best practices and experiences at all levels from regional, national to international (UNESCO, 2011). More boys than girls have a tendency of preferring scientific and technological subjects in schools. Their academic performance in these subjects is better compared to that of girls due to the attitude they have towards them. After school, boys pursue careers in the field of science and technology. This is a worldwide phenomenon, common to various educational systems and hence is a much-researched area.

The under-representation and under-achievement of girls in science and technology subjects is a severe inefficiency of educational systems in nations whose growth relies on the generation of human technological capacity as seen in most African countries (Lober, 2001). If only more girls could be encouraged to take up science and technology subjects in schools, such nations would have the benefit of an increasingly technological output with few extra inputs. When girls chose sciences stream, the figures show that they do well but after sometimes their teachers and even parents give them wrong guidance. It seem that women have a less clear vision of what their educational objectives (OECD, 2009). More often boys have decided to choose the direction of their studies according to personal ambitions and not on the grounds of their professional future. Majority of girls show themselves to be less sure, when they are faced with science oriented issues (Lober, 2001). In cases where girls have equal abilities with boys, they are reluctant to choose science stream. Contrary, a boy has less fear of being able to cope with challenging situations since they need to justify their male ego in the society.

Within the family circle, the girl suffers from the traditional concepts that parents have of girls. It can be seen all too frequently that her domestic duties get in the way of her homework. Domestic duties compete for her time with study and revision at home. The moment she gets back home, she starts on domestic tasks, and as she gets bored, she gives less and less time to her school homework, which needs great concentration. In some families, when times are hard, girls are neglected, and preference is given to the boys. The family income sometimes cannot support keeping all children at school thus; priority is given to the needs of the boy(s) (Lober, 2001).

Besides, for some parents, the primary duty of girls is to get a husband and produce children. Academic problems are not the only kind of issues that reduce girls' motivation to pursue scientific subjects (Republic of Kenya, 2012). At school, most boys prefer working without

girls since they do not think women are prepared to put forth enough effort, particularly in sciences, subjects where plenty of concentration and constant willingness to work is regarded as essential. Even when the girls are ready to work, the timetable for group studies disadvantages them; since the girl also should include domestic duties among the work, she should do (Lober, 2001). In Kakamega East Sub-county, the indispensable elements have been stress on science subjects. Science teachers are utilizing distinct methods of teaching to help girls improve in science subjects. Enhanced instructional technology is making inroads in learning system, which aims to make learners achieve higher (UNESCO, 2011). Attaining the aims of development can be endangered if a large percentage of expected recipients do not have satisfactory access to suitable kinds of education in science. Good academic performance in the science subjects is noteworthy due to their perceived contribution to industrial and technological development in attaining MDGs (Republic of Kenya, 2012).

The emergence of scientists and technicians engaged in the selection and adaptation of essential technologies would possibly enhance the anticipated developments in fields such as agriculture, health, and industries in line with the MDGs and Kenya's development plans. Failure in science subjects may affect upward social mobility for many a household with poor academic achievers. The important function of science in the attainment of the MDGs and Kenya's development has made the Kenyan government make it mandatory for every student to specialize in at least two out of the three science subjects taught in secondary schools. This notwithstanding, academic performance in these science subjects has continued to decline each year (KNEC, 2014). Available data indicate that in the last decade, student's academic achievement in science subjects has remained low nationally and at the Sub-county level as it is the case in Kakamega East. The stated issues affecting the various genders more so the girl's has resulted in the need to carry out such a study. The emphasis of the study was on the factors that cause gender disparity in science performance in KCSE.

Table 1.1 shows the national overall academic performance of students in Chemistry, Biology, and Physics at KCSE in the period 2013-2017. The average percentage academic achievement in Chemistry was lower than Biology and Physics

Table 1. 1: The KCSE Chemistry, Biology, Physics National Overall Performance (2010-2014) Percentage Mean Score

Year	Chemistry	Biology	Physics
2013	22.71	30.32	36.71
2014	19.17	27.15	31.31
2015	24.89	29.19	35.11
2016	23.66	32.44	36.64
2017	27.93	26.21	37.86

Source: KNEC (2013 - 2017)

Table 1.2 shows the academic performance in Chemistry, Biology and Physics in practical papers in the period 2013-2017 in Kakamega East sub-county. The mean score of the candidates was lower in Chemistry than in Biology and Physics.

Table 1. 2: Academic Performance in Chemistry, Biology, and Physics in Practical Papers

Year	Chemistry	Biology	Physics
2013	28.72	43.25	49.80
2014	27.15	39.65	38.05
2015	37.15	46.05	55.90
2016	29.75	47.01	55.62
2017	40.85	29.80	43.60

Source: KNEC (2010 - 2017)

Table 1.2 shows the national overall academic performance in Chemistry, Biology, and Physics at KCSE by gender in the period 2013-2017. The average percentage means score in

Chemistry of girls was low compared to that of boys in the two-year period.

Table 1.3 shows the overall KCSE academic performance in Science Subjects by Gender (2013-2014) Percentage Mean Score

Table 1. 3: Overall Academic Performance in Science Subjects (2013-2014)

	2013			2014		
	All	Female	Male	All	Female	Male
Chemistry	23.66	21.47	25.42	27.93	25.95	29.54
Biology	32.44	30.07	34.53	26.21	24.36	27.86
Physics	36.64	34.55	37.42	37.87	36.22	38.48

Source: KNEC (2013 - 2014)

From the data displayed in Table 2.3, it is appropriate to adopt teaching strategies that stimulate girls' interests in science to alleviate this gender imbalance.

1.2 Statement of the Problem

The need to teach science subjects in the contemporary science-oriented world is necessary. Quick economic and political progress have made the attainment of new and extensive information significant to rise the capability to acclimatise to the transforming world. Along these lines, some subjects, such as physics, chemistry, and biology require greater attention and investment in a country's educational plans since the world has become technological and science-oriented. Considering their fundamental nature and effect in the development of critical skills, and consolidating the foundations of research, sciences are of essential (the Republic of Kenya, 2012). However, despite the importance of sciences in the society, the existing educational plans seems to favour boys than girls. This means women are left out in science-related courses. In various third world nations and even or in some of the

industrialized world, women depict a lower level of academic achievement than boys and associate negative connotations to these subjects. This study sought to find out the reasons why girls perform dismally than boys in science subjects in KCSE.

1.3 Purpose of the Study

The purpose of this research was to determine the influence or effect of the student's attitude, socio-economic status and cultural factors on academic performance in sciences in KCSE.

1.4 Objectives of the Study

The following objectives guided the study:

- i. To assess the impact of students' attitude on academic performance in sciences at secondary school level in Kakamega East sub county.
- ii. To assess the influence of students' social and economic conditions on student's academic performance in science subjects.
- iii. To evaluate the cultural factors that causes gender disparity in academic performance in science subjects in KCSE.

1.5 Research Questions

The study sought to answer the following questions

- i. What is the effect of students' attitudes on academic performance in science subjects?
- ii. What is the influence of students' socio-economic status on academic performance in science subjects?
- iii. What influence does culture has on learner academic performance in science subjects?

1.6 Significance of the Study

The study's findings may be of importance to policy makers in the preparation of forthcoming educational policies aimed at enhancing girl student accomplishment in science subjects. The study may be significant to school administrators and the entire education

stakeholders as it identifies major causes of gender disparity in science performance among students. The study will also add to the works on gender disparities in science education and thus will be of value to scholars and researchers. Additionally, the findings of the study will be of usage to educators in determining the issues that have created “gender divide” in academic performance over time differently leading to more strategic approach to reducing this divide. The Ministry of Education would be able to review their policies on gender education more so girls’ education, classroom learning practices, more so pedagogy and assessment in most affected areas can be highlighted and made available to schools more so the teacher. Further, the community can be better informed as well as the legislature to rally and advocate for the change desired.

1.7 Limitation of the Study

The research was limited in scope and nature. This study was done in Kakamega East Sub-county located in rural setting. Respondents were also drawn from selected day and boarding public secondary schools. Shortage of study time also limited the extent of the engagement with the different participants. The study anticipated lack of openness from the respondents, which may have had an effect on the findings especially if they resorted on giving false information. To mitigate this limitation the researcher sampled 30 percent of the target group to embody the population in order to simplify the findings to the total population.

1.8 Delimitation of the Study

Delimitation means the scope of the study. The study was conducted in Kakamega East sub county. This study was also delimited to performance in science at K.C.S.E level. The variables targeted included learner characteristics, cultural beliefs, and family socio-economic status.

1.9 Organization of the Study

The research project was organized in five chapters. Chapter one which provided details about the background to the study, statement of the problem, objectives, research questions, significance, limitations, delimitation, definition of significant terms and finally the organization. The second chapter presented literature review, which included an overview of the concept of girls and boys' performance in science in K.C.S.E. This chapter also looked at how cultural factors and family socio-economic status influence girls' poor performance in sciences. Additionally, it provided information on summary and conceptual framework. The third, chapter three offered information on research methodology, design, the target population, sample size and sampling procedures, research instruments, instrument validity and reliability, data collection and analysis. The fourth chapter provided information on the research findings and analysis of research data. Finally, the fifth chapter provided information on summary, conclusions, and recommendations.

1.10 Definition of Operational Terms

Attitude	It means a tendency to react to negatively or positively towards a certain concept, person or situation, which influences a person's choice of action.
Positive attitudes	Refers to the ability of a person being optimistic and looking for good things rather than being pessimistic.
Negative attitudes	Means a disposition, manner or feeling that is not constructive and optimistic
Culture	The belief system and practice of a particular community group.
Culture Practices	Rituals, which are performed in communities by respective sexes. The cultural practices are societal norms, traditions, and beliefs. They include beliefs that women should be subjected to household chores and not be educated since they will marry and leave the homestead.
Family Income	Refers to the measure of all combined earnings of all people sharing a specific place of residence or household. It incorporates every form of income such as wages and salaries

High family income	It is where a household earns 20,000 Kenyan shillings and above per month
Low family income	It is where a family earns 19,000 Kenyan Shillings and below per month
Gender	social and cultural construction of being ‘male’ and ‘female’.
Gender Disparity -	The difference experienced between male and female persons in the society
Gender Equality:	Refers to equal treatment to male and female persons in society
Excellent academic performance:	It refers to a student who has scored A plain to B+
Good Academic performance:	It means a student scoring B plain to C+
Average academic performance:	It means a student scoring C plain to C minus
Poor academic performance:	It means a student who has scored D+ and below
Science:	A vast body of connected knowledge of theories and concepts developed by scientists.
Student perception	The way a learner views his/her studies.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter on review of related literature contains data on six sections. The first section was international call for provision of education for all, the second section talked about Kenyan government policies on girl education. Section 3 discussed factors contributing to gender disparity in science performance in KCSE. The fourth section explained the theoretical framework and the last section discussed the conceptual framework of the study.

2.2 International Call for Provision of Education For All

Education is one of the significant sectors that have been adequately documented in the literature for it serves as the springboard for social and economic transformation. During the meeting, representatives from 100 nations and numerous companies promised to offer education to everybody by the year 2000. The delegates agreed that children, youth, and adults would profit from educational chances deliberated to meet their elementary learning needs (the Republic of Kenya, 2012). The EFA conference held in the year 2000 in Senegal, approved a framework, which would guide nations in ensuring people, have access to basic education. The EFA 2000 valuation represented an unmatched determination to take stock of the condition of elementary education across the globe. It is included in the National evaluation of the progress achieved since the Jomtien conference attended by 183 countries. They highlighted the problem met and gave recommendations for the coming days (the Republic of Kenya, 2012). The conference produced a policy standard that forced states to attain quality basic education for all by the year 2015. The attention was on girls training, and a pledge from institutions and donor nations that no state dedicated to elementary knowledge would be thwarted in the achievement of this goal by lack of resources (OECD, 2009).

2.3 Related Studies on Science Academic Performance

Numerous studies have been done concerning the topic of study. In this section, the literature on gender issues in education and academic performance will be reviewed. Most studies in areas related to gender in education focus on the element of differences of sex, which focuses much on comparing male and female characteristics and academic performance. When dealing with the matter of gender and schooling, it is essential to describe what gender is and separate it from sex. The need for this differentiation is the implication of innate in academic performance, which is linked to the biology of a person and its effect on human behavior and outcome. The idea sex means the biological and physiological features that explain men and women (WHO, 2014). The biological notion on sex differences and mental performance considers social aspects subordinate to biological issues like brain structure. Several researchers found that boys have greater average brain sizes than women. Therefore, men would be projected to have a advanced average intelligent quotient. Proponents of this view include Allik et al., (1999). Contrary, Mackintosh (1998) asserts that that there is no sex variation in general intelligence. He describes the concept gender as the political and socio-economic virtue and opportunities associated to be being male and female.

Additionally, all communities have inherent conceptions of labels, which they utilize to separate the handling of girls and boys. More so, while girls in most cultures take primary responsibility for caring for the family, men are concerned more with the work outside the homestead (Allik et al, 1999). UNESCO (2011) notes that the assignment of duties is described culturally and socially based on sex. Children acquire traits that are suitable to their sex functions by the limitation of parents and the community. Such background literature informed this study since it be compared the academic performance of both girls and boys in science subjects in KCSE.

2.4 Development and Evolution of Gender

The gender viewpoint looks at its influence on people's opportunities, interactions and social duties. Differences in gender are social constructs, taught based on a community's specific views of the physical differences and the assumed capabilities and tendencies of girls and boys. Gender relations are described as contrivances whereby diverse cultures decide the duties, functions and responsibilities of each sex. Additionally, they detect access to material resources like land, education and those that are transient (Lober, 2001). The results for daily life are numerous. They are division of roles, labour, and opportunities for professional advancement and contribution in decision-making. For so long when discussing gender issues, the focus has been on women and their subordination to men in all aspects of life.

This perception led to the emergence of feminist movement and feminism theories as a way of explaining the sources of these issues facing women in society. The primary concern women activists have focused about gender bias is that it is not an individual matter but entrenched in the community structure (Lorber, 2001). Women activists focus on three areas in handling the matter of gender inequality. They include liberal, Marxist and Socialist and development theories. Theoretically, liberal feminism assert that biasness in gender are not based on biology. Therefore, women and men are same since their humanity supplants procreative variation. Both men and women need to have equal freedoms in either schooling or employment. This can be attained via confirmatory action, which calls for picking of qualified individuals to address the gender and ethnic imbalance that exist in the society. Asalatha et al. (2009) argue that central to liberal feminism was the concept that women's demerits originate from stereotyped customary expectations men hold and which women have internalized. The stereotypes are promoted through several agents of social interaction. Marxist and socialist women activists criticize the family as a source of women's exploitation and oppression. Development of women activism critical contribution to associating women's

conditions with control of economic resources in the family. It averts the political aspects of women's rights versus cultural norms and traditions (Lorber, 2001). As these feminism theories continued spreading and the duty of women in development was coming to the forefront more, rapid transformations were taking place in the development field. The last century was marked by a gradual shift in the way women were perceived within the development policy, particularly from the stature of victims and passive objects to that of independent people.

2.5 Gender and Education

In most communities, girls and boys differ in terms of access to and control of properties, and contribution in decision-making. In most communities, women as a group have less access to resources, opportunities, and decision-making compared to men (OECD, 2009). With any discussion of gender, issues of equality arise in most cases when one talks of gender equality (or inequality), the focus is usually on the disadvantaged girls. Hence, most strategies are geared towards increasing opportunities for girls and women. A worrying trend has however started arising where the boy child is now falling behind the girl child in different aspects of life. According to UNESCO (2011), 'gender equality', is the perception of boys and girls feeling the same benefits or drawbacks in joining school. The concept of gender equality may also be taken to refer to the full balance of boys and girls to enjoy cultural, economic, and political liberties. No one should be limited or denied access to these privileges based on their sex (Onsomu et al. 2005). Besides, according to Onsomu et al (2005), in Kenya, there has been growing dissatisfaction along gender lines on boys performing better compared to girls, specifically in science-oriented courses. Therefore, issues of gender in education cannot be addressed by merely getting the enrolment figures match that of boys.

2.6 Overview of Disparity in science performance

Across the globe, women experience and encounter problems as consumers and providers of education. By comparison with their male counterparts they under-participate informal education due to a misconception that they tend to underachieve in post-primary education especially in sciences and technology related subjects. This has made them under-represented in every sector in the society (Whyte, 2012). Until recently, these problems had been neglected for reasons, which include persistent confusion between sex and gender, the dominant power of traditional assumptions, and the invisibility of relevant evidence and pervasiveness of gender stereotyping. The main question is how the education system should respond to gender disparity (Sifuna & Chege, 2009).

Research has revealed that the education content and organization tend to reinforce rather than counteract the gender stereotyping attitudes and practices in the community, at work and family (Sifuna & Chege, 2009). The stereotypes target women whom most cultures have viewed inferior. For example, in the third world nations, male enrolment outnumbered female in both primary and secondary schools. In countries where primary education is universal and free, girls tend to do as well as boys and sometimes better (UNESCO, 2011). However, once out of the primary school enrolment, women under-achieve in physical science, engineering, and technology related subjects.

2.7 Government Policies on Girl Education

In the 20th Century, conscious efforts have been made towards attaining gender equality in education at international, regional, and individual nation level. This was necessitated by the opinion that women can and do contribute to the development and hence their education was necessary to achieve this development. Various efforts and initiatives geared towards gender equality in school at the global and country level were adopted. Education or schooling shall be free and compulsory at primary stage. Education for All (EFA) declaration had several

goals which included the need to ensure that by 2015, all children particularly girls and children living under challenging conditions together with those belonging to ethnic minorities should have admission to basic education. Additionally, it ratified the need to eliminate gender disparities in primary school and attain gender equality in education with stress on ensuring women's full and equal access and participation in education.

2.8 Factors Contributing to Gender Disparity in Academic Performance in Sciences

2.8.1 Learner Attitude towards Sciences

Attitude is a person's prevailing disposition to react positively or negatively to an event, person or something (Pearson, 2014). An attitude regulates what a person will imagine, hear, think or do. Attitudes or dispositions can be either positive features or negative bias (Pearson, 2014). The attitude in science entails the scientific model that a person assumes for problem solving, evaluation of concepts and decision-making. Attitudes can encourage an individual's desire and feeling towards studying science. There is a link between students' attitudes towards science and their academic accomplishment. Learners with a positive disposition toward science tend to perform better. Teachers play an important role in developing learner's competencies in the teaching process (UNESCO, 2011). Teachers are important in shaping learner's attitudes towards performance in science. The teacher plays a significant role during the process of learning, which can affect students' perceptions toward science subjects. In turn, it can affect influence their achievement. Teachers act as good examples to students, whatever they appreciate or will have a significant effect on their students (UNESCO, 2011).

Trowbridge (2004) argues that student's perceptions concerning the importance of studying sciences may be seen as both a contribution and result variable since their views about the subject can be associated to learning achievement in manner that encourage increased or lower academic accomplishment. Considering this, learners who do well in any subject

generally have a positive perception or attitude towards it. While those who have negative attitudes towards a subject tend to perform poorly in it (Olatunde, 2009), learner's attitude toward the learning of sciences is an aspect that has long concerned the attention of scholars. The way a student rates his/her ability in a subject significantly affects the attitude of the student towards the subject. UNESCO (2011), found out that, girls remained unconfident in pursuing physics, even when they are generally doing well in the subject. This even worsens as they progress up the academic ladder, so that, by the time they get to college, their confidence and ability to undertake science subjects is uncorrelated with the actual talent. Jones and Wheatley (2012) found that male students generally have a better perception towards sciences (especially physical sciences) than their female counterparts who are much inclined to the biological sciences. Wheatley (2012) found out that girls view biological sciences as more caring and relevant in day-to-day life than the physical sciences.

Girls are believed and have the self-belief that they cannot excel in hard subjects like the sciences and mathematics and opt for the 'simpler' subjects, which they figure, would give them greater examination passing chances. It has been argued that few girls study Physics because they are less confident than boys of their ability are and less likely to choose difficult subjects; the attitudes and expectations of parents, families and peer groups reinforce stereotypes of appropriate subjects for girls and boys (Jones & Wheatley, 2012). Concerning teacher-related factors, teachers' attitudes, and expectations may feed sex-stereotype attitudes toward certain subjects and in most cases; this attitude about girls' innate abilities and potential is negative.

2.8.2 Student's Socio-economic Status

According to Eshiwani (1985), some inclination exists for teaching boys compared to girls, which reflects the traditional limitations on women's roles. It also shows the conventional patrilineal traditional systems and notion that boys will have greater projections for modern contemporary work. Moreover, in rural areas, parents prefer taking men to school since they see it as more rewarding than when they educate women (Sifuna & Chege, 2002). Therefore, the gender duties that a community gives the young people will have a decisive consequence on their future such as schooling and social associations (Sifuna & Chege, 2002). Additionally, Chepchieng and Kiboss (2004) in their work found that lack of study time among women could be attributed to participation in household duties. On the other hand, boys had enough time to study, which means they were likely to record good results in schools.

Kose (2011) asserts that the social and economic condition of the household has a significant impact on the student's academic accomplishment. According to Kean and Tsai (2008), each actions, program, and activity of the homestead is a determiner that impacts the children's learning outcomes. Academic attainment at school is not only connected with school-associated aspects but also with the social and economic setting in which pupils are raised (Kean & Tsai, 2008).

Kose (2011) correlated these findings when he observed that the family's social and economic features determine students' academic accomplishment. Therefore, failure among learners from low social and economic families is attributed to the lack of friends from the high-class who can positively motivate them to study. Besides, Kose (2011) points out those learners from high socio-economic status are more likely to record good grades in academics due to the motivation and support from their families. Therefore, when it comes to the choice of subjects in schools, they are more likely to choose science subjects with the aim of

pursuing careers that are in line with family expectations. Eweniyi (2013) concurs with the findings that students' low academic achievement is associated with familial and parental influences. Kean and Tsai (2008) observe that every action of the family determines the children's educational outcomes. Besides families' socioeconomic status, parents' level of education influences students' academic achievement. Studies assert that caregiver's level of education serves as a determiner to the children's success. For instance, students whose parents had high training recorded good results due to motivation from parents. Kean and Tsai (2008), states that the normal period that parents contribute to education is a significant factor in students' academic success. De Broucker and Underwood (2010), indicated that those caregivers with high education offer the most favorable and subtle condition for their children to learn. In turn, offering the relevant and required environment and incentive for them to continue to higher education. Apart from family social status, student academic accomplishment is closely connected to family income or earnings (UNESCO, 2011).

Blanden and Gregg (2010) argues those household earning influences learners' learning needs in diverse ways. The spending in the homestead is a determiner of the stable income of the family. The amount of money disbursement has a positive impact on educational accomplishment. For this motive, the increases in the stable earnings of the household enable the increase in literacy and the rise of school achievement in both boys and girls at all phases of schooling. The learners with more prosperous families get better grades compared to those with poorer ones (Sifuna & Chege, 2010). There is a strong association between household learning and science academic achievement based on the distribution and division of income in the nation. Kose (2011) stated that depending on the results of their research that the academic success of learners with families of poor a financial condition is regularly falling, but that there is no clear outcome to show that this income influences children's schooling

outcomes. Pupil's academic attainment can be forecast based on the social and economic variables in their lives.

2.8.3 Cultural Factors

Culture determines or dictates various things in a person's life. This ranges from norms, values, beliefs, and even economic activities of the society. Culture is spread from one generation to another. This means that the parents and society perception on education determine children's view about the same. Gender socialization is an obstacle to girl's equal participation in education. Through home and societal socialization, boys and girls learn gender stereotypical roles, norms and attitudes. In most African communities, girls are brought up learning and knowing that women are not good in sciences (Chege & Sifuna, 2010). Due to this, girls acquire a negative attitude about their ability to compete at the same level as boys (Chimombo, 2000). Contrary, boys are brought up believing they can handle any subject. Cultural beliefs, traditions, and norms in Kenya have a substantial effect on girl student academic success. In the case of day schools, girls are subjected to domestic work daily while in the case of boarding schools, the girl pupil is negatively affected mostly during school holidays. Besides, the boy is given preference in a family where monetary resources are scarce. In some cases, the girl student does not attend school as desired (Orodho, 2010).

Parents and guardians have diverse dispositions towards their daughters and sons. Girls are raised to perform feminine roles such as rising of children while boys have are brought up knowing that they have an entire working life ahead of them. Parents and community at large believe that girls lack qualities of assertiveness, initiative, and independence. Besides, parents react in distinct ways whenever things go wrong for boys and girls in academic performance. These parental attitudinal differences are due to culture (Chege & Sifuna, 2010). Girls are not encouraged to enter those academic disciplines that were historically dominated by boys. Most societies view a girl's schooling as a waste of time since they will not stay at home

forever. Such cultural traditions and practices make women shy off from education and develop reliant attitudes.

Culturally described duties and functions for women particularly in domestic sphere teach and socialize them to adopt the roles of deputy mothers in the family. Due to the cultural separation of allocation of responsibilities and labour between sexes, which start at an early age, the chances of taking girls to schools is lower than that of boys. Therefore, parents tend to favour boys' education because they tend to believe they will care for them in the forthcoming days. Chege and Sifuna (2010) pointed out that parents and guardians tend to dishearten too much schooling for their girls. There is always a fear that if a female is well trained, she may find it hard to get a husband. Besides, women stay away from too much education to avoid venturing into academic disciplines, which would make it hard to follow their husbands, in case of transfer of residence (Sifuna & Chege, 2010). Chimombo (2000) noted that cultural practices, norms and beliefs that perceive girls having less capability than men if brought to the classroom may lead to their side-lining and further discourage them in their academic attainment.

2.9 Theoretical Framework

This study utilized Pearson's model on gender relations. According to Pearson concept, the community or society perceives all activities done to be based on social association or interaction and duties of boys and girls (Pearson, 2014). The society seems to have power and control on what men and women do, and their practical contributions to reproduction and generation unfortunately, the directive turns out to be culturally discriminate girls. Pearson model of gender relation was significant for this research since it dwells on diverse economic, cultural, and economic attributes that must be considered for females to take the opportunities to engage in social activities like education (Pearson, 2014). These economic and cultural norms stressed in the model are factors that influence girl academic performance in school.

This theory is relevant to the study because it incorporates the variables necessary to understand why girls are discriminated. In traditional society, a man is the head of the family, a position held by a male parent. This implies that the patriarchal idea is dominant (Pearson, 2014). The duties given to females in society are hardly described but they are anticipated to be good mothers, education is less important for them, and are subordinates (Pearson, 2014).

2.10 Conceptual Framework

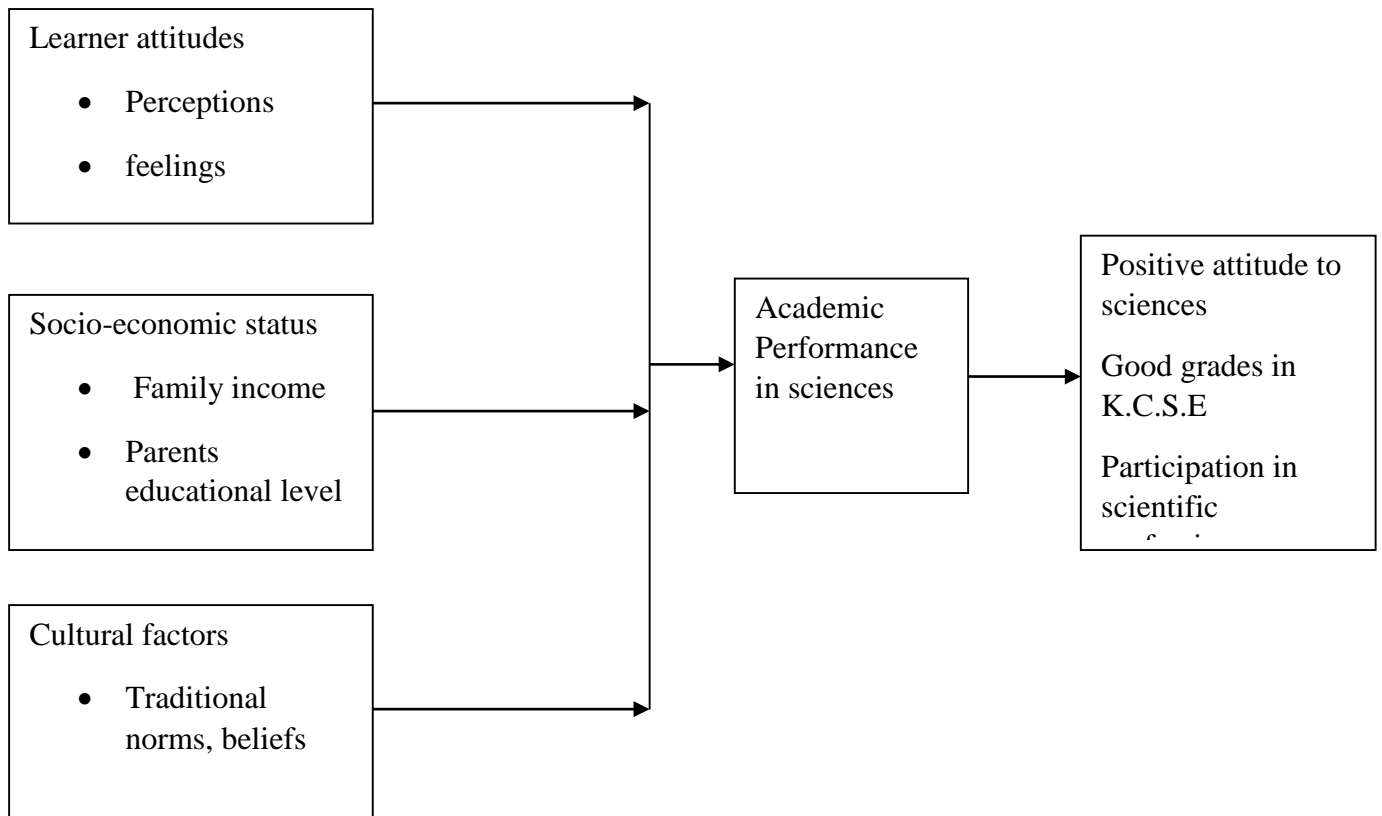


Figure 2. 1: Conceptual Framework

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides the methodology that was employed during the study. It described the research design, target population, sample size and sampling procedure, research instruments, instrument validity, instrument reliability, pilot study, the data collection procedures and data analysis techniques.

3.2 Research Design

A research design is a plan or blue print of how you intend to conduct the research. Best and Kahn (2007) define it as a plan or blue print according to which data is collected to investigate the research hypothesis or question in the most economical manner. Descriptive survey research design was used for this study because the study involved description of the behaviors or attitudes of the respondents. All closed-ended questions in the research project aimed at defining the characteristics of the respondents. This included gaining an understanding of traits or behaviours, like asking the respondents to identify traditions or norms that lead to gender disparity in science performance. This also enabled the researcher to reach as many respondents as possible within a short time to obtain the real picture as on the ground.

3.3 Target Population

According to Sheldon (2010), target population is the entire set of units for which the survey data are to be used. These sets of units are used to sample respondents for the study. Kakamega East Sub County has 124 secondary schools. The study targeted head teachers, science (physics, chemistry, and biology) teachers, and students. The number of head teachers targeted was 124. The number of science teachers targeted was 372. For the schools with many teachers, the researcher selected the longest serving teacher. The study also

targeted science students in form four. The total targeted students' population was 12400. The total target population for the study was 12896.

3.4 Sample Size and Sampling

A sample is a small quantity of a population selected for reflection and analysis. Mugenda and Mugenda (2008) recommend ten percent to thirty percent (10% to 30%) of the population as a suitable sample to represent a population. Therefore, the researcher used 10 per cent in selecting the sample size. The sample size was 12 schools. Since there was one head teacher per school, head teachers targeted were 12. The researcher selected one teacher per subject, which is $3 \times 12 = 36$. In schools with many science teachers, the study selected the one who has served for the longest time. More so, the researcher selected two students per subject, which is $6 \times 12 = 72$.

3.5 Research Instruments

Research instrument used to collect data for the study were two sets, which included questionnaires and interview guide. Three sets of questionnaires was used; one questionnaire for head teachers, one for science teachers and another for science students. A questionnaire enabled the researcher to collect information that can easily be analyzed. They also allowed for anonymity of respondents. The questionnaires comprised of closed and open-ended questions. The questionnaire was used to gather information concerning the following aspects; girls' perception towards science subjects, culture, beliefs, and traditions, teachers and parents' roles that might influence girl's studying of science subjects in secondary schools.

3.6 Validity of Research Instruments

Validity is the extent to which a research instrument processes or measures what it is supposed to measure and performs, as it is intended to perform (Roberts, 2004). Validity of the research instruments was done during pilot study. It was conducted through pre-testing of the instruments to determine whether the items represent what they were supposed to measure.

3.7 Reliability of Data Collection Instruments

Mugenda and Mugenda (2008) define reliability as some form of degree to which a study instruments produces constant results or data after repeated tests is applied several times. The test-retest method was utilized to test the consistence of the tool. In this study, the instrument was administered to the same group twice. To ensure reliability of the findings, the test was repeated after two weeks and the and the two sets of results compared using Spearman's Rank Correlation Coefficient whereby associations between the two sets of scores representing the measurement obtained from the instruments used was established. This was done to ensure desirable reliability coefficient.

3.8 Piloting

Piloting refers to trying out the items in a questionnaire with a small group of respondents (Wiersma, 2010). The pilot study helped to identify inconsistencies in the items for purposes of reviewing them before the actual research. The pilot study was carried out to pre-test the instruments for measuring what was intended to be measured. The pilot study was done one boy and girl school in Kakamega Central Sub-county, which is neighbouring Sub-county. It identified two head teachers, four science teachers, and fifteen KCSE registered students taking all the three science subjects. Their responses were then analysed to allow necessary amendments to be made to the actual study. The respondents gave feedback on the instruments

about the length of the instruments, clarity, and the formats. The respondents in the pilot study were not incorporated in the actual study.

3.9 Data Collection

The researcher proceeded to schools for collection of information or data. The questionnaires were handed to individual respondents within the sampled schools. The researcher collected the questionnaires immediately they were filled. This discouraged the respondents discussing given answers, and ensured higher return rate. Furthermore, the researcher interviewed the head teachers to get more information on the topic of study.

3.10 Data Analysis

Data analysis involves organizing, summarizing, and synthesizing data in order to provide necessary information for description. The researcher carried out data analysis by scrutinizing the questionnaires and the interview schedules. A tally system was developed where total number of frequencies for given variables were calculated. The data was then presented using tables, graphs, and pie charts. The researcher applied descriptive statistics in analyzing the data. The results were summarized in frequency tables and charts after which a report was compiled.

3.11 Ethical Consideration

The research took the following measures before embarking on the actual data collection in order to ensure adherence to research ethics. First, the researcher sought permission from all relevant authorities, which include NACOSTI, Kakamega County Commissioner, and Kakamega County Director of Education and Kakamega East Sub-county Director of Education. In addition, the researcher sought the respondents consent before they participated in the study. In order to secure their cooperation, participants were made conscious of the purpose of the study. They were also assured that their responses would be treated with utmost confidentiality. Furthermore, participants in the study were assured that all information

will be treated with anonymity, confidentiality and their names will not be divulged. The names of the schools and learners were not shown on any identification form that they used to make their response. Lastly, the respondents were not be coerced to fill the questionnaires; it was a voluntary exercise.

CHAPTER FOUR

PRESENTATION OF THE FINDINGS

4.1 Introduction

This chapter entails presentation of the study's findings, which sought to establish factors contributing to gender disparity in science academic achievement KCSE in Kakamega East Sub County. The findings are arranged according to the levels under which the respondents in the study area participated. The responses were summarized and compiled in frequencies, and converted to percentages. The data was analyzed using descriptive statistics. Therefore, the chapter presents the findings in accordance with the issues and views articulated by participants who were science teachers, secondary school students, and head teachers. The following objectives guided the study:

- i. To establish the impact of the students' attitude on academic performance in sciences at secondary school level in Kakamega East sub county.
- ii. To examine the influence of students' socio-economic status on academic performance in sciences at secondary school level in Kakamega East Sub-county.
- iii. To assess the influence of cultural factors on academic performance in sciences at secondary school level in Kakamega East sub county.

4.2 Response Rate

The research instruments were administered to 12 head teachers, 36 science subject teachers and 72 students. The questionnaire was the main research instrument. The research assistance assisted in issuing the tools to the respondents. Thus, the questionnaires were returned after being filled. All the 120 respondents returned their questionnaires. According to Kerlinger (1973), 60 per cent of questionnaire rate is good. In this study, the return rate of questionnaires

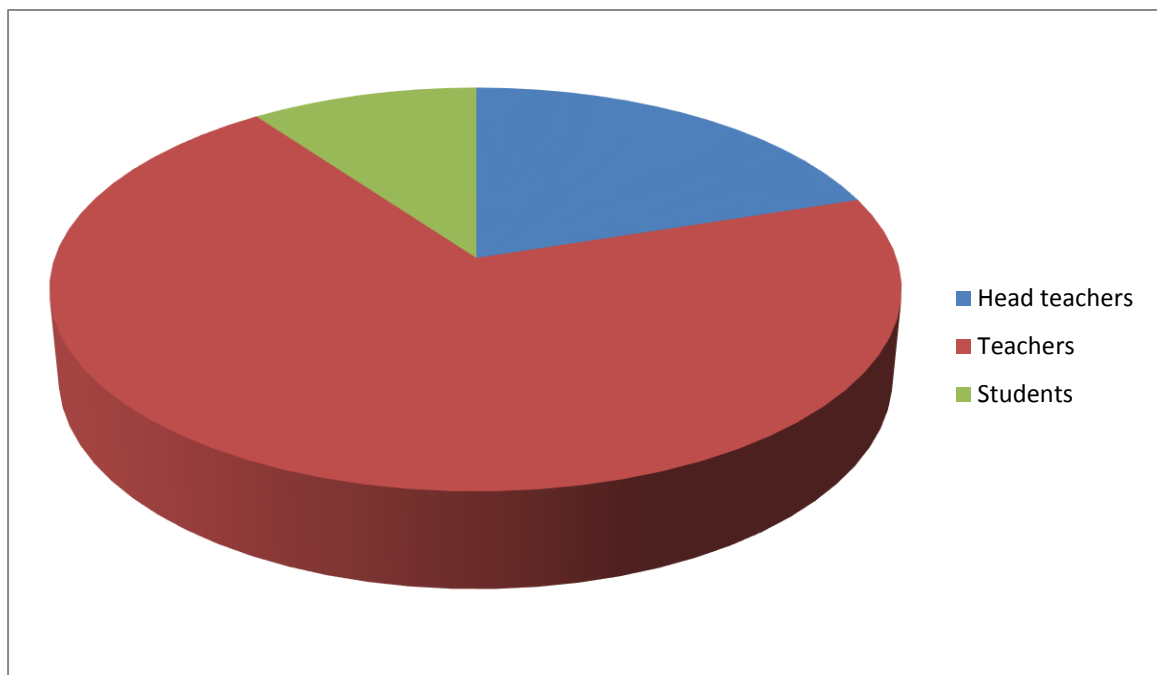
was 100 percent, which was above 60 percent. Therefore, it was a perfect return rate. This return rate was represented in Table 4.1

Table 4. 1 Respondents Return Rate

Category of Respondents	Sample Size	Return Rate	Percentage
Head teachers	12	12	100
Teachers	36	36	100
Students	72	72	100
Total	120	120	100

Figure 4. 1 Respondents Return Rate

The data in Table 4.1 was represented in pie chart as indicated in Figure 4.1



4.3 Demographic Data

The study analysed demographic data of respondents. The data analysed included, gender of the head teachers, teachers, and students. The data also included age of the head teachers and teachers.

4.3.1 Gender of the respondents

The study sought the gender distribution of head teacher, teachers and students. The results are presented in Table 4.2

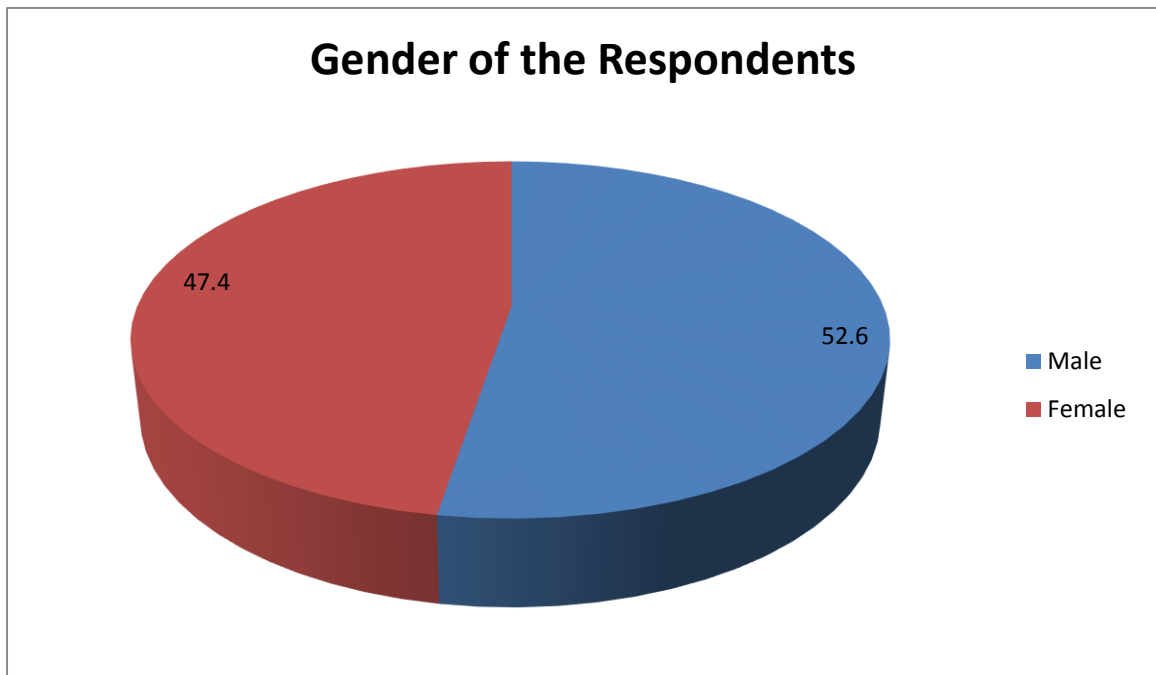
Table 4. 2 Respondent's Gender

	Head teachers		Science Teachers		Students	
	n	%	n	%	n	%
Male	7	58.3	20	55.6	40	52.6
Female	4	41.7	16	44.4	32	47.4
Total	12	100.0	36	100.0	76	100.0

From the results in the Table 4.2 above, male head teachers comprised 58.3 while 41.7 percent were female. In addition 55.6 percent of science teachers were male while 44.4 percent of were female. Besides, 52.6 percent of form four students were male while 47.4 percent of were male. Overall, the majority of the head teachers, science teachers and form four students were male. The gender disparity differed too much in the brackets of head teachers and science students. This implied that boys are motivated to pursue science subjects due to the presence of role models.

The findings of Table 4.4 were presented in Figure 4.2

Figure 4. 2: Gender of the Respondents



4.3.2 Age of Head teachers and teachers

After analysing the gender of the respondents, age of head teachers and teachers was analysed. The summary of the analysis was as presented in Table 4.3.

Table 4. 3: Age of the respondents

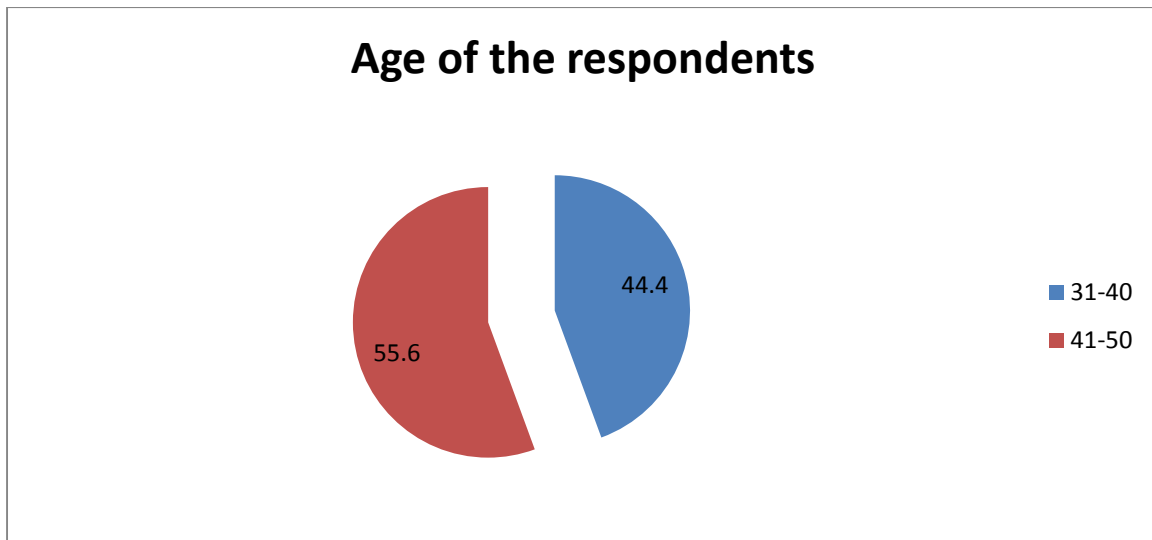
	Head teachers		Science Teachers	
	n	%	n	%
31-40	2	16.7	16	44.4
41-50	10	83.3	20	55.6
Total	12	100.0	36	100.0

From the information in Table 4.3, 16.7 percent of the head teachers were in the age bracket of 31-40years while 83.3 percent were in the age bracket of 41-50 years In addition,

16percent of the science teachers were in the age bracket of 31-40years while 55.6 percent were in the age bracket of 41-50 years.

The findings in Table 4.3 was presented in pie chart in Figure 4.3.

Figure 4. 3 Age of the Respondents



4.4 Professional qualification of the respondents

After analysing the gender of the respondents and age of the head teachers and teachers, the study sought to establish the professional qualification of the head teachers and science teachers. The results of the findings were shown in Table 4.4

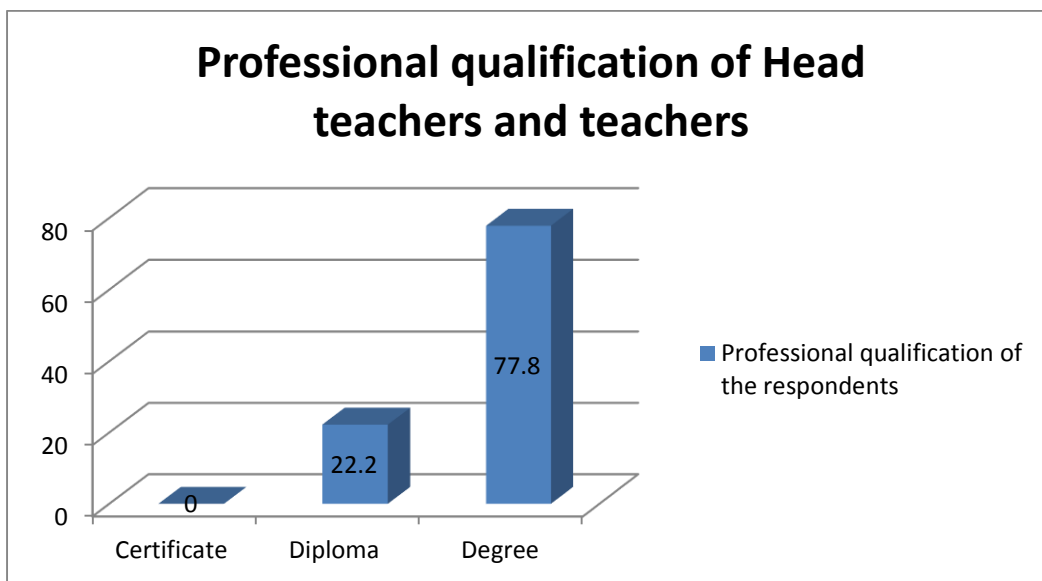
Table 4. 4: Professional qualification of the respondents

	Head teachers		Science teachers	
	n	%	n	%
Certificate	0	0	0	0
Diploma	1	8.3	8	22.2
Degree	11	91.7	28	77.8
Total	12	100.0	36	100.0

From the results in the Table 4.4 above, 91.7 percent of the head teachers had degrees while only 8.3 percent had a diploma. Besides, 77.8 per cent of the science teachers had a professional qualification of degree while 22.2 per cent had diploma. No group had a professional qualification of certificate.

The findings of Table 4.4 was presented in a bar graph in Figure 4.4.

Figure 4. 4: Professional qualification of the head teachers and teachers



Sixty percent of the head-teachers who participated in this study were male as compared to 40.0% of their female colleagues. Seventy percent were above 50 years of age. Forty percent had master’s degree while sixty percent had first degree. Only fifty nine percent of those who participated had over ten years of experience as head-teachers.

4.5 School Category

Respondents were drawn from three different school categories: Boys’, girls’ and mixed schools. Table 4.5 shows the findings of the study

Table 4. 5: School Category

Category of School	Frequency	%
Boys only	20	16.7
Girls only	30	25
Day-Mixed	70	58.3
Total	120	100

Figure 4. 5: School Category

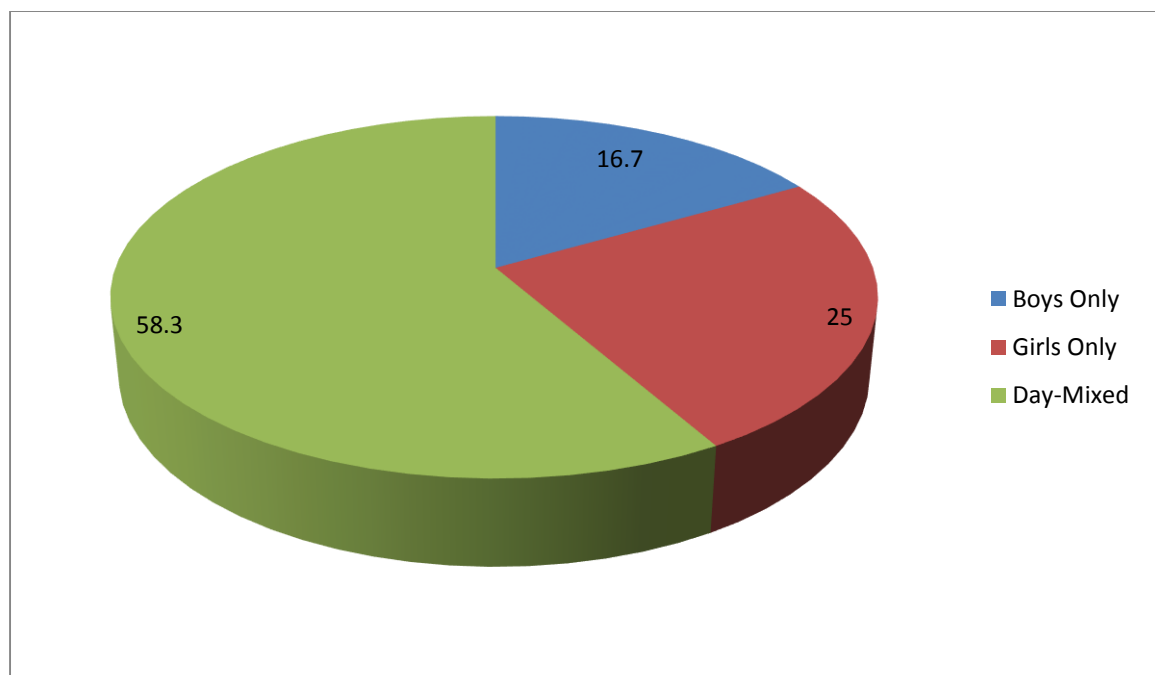


Table 4.5 provides information on sampled students' distribution based on the school category or type. Out of the sampled respondents, 30 (6.2%) came from boys only, 90 (24.5%) from girls' only and 160 (69.3%) from mixed schools category. Kakamega East Sub-county consists of mostly mixed followed by girls' only schools and lastly boys only schools (only three boys' schools for the entire Sub-county). Therefore, this explains why the population of the sample representing boys from boys' only schools is the least followed by girls and lastly the sample representing mixed schools is the largest.

4.6 Analysis of data on students attitudes towards science subjects

After analysing data on the respondent is demographic information, the study analysed data that was on objective one and research question one. The research objective one sought to determine student's attitudes towards science subjects. To achieve this objective, the study sought to inquire whether students considered sciences as significant or important subjects or not, and whether or not they enjoyed both the theory and practical lessons. Views were sought from the students on the importance of science subjects. The summary of the students' responses was represented in Table 4.6

Table 4. 6 Students' responses on importance of science subjects

	Male students		Female students	
	n	%	n	%
Important	30	75	12	37.5
Not important	10	25	20	62.6
Total	40	100.0	32	100.0

Data contained in Table 4.6 indicated that 75 percent of the male students said that science subject was important in their life while 37.5 of female said it was important. Additionally,

25 percent of male student respondents said that sciences were not important while 62.5 percent female student's respondents said science subjects were not important. This implied that boys viewed science subjects as important in their life. This concurred with Trowbridge (2004), who noted that male students' positive perception on science subjects were higher than female students.

The study also sought information from students whether or not they enjoyed both the theory and practical lessons. The summary of the students' responses were reflected in Table 4.7

Table 4.7 Students' views on enjoyment while pursuing science subjects

	Male students		Female students	
	n	%	n	%
Enjoy	30	75	12	37.5
Don't Enjoy	10	25	20	62.6
Total	40	100.0	32	100.0

Data contained in Table 4.7 indicated that 75 percent of the male students said that they enjoyed sciences while 37.5 of female students respondents they enjoyed science subjects. Additionally, 25 percent of male student respondents said that they did not enjoy learning sciences while 62.5 percent female students' respondents said they did not enjoy learning science subjects. This implied that boys enjoyed learning science subjects than girls. This concurred with Trowbridge (2004), who noted that male students' enjoy learning science subjects than the female students.

The study sought further student's perceptions on influence of attitudes towards science subjects. The findings were indicated in Table 4.8

Table 4.8 Students' perceptions on influence of attitude towards science subjects

STATEMENT	SD (%)	D (%)	NS (%)	A (%)	SA (%)
i. Science subjects are useful in my future life.	1.9	3.1	9.3	32.2	53.5
ii. I do not like Chemistry, Biology and Physics	42.1	28.4	15.4	10.2	3.9
iii. I enjoy Biology, chemistry and physics theory lessons.	6.0	9.4	12.1	41.5	31.0
iv. I enjoy Chemistry, Physics and chemistry practical lessons.	3.3	3.9	6.0	40.0	46.7
v. Science subjects are difficult	23.2	24.7	16.6	19.7	15.8
vi. I like my Chemistry, Biology and Physics teacher	3.7	6.4	7.1	32.4	50.3
vii. I often study Chemistry, Biology, and Physics on my own.	10.4	14.5	13.3	35.3	26.6
viii. My friends influenced me to choose Chemistry, Biology and physics.	42.0	27.7	12.3	9.6	8.5
ix. My Chemistry, Biology and physics teacher influenced me to choose the subject	36.8	23.7	13.1	11.6	14.8
x. I like studying Chemistry, Biology, and Physics during free time.	15.8	23.1	16.6	29.1	15.4

Key:

SD Strongly Agree

D Disagree

NS Not Sure

A Agree

SA Strongly Agree

Table 4.8 gives a summary of the analysis of students' attitudes towards Chemistry, Biology, and Physics. On the issue of importance of the subject, 1.9% strongly disagreed with the notion that science subjects areas important, 3.1% disagreed, 9.3 were not sure, 32.2% agreed while 53.5% strongly agreed that science subjects are important for their future life. This means that about 85.7% considered science subjects as important to their future life. Probed on their dislike for the subjects, 42.1% strongly disagreed, 28.4% disagreed, and 15.4% were

not sure.

A further 10.2% admitted to their dislike of the subjects by agreeing while 3.95% strongly agreed that they disliked Chemistry. Seventy-one percent attested to liking Chemistry, Biology, and Physics. On the difficulty of the subjects, 23.2% of the respondents strongly disagreed with the notion that Chemistry, physics and Biology are difficult subjects, 24.7% disagreed while 16.6% of the respondents were non-committal. Another 19.7% agreed that the subjects were difficult while 15.8% strongly felt that Chemistry, biology and Physics was difficult. Cumulatively therefore, 47.9% did not consider the subjects difficult while 35.5 percent considered science subjects as difficult with the remaining 19.7% being non-committal.

Concerning practical lessons, 3.3% strongly felt that they did not enjoy, 3.9% disagreed to enjoying the lessons while 6.0% were not sure. Of the 86.7% remaining respondents, 40.0% agreed that they enjoy Chemistry practical lessons while 46.7% strongly agreed. According to MOEST 2013 report, learners care about how a teacher relates to them than how much the teacher knows. If they are positive about the teacher, they will look for positive things about the teacher. The study sought to determine how respondents perceive their science teachers as a determinant of their attitude towards the teacher and ultimately the subjects.

In their response, 82.7% cumulatively scored for liking their science teachers the remaining 17.2% said they either did not like their teacher or were not sure. Of those who said they disliked their teacher, 3.7% strongly disagreed to liking the teacher, 6.4% disagreed while a further 7.1% were not sure. On the other hand 32.4% agreed that they liked the subject teacher and 50.3% strongly agreed. In terms of time invested in the study of the subject, an important aspect of attitude, 10.4% of the respondents strongly disagreed that they often studied Biology, Physics and Chemistry, 14.5% disagreed while 13.3% were non-committal (not sure). Asked whether they liked studying sciences, 15.8% strongly disagreed, 23.1%

disagreed while 16.6% were not sure. On whether it was out of the influence of friends that they chose to specialize in Chemistry, 42.0% strongly disagreed, 27.7% disagreed while 12.3% were non-committal. Only 9.6% of the respondents who agreed that peers influenced their choice and the remaining 8.5% strongly agreed to the same statement. On whether the science teachers influenced their choice, 36.8% strongly disagreed, 23.7% disagreed while 13.1% were not sure.

Overall, data contained in Table 4.8 revealed that 22% of the students perceived sciences as important while 20 % said they enjoyed learning the subject. More so, 25% of the students indicated that their feelings towards the sciences influenced their desire to study it. The remaining 23 % of the learners said that their choice of science subject was based on the teaching methods that the teacher utilized in delivering the content.

The study further sought information on learner's attitudes towards science subjects. Head teachers, teachers and students were asked to rate their perceptions as strongly disagree, disagree, agree and strongly agree. Their responses are reflected in Table 4.10

Table 4. 10 Perceptions of head teachers, teachers and students on influence of attitudes towards sciences

Rating	Head teachers		Teachers		Students	
	N	%	n	%	n	%
	Strongly disagree	2	20	8	24.2	5
Disagree	0	0	0	0	16	17.3
Agree	3	30	11	30.3	19	21.1
Strongly agree	7	50	17	45.6	32	48.4
Total	12	100	36	100	72	100

Data contained in Table 4.10 revealed that 50 percent of the head teachers strongly agreed that learners attitudes influenced their participation in science subjects. Besides, 30 percent of the head teachers agreed that the attitude of learners influenced their participation in sciences. Additionally, 20 percent of the head teachers strongly disagreed that learners’ attitude influenced their participation in science subjects.

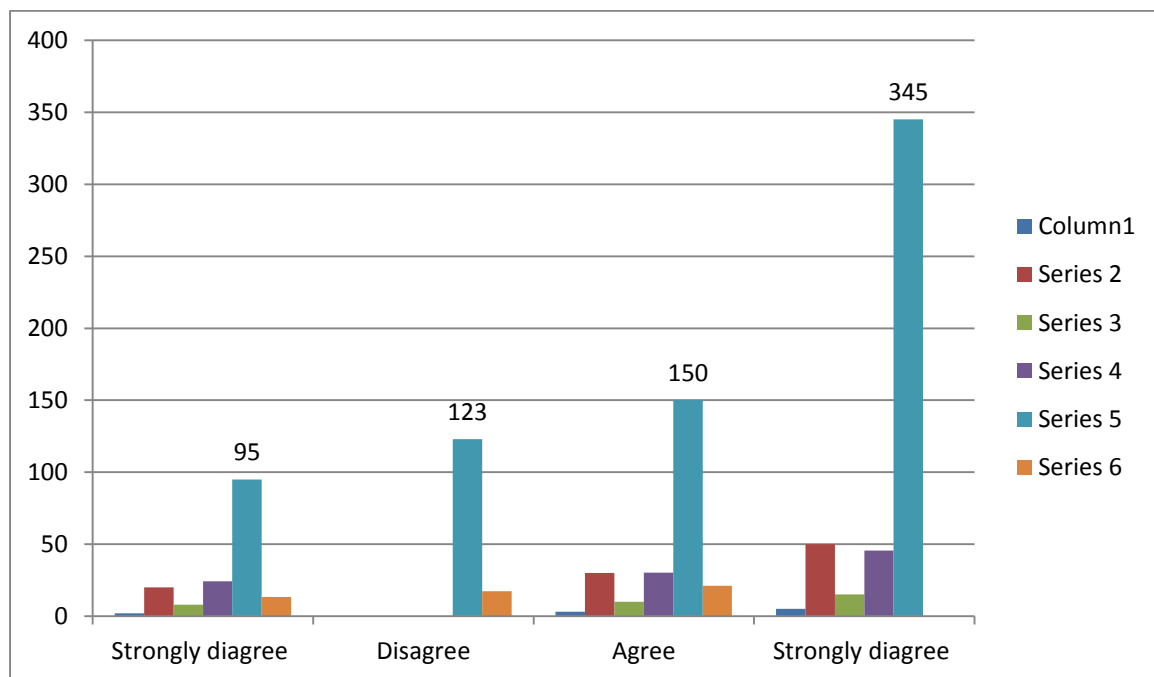
Further findings contained on data in Table 4.10 indicated that 45.6 percent of the teachers strongly agreed that learners attitudes influenced their participation in science subjects. Furthermore, 30.3 percent of the teachers agreed that the attitude of learners influenced their participation in sciences. Additionally, 24.2 percent of the teachers strongly disagreed that learners’ attitude influenced their participation in science subjects.

The research findings contained on data in Table 4.10 further showed that 48.4 percent of the students strongly agreed that learners attitudes influenced their participation in science subjects. Furthermore, 21.1 percent of the students agreed that the attitude of learners

influenced their participation in sciences. More so, 17.3 percent of the students disagreed that learners attitudes influenced their participation in sciences. Additionally, 13.3 percent of the students strongly disagreed that learners’ attitude influenced their participation in science subjects.

Overall data contained in Table 4.10 revealed that over 70 percent of head teachers, teachers and students indicated that learners attitudes influenced their participation in science subjects. This implied that learners’ attitudes play crucial role in pursuance of science subjects. The research findings concurred with Trowbridge (2004) who asserted that learner’ attitudes about the importance of learning sciences may be perceived as both a contribution and result variable since their dispositions towards the subject can be associated to educational achievement in ways that strengthen higher or lower academic attainment.

Figure 4. 6 Perception of head teachers, teachers and students on the influence of attitudes towards sciences



The study further sought teachers’ and learners’ perceptions on the extent of learners’ attitudes towards pursuance of science subjects. The findings were captured in Table 4.11.

Table 4. 11 Perceptions of teachers and students on the extent of earners attitudes towards sciences

Rating	Male		Male		Female		Female	
	Teachers		Students		Teachers		Students	
	n	%	n	%	n	%	n	%
Positive	15	63.6	31	70.1	9	42.4	11	32.8
Negative	5	36.4	9	29.9	8	57.6	21	67.2
Total	20	100	40	100	16	100	32	100

Data contained in Table 4.11 revealed that 63.6 percent of the teachers indicated that male learners have a positive attitude towards sciences while 36.4 percent of the teachers noted that male students have a negative attitude towards the science subjects. Besides, 70.1 percent of the students indicated that male students had a positive towards sciences while 29.9 percent of the students noted that male students had a negative attitude.

Further findings showed that 42.4 percent of the teachers believed that they had a positive attitude while 57.6 percent of the teachers believed they had a negative attitude. More so, 32.8 percent of the students indicated that female learners had a positive attitude towards science subjects while 57.6 percent of the students showed that female students had a negative attitude towards science subjects.

Overall data contained in Table 4.11 revealed that over 60 percent of teachers and students indicated that male learners have a positive attitude towards sciences while less than 30% revealed that female students have a negative attitude towards sciences. This implied that male learners' attitudes played a crucial role in pursuance of science subjects. This research finding concurred with Jones and Wheatley (2012) who found that, male students generally

have a better perception towards sciences (especially physical sciences) than their female counterparts do.

4.6.1 Socio-economic Status Influence on Academic Performance

After analysing data of head teacher, teachers and students perceptions on the influence of attitudes on academic performance in science subjects, the study sought to find out the effect of socio-economic status on learner choice of science subjects. Furthermore, the researcher asked the head teachers, teachers and students to give their perceptions on how socio-economic status influence learner choice of science subjects.

The findings were presented in Table 4 12.

Table 4. 12: Perceptions of head teachers, teachers and students on how Learners Socio-Economic Status Influence their Choice of Science Subjects

Rating	Head teachers		Teachers		Students	
	n	%	N	%	n	%
	Strongly disagree	1	10	4	12.1	7
Disagree	0	0	0	0	9	16.8
Agree	2	20	11	33.3	16	22.7
Strongly agree	9	70	21	54.6	40	56.9
Total	12	100	36	100	72	100

Data contained in Table 4.12 revealed that 10 percent of the head teachers strongly disagreed socio economic status of students influenced their choice of science subjects. Another 12.1% of the teachers strongly disagreed that socio economic status of learners influenced choice of science subjects. Besides, 36 percent of the students strongly disagreed that socio economic

status of students influenced their choice of science subjects. However, 0 percent of the head teachers disagreed that socio-economic status of students influenced learners' choice of science subjects. In addition, none percent of the teachers disagreed that socio-economic status of learners influenced the students' choice of science subjects. More so, 16.8 percent of the students disagreed that socio-economic status of students influenced learners' choice of science subject.

Further findings from Table 4.12 revealed that 20 percent of the head teachers agreed that socio economic status of learners influenced students' choice of science subjects. Additionally, 33.3 percent teachers agreed that socio economic status of learners influenced students' choice of science subjects. More so, 22.7 percent of the student's greed that socio economic status of learners influenced students' choice of science subjects. Further research findings from Table 4.9 revealed that 70 percent of the head teachers strongly agreed that socio economic status of learners influenced students' choice of science subjects. In addition, 54.6 percent of the teachers strongly agreed that socio economic status of learners influenced students' choice of science subjects. Furthermore, 56.9 percent of the students strongly agreed that socio economic status of learners influenced students' choice of science subjects.

Overall data from Table 4.12 indicated that at least 80 percent of the head teachers, teachers and students agreed that the socio-economic status of students influenced learners' choice of science subjects. This implied that the socio-economic status of students play a crucial role in determining choice of science subjects by the students. The study findings concurred with Kose (2011) who noted that parental socio-economic characteristics influenced learner' academic attainment.

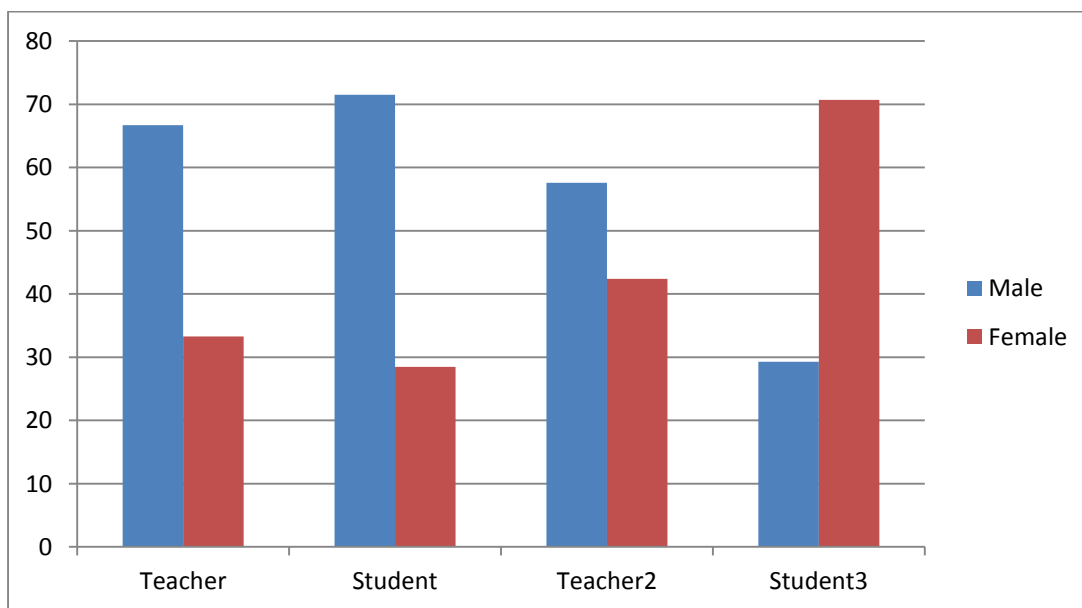
The study wanted to understand the perception of teachers of science, and students on the influence low and high socio-economic status on choice of sciences. The findings were presented in Table 4.13

Table 4. 13Perceptions of teachers and students on how low and high socio-economic status influence learners choice of science subjects

	Male				Female			
	Teachers		Students		Teachers		Students	
	n	%	n	%	n	%	n	%
Low	15	66.7	25	71.5	10	57.6	7	29.31
High	5	33.3	15	28.5	6	42.4	25	70.7
Total	20	100	15	100	16	100	32	100

The findings in Table 4.13 were presented in bar graph in Figure 4.7

Figure 4. 7 Perceptions of teachers and students on how low and high socio-economic status influence learner’s choice of science subjects



Data contained in Table 4.13 revealed that 66.7 percent of the teachers indicated that low socio-economic status of male learners affected their choice of science subjects while 33.3 percent of the teachers noted that high socio-economic status of male students influenced their choice of science subjects. Additionally, 71.5 percent of male students believed socio-economic status of a family influences learner's choice of science subjects while 28.5 percent believed that socio-economic status does not influence student's choice of subjects. Further data from table 4.13 showed that 57.6 per cent of teachers believed that low socio-economic status affect girl's choice of science subjects while 42.4 per cent of teachers believed that high socio-economic status affect learners choice of science subjects. Additionally, 29.31 per cent of students believed that low socio-economic status of learners affect their choice of science subjects. Overall, data contained in Table 4.13 revealed that over 60 percent of head teachers, teachers and students believed family socio-economic status influence learners participation in sciences. This implied that socio-economic status of the family determines student's choice of science subjects. The research findings concurred with Kean and Tsai (2008) who observed that family's socio-economic status influence learners achievement in school.

The study further wanted to understand the effects of culture on gender academic performance in sciences. The findings are presented in Table 4.14 below.

4.7 Influence of Cultural Factors on Academic Performance in Sciences

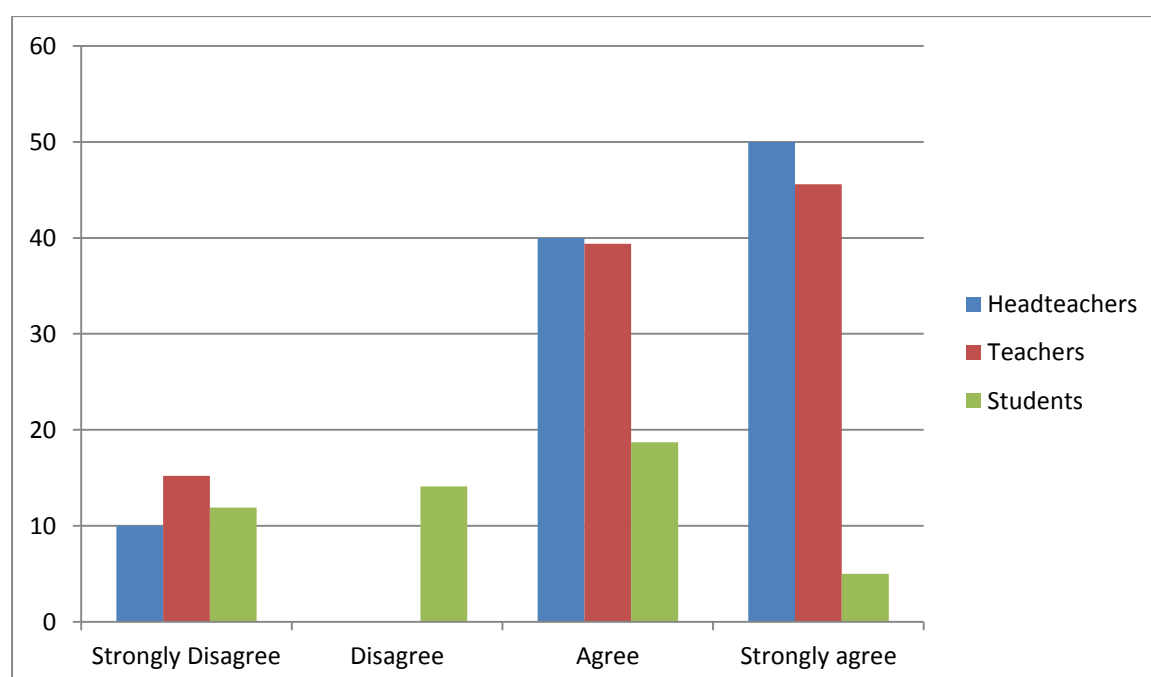
After analysing socio-economic status, the study sought to find out how culture influence students choice of science subject. The study sought the opinions of head teachers, teachers and students on the influence of culture on student's choice of science subjects. The findings was presented in Table 4.14

Table 4. 14 Perceptions of head teachers, teachers and students on how culture affects learner’s choice of sciences

Rating	Head teachers		Teachers		Students	
	n	%	n	%	n	%
	Strongly disagree	1	10	5	15.2	2
Disagree	0	0	0	0	10	14.1
Agree	4	40	14	39.4	15	18.7
Strongly agree	7	59	17	45.6	45	49.7
Total	11	100	36	100	76	100

The findings of Table 4.14 was presented in bar graph in Figure 4.8

Figure 4. 8 Perceptions of head teachers, teachers and students on how culture affects learner’s choice of sciences



Data contained in Table 4.14 discovered that 10 percent of the head teachers strongly disagreed that culture influenced learner's participation in science subjects. Besides, 40 percent of the head teachers agreed that the culture of learners influenced their participation in sciences. Additionally, 50 percent of the head teachers strongly agreed that learners' culture such as societal perception of girls attending school influenced their participation in science subjects.

Further findings contained on data in Table 4.14 indicated that 45.6 percent of the teachers strongly agreed that learners culture influenced their participation in science subjects. Furthermore, 39.4 percent of the teachers agreed that the culture of learners influenced their participation in sciences. Additionally, 15.2 percent of the teachers strongly disagreed that learners' culture influenced their participation in science subjects.

The research findings contained on data in Table 4.14 further showed that 49.7 percent of the students strongly agreed that learners culture influenced their participation in science subjects. Furthermore, 18.7 percent of the students agreed that the culture of learners influenced their participation in sciences. More so, 14.4 percent of the students disagreed that learners culture influenced their participation in sciences. Additionally, 11.9 percent of the students strongly disagreed that learners' culture influenced their participation in science subjects.

Overall data contained in Table 4.14 indicated that over 50 percent of head teachers, teachers and students indicated that learners culture influenced their participation in science subjects. This implied that learners' culture play crucial role in pursuance of science subjects. The research findings concurred with Chege and Sifuna (2010) who asserted that societal culture make girls acquire negative attitude about their ability to compete at the same level with boys while boys on the other hand are brought up believing they can handle any subject.

4.8 Implication for Kenya Vision 2030

The vision 2030 plan aims at making Kenya an industrialized middle-income nation. Achievement in education will lead to realization of the vision through specialized training and innovation. Science and technology have been mapped out as the key pillars to the achievement of the vision because they can steer innovation and industrialization. In turn, it will accelerate economic growth of the country. The research findings show that science performance in Kenyan schools is below average. The boys performed better than girls did but the study has shown that the results are not impressive. The implication is that the majority of the students are performing below average making access to science-oriented courses that can steer innovation and industrialization difficult. The ministry of education and other stakeholders need to address the issues discussed in the research work to improve performance in science subjects. If secondary school students are not attaining required grades to enrol to science and technology courses, it will be impossible to realize the vision.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

This chapter entails a summary of the research findings, conclusions, and recommendations for additional study. The main purpose of this study was to establish the key determinants of gender disparity in Science Subjects performance in Kakamega East Sub-county in an attempt to provide a way of remedying the situation. The study investigated students' attitude towards sciences and its effects on performance. Additionally, the research investigated how the socio-economic status of a family influenced student's academic performance in sciences. Furthermore, the study looked at cultural aspects that influence learner's academic performance in the sciences. Research data was obtained through structured questionnaires. Science teachers, students, and principals were used as subjects of the study. Observations were carried out in all the sampled secondary schools in Kakamega East sub county. Information obtained was analysed both qualitatively and quantitatively with the aid of SPSS computer software.

5.2 Summary

The main research findings from the summarized data are presented below based on the demographic data and the study's objectives.

5.2.1 Demographic Data of the Respondents

The research revealed that the male population was higher among the students' respondents accounting for 60.1% of the total students' respondents in comparison to 39.9% of the female students. 60.7% of the students were aged between 15 and 16 years and only 3.0% were above 18 years. In addition, the male teachers' participants were dominant at 62.5% and 37.5% were female, showing that science has been a male dominated field. Furthermore, Sixty percent of the head-teachers were male as compared to 40.0% of their female

colleagues. Seventy percent were above 50 years of age. Forty percent had master's degree while sixty percent had first degree. Only fifty nine percent of those who participated had over ten years of experience as head-teachers.

5.2.2 Findings of Objective One: The Influence of Student's Attitude

Data contained in Table 4.6 indicated that 75 percent of the male students said that science subject was important in their life while 37.5 per cent of the female students noted sciences were important. This implied that boys viewed science subjects more important than girls. This concurred with Trowbridge (2004), who noted that male students' positive perception on the importance of science subjects were higher than female students. In addition, findings contained in Table 4.7 indicated that 75 percent of the male students said that they enjoyed sciences while 37.5 of female students' respondents said they enjoyed science subjects. This meant that boys enjoyed learning science subjects than girls. This concurred with Trowbridge (2004), who noted that male students' enjoy learning science subjects than the female students.

Further data contained in Table 4.8 revealed that 45% of respondents noted that females had a positive attitude towards science subject while 55% of the respondents indicated that male students had a positive attitude towards science subjects. This implied that students of both gender had a positive attitude towards sciences. However, it was established that boys had a relatively more positive attitude than the girls. This was an indication that students developed interest in the subjects because of anticipated career awareness. This means that the students' interest in the science subjects were intrinsically driven by their career prospects. Boys therefore, had positive attitudes towards science subjects due to career expectations. The findings concurred with Whyte (2011), who noted that girls exhibit less positive attitude towards sciences than boys.

5.2.3 Findings of Objective Two: The influence of Students' Socio-economic Status

Data contained in Table 4.10 indicated 67 % of respondents indicated that their parents were more concerned with their education while 51% of the respondents showed the same. This implied that parents have distinct perceptions towards their daughters and sons. Girls are raised to handle feminine duties such as rising of children while boys have a whole working life. This explains why majority of the parents are concerned with the boys education than girls. In addition, the research found out that the level of education of parents influenced learner's involvement in the academics. The research findings indicated that failure among learners from low socio-economic status had low school success rates due to lack of friends from high socio-economic status who can encourage them to study hard. More so, the findings of the study correlated with Ozurumba's (2013) conclusion that in most families, the level of educational of the parents correlate with their children academic performance. Parents who are educated are more likely to help their offspring in various subjects at home and attend school academic clinics to find out the children's learning progress.

5.2.4 Findings of Objective Three: The Influence of Culture

Data contained in Table 4.11 showed that 55% of the respondents were adversely affected by culture while 41% of the respondents revealed that culture did not play a significant role in their academics. However, 67% of the female respondents indicated that cultural stereotyping was a hindrance to their educational success while 20% of the male respondents were of the same thought. These findings concurred with De Broueker and Underwood (2010) concerning the cultural norms and traditions that overlook girls participation in education.

5.3 Conclusion

The conclusions made relied on the study's findings. The study concluded that boys performed better than girls in physics and chemistry did whereas girls performed better than

boys in biology. Additionally, the performance in science subjects varied depending on the category of school. County schools performed better than the Sub-county school. Furthermore, performance also varied depending on the type of school. Besides, learner attitude, socio-economic and cultural factors influenced the performance of girls and boys in sciences at Kenya Certificate of Secondary Education.

5.4 Recommendations

From the observations and findings recorded in the course of this study, the following recommendations were made in an attempt to avert the issue of gender disparity in performance of sciences.

5.4.1 Ministry of Education, Science, and Technology should

Enhance supervision of schools to assist student's general secondary school entry behaviour by providing career guidelines, which would encourage both boys and girls to pursue science subjects. The ministry should formulate a policy to guarantee that both boys and girls have equal participation in science related activities.

5.4.2 The School Administration should

Teacher and parents should hold academic clinics where they sensitize the learners on the importance of science subjects. Career counselling and vocational guidance will motivate the students more and they will be able to change their view of who they are and who they can become.

5.4.3 The Science Teachers should

Organize excursions to science discussions as a way of encouraging learners to advance positive attitude or disposition towards sciences. Additionally, science teachers should adopt a testing policy by giving the students more Chemistry, Biology, and Physics assignments apart from the school controlled midterm and end of term tests.

5.4.4 Recommendations for Further Research

Based on the findings from this study, the following recommendations are proposed for further research.

- i. A comprehensive study should be done on the causes of science educator's negative insight of their students' abilities in science subjects. Additionally, a research should be carried out to assess the effects of students' science anxiety especially among girls.
- ii. To better understand the reasons for the differential academic performance between the boys and girls, a study on the other issues that determine the differences in science academic attainment.

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APPENDICES

Appendix I: Introduction Letter

University of Nairobi,

P.O. Box 30197,

Nairobi

September 2018

To

THE HEAD TEACHER

.....SECONDARY SCHOOLS,

Kakamega East Sub-county

Dear Sir/ Madam

RE: PERMISSION TO CONDUCT RESEARCH IN YOUR SCHOOL

I am a postgraduate student at the University of Nairobi pursuing a Master of Education Degree in the Department of Educational Foundations. I am conducting a research on FACTORS CONTRIBUTING TO GENDER DISPARITY IN SCIENCE PERFORMANCE IN KCSE IN KAKAMEGA EAST SUB-COUNTY, KENYA.

Kindly, I request for information from you that will facilitate the subject under study. The information you will provide will be used for the purpose of this study only and your identity will be treated with utmost confidentiality.

Thank you

Yours Faithfully,

Imbova Navin

Appendix II: Head-Teacher Questionnaire

Kindly tick (✓) the appropriate response or respond as indicated. Do not write your name or the name of your school.

SECTION A

Demographic Information

1) Kindly indicate your school category Boys () Mixed () Girls ()

2) Indicate your highest professional qualifications.

- a) Diploma ()
- b) Graduate ()
- c) Masters ()
- d) PhD ()
- e) Any other, specify.....

3) For how long have you been a secondary school head teacher?

- a) Less than one year ()
- b) 1-5 years ()
- c) 6-10 years ()
- d) 11-15 years ()
- e) More than 15 years ()

SECTION B

In your opinion, do learner characteristics influence their performance in Chemistry in K.C.S.E?

1. Do you think cultural factors can influence how boys and girls perform in chemistry in K.C.S.E
2. Do you think boys and girls attitude towards chemistry influence their performance in the subject?
3. What is your opinion on how socio-economic status of a family influence boys and girls performance in chemistry?

THANK YOU FOR YOUR RESPONSE

Appendix III: Teacher Questionnaires

The following statements are intended to obtain information on the differences to boys and girls performance in science in your school. The statements appearing in section A are open ended. In section B, the questions are both open and close ended. Please respond to all of them accordingly. All the information given is private and confidential, and will be used for the purposes of this study only.

Kindly tick (✓) the appropriate response or respond as indicated. DO NOT WRITE YOUR NAME OR THE NAME OF YOUR SCHOOL.

SECTION A: Demographic Information

Kindly indicate your school category: Boys [] Girls [] Mixed []

1. What is your gender? Male [] Female []
2. What is your age?
21 – 25 years [] 26 – 30 years [] 41 – 45 years []
31 – 35 years [] 36 – 40 years [] 46 – 50 years []
51 – 55 years [] 56 – 60 years []
3. What is your highest professional qualification
PhD [] M.Ed [] B.Ed [] Diploma []
Any other (specify).....
4. For how long have you been teaching chemistry?
1 – 5 years [] 6 – 10 years []
11 – 15 years [] 16 – 20 years []
20 – 25 years [] 25 – 30 years []
5. What is the total number of pupils in your class?
Male [] Female []
6. How many science teachers are there in your current station? ...
7. Apart from teaching, do you have any administrative responsibilities?
YES () NO () If yes, please specify.....

SECTION B

Against some statements in this section are abbreviations SA-Strongly Agree, A-Agree, NS-Not Sure, D-Disagree, and SD-Strongly disagree. Please respond to all of the statement by ticking against the box you feel is the most suitable as per your opinion.

STATEMENT	SA	A	NS	D	SD
8. Students like coming to me with science problems for help					
9. Most students choose science subjects in my school because they have no alternative					
10. Students who spend more time studying physics, chemistry and biology perform well in the subject					

11. How do you classify the academic performance of your students in science examination particularly K.C.S.E. Poor () Average () Good () V. Good ()
12. Are you happy with the academic performance of your students in science subject's examination particularly in K.C.S.E?
13. What influences your choice of a teaching and learning technique?.....
.....
14. In your opinion, what contributes to poor academic performance in science subjects.....
15. What do you do to cover science syllabus adequately? Give brief explanation.....
16. How often do you provide the following types of assessment to your science subject students?
17. What cultural practices do you think limit girls from choosing oriented subject?

18. Do you think a learner's socio-economic status influence their academic performance?

	Always	Often	Occasionally	Rarely	Never
Beginning of term tests					
Weekly tests					
Mid-term tests					
End of term tests					
Revision of past K.C.S.E exams					

Appendix IV: Questionnaire for Students

The statements below are intended to gather information on factors that might be contributing to performance of students in sciences in your school. Suggest to the best of your ability your opinion against each of the statements. Thanks for accepting to take part in this programme.

Section A: Background Characteristics.

1. What is the name of your school? _____
2. What is the category of your school? Girls Only () Boys Only () Mixed ()
3. Which type of primary school did you attend? [Tick only one] Public () Private ()
4. What is your gender (tick one) A. Boy B. Girl
5. What was your grade in Science in KCPE? A B C D E

Section B: Learner attitudes Towards Chemistry

For **MOST** statements in this section, the abbreviations **SA- Strongly Agree, A- Agree, NS- Not sure, D- Disagree, and SD- Strongly Disagree will appear**, please respond to all the statements by ticking the one you consider most appropriate

STATEMENT	SA	A	NS	D	SD
1. Science subjects are useful in my life					
2. I do not like sciences					
3. I enjoy science theory lessons					
4. I enjoy science practical lessons					
5. My chemistry teacher believes that I can perform well in chemistry					

6. We have a science club in the school. YES () NO ()
7. What aspects of your culture do you think hinder favor boys?
8. What is your family's monthly income?

THANK YOU FOR YOUR RESPONSE

Appendix V: Authorization Letter



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

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NACOSTI, Upper Kabete
Off Wanyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. **NACOSTI/P/18/78632/27155**

Date: **10th December, 2018**

Navin Imbova Mackatiani
University of Nairobi
P.O Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *“Factors contributing to gender disparity in science performance in Kenya Certificate of Secondary Education in Kakamega East Sub-County, Kenya,”* I am pleased to inform you that you have been authorized to undertake research in **Kakamega County** for the period ending **10th December, 2019.**

You are advised to report to **the County Commissioner and the County Director of Education, Kakamega County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit a **copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Kakamega County.


The County Director of Education
Kakamega County.

National Commission for Science, Technology and Innovation is ISO9001:2008 Certified

Appendix VI: Research Permit

THIS IS TO CERTIFY THAT:
MR. NAVIN IMBOVA MACKATIANI
of UNIVERSITY OF NAIROBI, 0-50100
Kakamega, has been permitted to
conduct research in Kakamega County
on the topic: FACTORS CONTRIBUTING
TO GENDER DISPARITY IN SCIENCE
PERFORMANCE IN KENYA CERTIFICATE
OF SECONDARY EDUCATION IN
KAKAMEGA EAST SUB-COUNTY, KENYA.
for the period ending:
10th December, 2019

Permit No : NACOSTI/P/18/78632/27155
Date Of Issue : 10th December, 2018
Fee Recieved :Ksh 1000



[Signature]
Director General
National Commission for Science,
Technology & Innovation

.....
Applicant's
Signature