FACTORS INFLUENCING THE CHOICE OF SCIENCE SUBJECTS IN SECONDARY SCHOOLS IN TANZANIA: THE CASE OF KIBAHA DISTRICT

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE MASTER OF EDUCATION IN ADMINISTRATION, PLANNING AND POLICY STUDIES OF THE OPEN UNIVERSITY OF TANZANIA

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CERTIFICATION

The undersigned certifies that she has read and hereby recommends for acceptance by the Open University of Tanzania a dissertation titled: *"**Factors Influencing the Choice of Science Subjects in Secondary Schools in Tanzania: The Case of Kibaha District",***in partial fulfillment of the requirements for the degree of Master of Education in Administration, Planning and Policy Studies of the Open University of Tanzania**.**

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Date

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DECLARATION

I, **Mwenga Huruma,**do herebydeclare that this dissertation is my own original work and that it has not been presented by any person and it will not be presented to any other University for a similar or any other degree award.

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Signature

…….

Date

DEDICATION

This dissertation is dedicated to; Magreth Msoka, my wife, Gladness Mwenga, my daughter, Gift Mwenga, my son andMr and Mrs Mwenga, my parents, who supported and encouraged me throughout the entire period of this course and made it possible for me to successfully complete my dissertation.

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ABSTRACT

The main objective of this study is to identify factors, whichinfluence the choice of Science subjects in secondary schools in Tanzania. The study was conducted in Kibaha district as a case study. A total of 122 respondents from six different co-educational secondary schools represented by letters A, B, C, D, E, G and F were involved in the study. The study adopted a holistic case study design. Both Qualitative and quantitative approaches were used and data were gathered through Questionnaires, Interviews, Observations, Documentary Reviews and all ethical issues such as seeking permission for data collection from responsible authorities andconfidentiality of respondents were observed. Descriptive statistics for data analysis were backed by Microsoft office Excel. The study found out that some factors were found to have great influence in deciding to study Science subjects and have sustaining power to students regarding their choice and sustainance of Science Subjects. Also factors that led to low or high students' performance in Science subjects were discussed.The findings show that availability of laboratory, library, Science textbooks, and teaching style affect the performance of Science subjects.The study recommends that the parents should cooperate with teachers in guiding and influencing students to choose science subjects. The Government should strive to ensure there are adequate Science teachers, adequate teaching and learning facilities in schools including textbooks and equipment so as to attract more students into Science, more privilege especially in accessing loans should be given to Science students to motivate them to take Science subjects, employment opportunities and other aspects. Educational policies should be well communicated to students as they are the beneficiary of the policies.

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LIST OF ABBREVIATIONS

BRN	Big Results Now
CBG	Chemistry, Biology and Geography
CSEE	Certificate of Secondary Education
GCSE	General Certificate of Secondary Education
HESLB	Higher Education Students' Loans Board
MEDAPPS	Masters of Education in Administration, Planning and Policy Studies
NECTA	National Examination Council of Tanzania
OECD	Organization for Economic Cooperation and Development
OUT	Open University of Tanzania
PCB	Physics, Chemistry and Biology
PCM	Physics, Chemistry and Mathematics
PGM	Physics, Geography and Mathematics
PSLE	Primary School Leaving Certificate
SEDP	Secondary Education Development Plan
STEM	Science, Technology, Engineering and Mathematics
TSS	Takwimu za Shule za Sekondari (Secondary School Statistics)
UNESCO	United Nations Educational, Scientific and Cultural Organization
UK	United Kingdom
URT	United Republic of Tanzania
USA	United States of America

CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter deals with the background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study and organization of study.

1.2 Background

A major goal for education in the 21st century is to create scientifically literate citizens, who are able to think critically, make sense of complex data, and solve problems (NRC, 1996). Blum (1977) asserts that a rigid education system with no offer for choice of subject cannot inspire and sustain that diversity of though. Regardless of all the efforts , currently it is observed that the objectives for improving scientific literacy is not archieved, Science enrollment are relatively low, archivements in certain grade level is declining and teachers morale is low. In the past the more intellectual able students were the ones selected to pursue Science and Mathematics in secondary schools (Voogot, 2001).

The number of secondary schools has more than tripled between 2004 and 2014 to serve different underserved communities and so has the number of enrolees. Despite these successes, there have been a number of challenges, including the following; Poor performance in secondary education examinations, with most students getting marginal pass of Division IV or failing completely, acute shortages of teachers, especially in the Sciences and Mathematics, with many students not able to do these

subjects at all, acute shortages of Science and Mathematics teachers, inequalities in learning environments among different schools resulting in inequalities of learning outcomes, with girls doing poorly in both participation rates and pass rates, especially in Science and Mathematics subjects, insufficient infrastructure, including many construction projects that started under SEDP I, but were not completed, lack of, or non-use of, laboratories and libraries in most schools resulting in students doing the Science theoretically, and most of them doing poorly. This poor performance in Science subjects has, in turn, resulted in an avoidance syndrome, with most students choosing to enroll in Arts subjects, rather than natural Sciences, poor teaching approaches in the classroom, as it is teacher-centered, no practicals and demonstrations, and classroom time often not being used efficiently and effectively for mental engagement of the students and poor teacher incentive system (UNESCO, 2010).According to Hon. Kawambwa, the Tanzania minister of Education and Vocation Training when interviewed by ITV on 10th December, 2012, said:

> *"We are trying to increase the enrollment of students in Science courses by motivating them. The Government priorities are on education and health courses, such areas are given loans on high priority compared to other fields."*

Hon. January Makamba (2013), the deputy minister for Science and communication in Tanzania commented on the global forum titled as smart partnership global dialogue:

> *"Investment in Science and technology by increasing access to Science education through establishing different institutes for research is significant."*

The broad objectives of the National Science and Technology policy (1996) for Tanzania are; to inculcate a Science and technology culture in the Tanzania society, to establish and/or strengthen national Science and technology institutions through provision of adequate facilities, to promote active participation of women in Science and technology by creating an enabling environment for them to be innovative and conscious of Science and technology in their everyday life (URT, 1996).

With all efforts done to increase the access to secondary education, and challenges facing Science education provision still there are minimal attention on what influences students to join Science subjects, Perhaps these tasks are perceived to be a teacher's role. A simple question to make is what factors affect students' decision on which subjects to study? This study has developed the answers to these questions.

1.3 Statement of the Problem

The rate of students dropping Science in Tanzania is getting worse and alarming regardless of the increase in access to education for most Tanzanian children. Teachers, without proper study, attribute this high dropout rate to various factors such as non-preparedness for self-study, lack of aptitude to the Science discipline, lack of support on the part of Government and influence of other groups like parents, role models, teachers and peer friends (Salim, 2012).

In the recent years, the Tanzania workforce has grown at more than four times the rate of total employment. At the same time, the proportion of Tanzanian citizens qualified to fill Science jobs is stagnating (MoE, 2010). There is a wide discrepancy between learners opting for Science subjects and those opting for other subjects in

secondary schools especially at form three level in Tanzania. Students are classified as Science students when they join either chemistry only or chemistry and physics classes where as those non - Science students are allowed to drop Science subjects. The students decision regarding choice of Science subjects at secondary schools are often made with little information and awareness. Students make choice of optional Science subjects with considerable ambiguity, uncertainty and stress (Ndalichako & Komba, 2014).

1.4 Objectives of the Study

To study the factors influencing students decision regarding the choice of Science subjects. More specifically this study aimed to;

(i) Examine factors influencing students' choice of Science subjects.

(ii) Investigate what factors sustain the interest of studying Science subjects.

(iii) Investigate what factors influences the level of performance in Science subjects.

1.5 Research Questions

(i) What factors influence students' choice of Science subjects?

(ii) What factors sustain students' interests in Science subjects?

(iii) What factors lead students to achieve the level of performance in Science subjects?

1.6 Significance of the Study

This study aims at identifying the factors influencing students' interest and choice of Science subjects. It's my belief that knowing the key factors discouraging or

encouraging students to join Science studies, as a nation, we will be in a good position to fight against the problem. We all need to know that motivation plays a great role in determining the students' choice to either join or opt out of Science subjects.

This study reminds different stakeholders the role of influencing students to participate in Science subjects. Students need external influences to get involved in different academic programmes.

To change the current status on students' participation in Science subjects to a level the Government desires, more effort are needed. The efforts constitute the motivation to students, who have negative attitudes toward Science studies.

Teachers, parents, Science professionals and Government through their policy makers and planners are able through this study to identify their position in influencing students to pursue Science studies.

The Government is awakened to work fast in its educational plans after being aware of the extent to which presence of laboratories in schools and the general school environment affects the student's participation in Science studies.

Through this study teachers and parents are able to weigh their power if it is enough to encourage learners to pursue Science studies so as to align with the Government demand for Science workforce in different socio-economic areas.

This study attempts to establish the exact reasons for why there is high dropout rate in Science subjects at early stages of the secondary education programmes offered by

the Ministry of Education and Vocational Training of Tanzania while determining the motivational factors for enrolment of more students in the Science programmes.

The study is significant to other researchers who are interested in doing research on education development and students' performance in relation to education management activities and strategies in the country. In addition, the study significantly enriches different studies that have been undertaken on students' performance, and it reveals the problems associated with secondary education and students' performance, which are very important in identifying the solutions for addressing the identified problems.

1.7 Summary of the Chapter

The chapter presents the status of the education system in Tanzania which seems to be faced with many challenges thus influencing students' choice of subjects to study for their future career aspirations. Three research questions were formulated from their specific objects. It gives out the severity of the issue at hand and hence the rational of the study. The main objective of the study is to identify the factors influencing students' choice of Science Subjects to study in Secondary Schools.

1.8 Organization of the Study

The study is organized on five chapters, chapter one deals with the background of the study, statement of the problem, purpose of the study, specific objectives of the study, research questions, significance of the study and organization of study. Chapter two, deals with theoretical literature review, empirical studies, research gap and conceptual frame work. Chapter three covers research methodology, Study area,

research design, research approach, target population, sample and sampling procedures, research instruments, validity and reliability of research instruments, data collection technique, data analysis, ethical issues, research budget and time frame. Chapter four presents the findings of the research study as respondents respond to the research instruments and discussion of the findings. Chapter five presents conclusion and recommendations for action and for further research. Thereafter follows references and appendices.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This Chapter deals with theoretical literature review, empirical studies, research gap and conceptual framework.

2.2 Theoretical Literature Review

2.2.1 Rational Choice Theory

Rational choice theory, also known as choice theory or rational action theory, is a framework for understanding and often formally modeling social and economic behaviour. The basic premise of rational choice theory is that aggregate social behaviour results from the behaviour of individual actors, each of whom is making own individual decisions. The theory therefore focuses on the determinants of the individual choices (methodological individualism).

Rational choice theory then assumes that an individual has preferences among the available choice alternatives that allow them to state which option they prefer. These preferences are assumed to be complete (the person can always say which of two alternatives they consider preferable or that neither is preferred to the other) and transitive (if option A is preferred over option B and option B is preferred over option C, then A is preferred over C). The rational agent is assumed to take account of available information, probabilities of events, and potential costs and benefits in determining preferences, and to act consistently in choosing the self-determined best choice of action.

2.2.2 Holland's Theory

Holland's theory is centred on the notion that most people fit into one of six personality types; Realistic, Investigative, Artistic, Social, Enterprising and Conventional.

Table 2.1: Realistic

Description of interest area	Some key skills	Some occupations with Realistic components	Subjects you could study to give you the skills
Likes to work mainly with hands, making, fixing, assembling or building things, using and operating equipment, tools or machines. Often likes to work outdoors	Using and operating tools, equipment and machinery, designing, building, repairing, maintaining, working manually, measuring, working in detail, driving, moving, caring for animals, working with plants	Pilot, farmer, horticulturalist, builder, engineer, armed services personnel, mechanic, upholsterer, electrician, computer technologist, park ranger, sportsperson	English, Maths, Science, Workshop, Technology, Computing, Business Studies, Agriculture, Horticulture, Physical Education

Source. Savickas et. al, 2012

Table 2.2: Investigative

Description of interest area	Some key skills	Some occupations with Investigative components	Subjects you could study to give you the skills
Likes to discover and research ideas, observe, investigate and experiment, ask questions and solve problems	Thinking analytically and logically, computing, communicating by writing and speaking, designing, formulating, calculating, diagnosing, experimenting, investigating	Science, research, medical and health occupations, chemist, marine scientist, forestry technician, medical or agricultural laboratory technician, zoologist, dentist, doctor	English, Maths, Science, Computing, Technology

Source. Savickas et. al, 2012

2.3 Empirical Studies in Developed Countries

Worldwide, there is still a shortage of studies in Mathematics and Science education that examine student engagement over time and research the reasons for taking or avoiding Mathematics and Science at the point at which these subjects become optional. Much remains to be done to understand what drives student subject choice once subjects become optional (Blenkinsop *et al*., 2006; Gill *et al*., 2009). Of the Sciences, we concentrate on physics. In part this is because of the severity of the problems: both in the UK and in a number of other countries. This include a persistent shortage of specialist physics teachers and a continuing decline in the percentage of school cohort that chooses to study physics 'post-16' (a term that we use as a shorthand for 'post-compulsory' as physics, within Science, is compulsory for students in the UK until this point).

In England at the age of 16, students typically take General Certificate of Secondary Education (GCSE) examinations in about eight to twelve subjects, with limited student choice. Post-16 academic courses usually take the form of Advanced Level (A-Level) examinations taken at age 18 in about two to four subjects with a great deal of student choice.

In order to do physics at A-Level, students in England, Northern Ireland and Wales (Scotland has a different examination system) are typically required to get a high grade (A*, A or B) in GCSE Science or physics (Gill, 2009).The trend seen in France, Germany and other developed countries where for instance, the students' enrolment number has been decreasing in different rates. Example the trend in some of the countries were as follows, Norway experienced decrease at the rate of 40% as

from 1994 to 2003, Denmark is 20% as from 1994 to 2002, Germany 20% as from 1994 to 2001 and the Netherlands was 6% as from 1994 to 2001(OECD, 2007).

According to the 2005 Euro barometer study on European reports, it was revealed that the reason why youth in schools are currently not interested in taking Science subjects are complex, however, there is a firm evidence that indicates a connection between attitudes towards Science subjects and the way in which Science subjects are taught. The current pipeline and participation rates for US trained STEM (Science, Technology, Engineering and Mathematics) professionals are thought to be inadequate to meet the nation's needs. Due to lack of proper motivation, many high-STEM-ability students fail to realize their full STEM potential in high school or leave the STEM track in college.

According to the EWC (Engineering Workforce Commission) report of 2005, over the past 20 years, the total number of students, who received bachelor's degrees in engineering declined by 19.8% in the US. During the 2000-2010 periods, employment in Science and engineering occupations would have been expected to increase about three times faster than the rate for all occupations. According to another report from the Computing Research Association, enrollment in undergraduate degree programmes in computer Science is more than 50% that is lower than that of five years ago. Between 2005-2006 and 2006-2007, the number of new students declaring computer Sciences as a major fell 43%, to 8,021 (School News, 2008a). The report did agree with the US Bureau of Labour Statistics in 2008 that between 2006 and 2016, 854,000 professional IT (information technology) jobs will be added, an increase of about 24% with the estimated 1.6 million IT jobs

replaced in the ten-year period fields. According to Gellos, a spokesman for Microsoft Corp, all companies have that person down the hall to help with computer issues (School News, 2008a).

In a 2008 report, a public high school authority in the US discovered an extremely low level of interest for participating in STEM related career academics in high school among middle school students; however, the students showed higher interests in arts, literatures, businesses and entertainment related careers, especially the girls (Rogers, 2009). Thus, it sometimes becomes a challenge for many high schools in the US to get a sufficient number of students to choose to enroll in STEM related academic. If low enrollment in STEM fields and low interest in STEM academics continue, all high school academics that link to STEM majors will be at great risk (Rogers, 2009).

The Nashville Area Chamber of Commerce in Tennessee and numerous national sources point out that the US needed more workers in STEM fields. Experts warn that the US apathetic performance in encouraging students to enter STEM careers can complicate the troubles of the nation's already ailing economical situation (Ramirez, 2008).

Furthermore, Science and Mathematics teachers face inadequate support, including appropriate professional development as well as interesting and challenging or relevant curricula. School systems lack tools for assessing progress and rewarding success. The nation lacks clear and shared standards for Science and Mathematics that would help all actors in the system set and achieve goals. As a result, too many

American students conclude early in their education that STEM subjects are boring, too difficult or unwelcoming, leaving them ill-prepared to meet the challenges that will face their generation, their country and the world. Studies found that many US teachers are not well prepared to teach Mathematics and Sciences (Education News, 2010). Future Mathematics teachers are getting weak training and are not prepared to teach the demanding curriculum needed for US students to compete internationally.

The United States and China now account for the largest number of doctoral degrees awarded in the natural Sciences and engineering. The National Science Board has identified better coordination and more effective teaching as the greatest needs of the U.S. educational system. Every two years the National Science Foundation releases a new edition of its Science and Engineering Indicators (USA National Science Board, 2011).

A 2004 study found that 72.2% of US parents indicated that the basis of career choice should be based upon a combination of interests/abilities and the job market; 27.6% responded that career choices should be based solely upon interests/abilities, and only 0.2% stated that career choices should be based upon the labour market (Taylor, et al, 2004). The study found more than 90% of parents had little or very little influence on their college-age children's career decisions; fewer than 10% parents had great influence on their children's career decision-making. Parental support and encouragement were found as influencing factors in children's vocational outcome. The study also found that regarding influence on students, the father and mother were ranked as the first two, the teacher as the third and the counselor as the fourth in children's choice for career development.

However, most of the parents did agree that they did not have or should not have more influence on their children's career decisions (Taylor et al, 2004).In another study, Robinson and Ochs (2008) found that friends were another important influencing body for pursuing high school students for taking Science.

Carmen, Vidal Rodeiro (2006) A new curriculum and assessment structure for students staying in education after age 16 was introduced in 2000. One of its objectives was to increase the breadth of the curriculum followed by 16- 19 year olds and to increase student participation rates after compulsory schooling. This new curriculum had a major impact upon students' choice of subjects and their achievements. Recent policy developments in England provide a basis for a renewed interest in the factors affecting subject choice in the later years of schooling (ibid).The purpose of the research was to learn how and why students choose their subjects at AS/A level, how they combine them and what advice is given to them on subject choice and subject combinations. Students in England typically study three or four subjects to A level and an additional subject to AS level. The subjects that are perceived as more important are Chemistry, Further Mathematics, Biology, Mathematics, Music and English. The subjects perceived as less important are Sociology, Media Studies, Religious Studies and Philosophy. This perception varies by gender and ability (ibid).

A set of reasons for choosing subjects was given and students were asked to rate how important these reasons were at the time they made their choices. Future employment considerations and references to enjoyment, usefulness and ability dominated the responses.

However, the reasons given by students depended on the nature of the subjects. There does not seem to be evidence that centres were leading students into taking particular subjects. Factors affecting subject choice were also studied by social class, ability and centre type. Choice was limited by the subjects offered in the centres. In some cases, subjects were offered through options blocks and students were able to make a relatively free choice from within specific subject categories (such as Humanities, Languages, Technology, Arts, etc) (ibid).

The aim of this strategy was to encourage students to have a mixture of subjects thus not closing down their future options. However, students who had a particular interest in a specific area represented this grouping. In fact, some students reported that they had compromised their choices by tailoring their options to what the centres could make available. Parents and teachers were the most sought sources of advice when decisions about AS/A2 subjects were made. Other family members, in particular brothers and sisters, were also useful sources of information. Formal careers education and guidance appeared to have less influence than family but they played an important role in the decision making process (ibid).

Alkhatib (2013) from Jordan University of Science and Technology said:

> *"I think historically speaking Mathematics and Science subjects used to be introduced as difficult subjects. This perspective is promoted by both students and teachers. Now technology can be used to make these subjects lovely for students."*

Markatos (2013) from National Technical University of Athens said:

> *"It all depends on the teacher. When he/she creates an interesting class presentation the students react accordingly. Learning must be pleasant to both students and tutors if it is to be efficient. Unfortunately in many cases it is neither"*

Williams (2013) a Scientist from Soka University of America said:

> *"The calculus reform efforts of the 1980s and 1990s recognized a problem that I myself experienced when I was studying engineering back in the day. All of my calculus classes focused exclusively on problem sets.*
>
> *When I then went to my engineering physics class, I was asked to solve real-world problems, not problem sets--and I struggled to transfer what I had learned in my calculus classes to those real-world problems. It would be interesting to know from people working in Mathematics whether those reform efforts shifted the focus of instruction and, if so, whether it has had any effect"*

2.4 Empirical Studies From Developing Countries

Researches conducted in some developing countries by Munro and Elson (2000) indicates that, only 30% of students studied Physics and 32% studied Chemistry and Mathematics at their higher learning in 1994. These percentages decreased to 25% and 26% respectively in 2005 (Lyons, 2005).

According to Kaundia and Inanga (2001) in their research on the advantages and opportunities of Science and Mathematics based careers for women, the choice of optional subjects is mainly based on the interaction between the curriculum and the clientele. The Kenya certificate of secondary education is offered to all candidates who fulfill all the requirements. For examination, candidates must sit for at least seven subjects selected from group, 2, 3, 4 and 5. English, Kiswahili and Mathematics in-group are all compulsory.

Farrant (1997) argues that where study options exist, the subject chosen can be of critical importance to the pupil. Therefore, the teacher needs to know their pupils intimately and also to have knowledge of careers and the job market so that they can get the pupils to the right track as early as possible.

What factors influence those students opting for Geography at the expense of other optional subjects in Botswana? What are the implications for teacher education at this level of education? The major finding to this question by Adeyami (2009) was the preference of Geography by students because of its relationship with their intended careers.

The implications of this study, among others, include the organization of frequent workshops to students and the need to tailor teacher education curriculum to include career choice and the effective use of counseling facilities in schools (ibid).In real sense, there is no major natural barrier to equality between the sexes in matters of education since differentiation in learning is dependent on the social environment, which can be changed.

However, the school system permits and fosters great differences in the choices of subject of study although research shows that the school system does its best. Counc and Wendy (2000), assert that boys choose Mathematics and Science with excitement and anticipation because Science offers practical hands on learning connecting to many of the things that excite the imagination such as space, cars and airplanes. The prospect of messing around with Chemicals, Bunsen burners and experiments is very seductive to many boys.

The main attraction of Mathematics for boys is that it constantly posse's short term challenges which appeal to their sense of competitiveness and satisfaction of attaining time limited goals. Girls on the other hand learn Science with a degree of practicality, building on their everyday experiences and suggesting how these could be improved by Science. This means there is a link between enjoyment of a lesson and success in the subject.

Pratt et al, (1984), argues that where choice is available, girls tend to prefer the Humanities; Languages and Social Science while boys prefer Sciences, Mathematics and Technological subjects. Students tend to be directed into conventionally male and female subjects.

Further, Wasanga (1997), reported that male students have positive attitudes towards all aspects of Science while female students towards Science is influenced by their perception of the subject being difficult as well as their teachers and books. The masculine image of Science as presented in schools made it particularly a difficult choice.

For adolescent girls who were striving to achieve a feminine identity hence they are concentrated in Art based subjects. The researcher asserts that girls perceive Science subjects to be more useful to boys (ibid). At tertiary level women are generally under – represented compared to men especially in Science and Mathematics. Girls fail in Science and Mathematics generally because of three things: the way the subjects are taught; their attitude towards the subjects; and social cultural factors (Wasanga, 1997).

Salisbury & Ruddel (2000) assert that teachers' attitude and behaviour affect pupils' subject choices in different ways. Some students will choose a subject just because they like the teachers and this may or may not have significance of gender differences.

Further, according to those two editors, some teachers may have their own attitude about the suitability of their subject for boys and girls, which they express in number of overt and covert ways. Experiences of different areas of the curriculum may still differ for boys and girls because of the attitudes and behaviour of teachers. Gender imbalance among teachers could have a bearing in sex differentiation of subject choice. Statistics from Equal Opportunity Commission (1987) showed that teachers subject qualifications tend to reinforce sex stereotyping in curriculum choice because of the absence of non-stereotypical role models.

Education should provide each child with the basic skills for surviving in the modern world and help him develop some useful marketable skills that will be of use to others hence ensuring employment.

Large numbers of young people remain unemployed after school partly because the schools do not provide the range of qualifications that match employment needs (Peninah, 2012). Eyken (1973) concurs with this view by asserting that education fails a child if it has little to do with his real life education must relate to learners lives as they have been, as they are and as they will, hence giving purpose to the process. Education should not reduce young people to bored, repressed and frustrated kids.

Eshiwani (2001) argues that as the country strives to attain a higher level of social economic development. It is imperative that the education and training sector properly play its role of developing the necessary human resource; in fact Sciences and Mathematics need to be strengthened to form a firm foundation for subsequent development. This is so because in situations where people have access to education, the subjects they study tend to fix them to particular careers.

According to Ihanga and Kaundia (2001), different subjects are rated differently for specific jobs. Different subjects are weighed differently for specific jobs. This implies that there is need by teachers to continually point out that the relationship between what is being taught and its use in occupations. Further teachers can also provide opportunities for students to take part in a variety of experiences that relate to the subject matter being taught to occupations, according to Moon and Mayes (1995).

Eshiwani (2001) in own's research on enhancing female participation and performance in Mathematics, Science, and Information Technology in university

education found out that most schools do not have adequate facilities and equipment for the effective teaching of Science subjects. The researcher further observed that girls' schools are relatively less endowed with the facilities needed for teaching schools are relatively less endowed with the facilities needed for teaching Science subjects. This denies girls' access to a wide choice of Science based fields as they are concentrated in Art based subjects.

This research points to the direction that, the provision and improvement of facilities for teaching Science in schools is an impotent fact in increasing student's participation in Science. Hangs (2001), reveals that good results of a school in a particular subject are a motivation in itself because in a school where boys and girls always do well in a subject, even weaker students will be motivated to choose it in order to excel like their predecessors.

In fact Krebs (1972) asserts that some optional subjects have never effectively existed as a real choice for the majority of students. Rather they have been something that students can settle for when, what they regard as more desirable choices appear closed to them, this situation arises due to: The problem of unavailability of quality education in these subjects, lack of educational motivational for the subjects, Lack of adequate provision of adequate information regarding these subjects and Lack of help to individuals to make and implement decisions regarding these subjects. Krebs (ibid) points to the fact that before choosing subjects there is need for a complete and consistent system of preferences which allow a choice among the alternative because the learning environment is critical on how boys and girls can view a subject.

During the study, (Hizza, 2012) it was observed that all the schools under study had neither libraries nor laboratories.This is among of the challenges facing most of ward secondary schools in Tanzania (URT, 2010). Despite the absence of libraries and laboratories in the selected schools, still 59% of students want to specialize in Science subject, 24% want to specialize in Arts subject and 07% want to learn Commerce subjects by, and while 10% had no response in the areas which they would love to specialize. This implies that, the nonexistence of libraries and laboratories in these schools hinders the visions of students who intend to specialize in Science, Arts and Commercial subjects. The study revealed that, fewer books found in these schools are kept in the head master's office where only teachers can access them (Hizza, 2012).

One important issue to be considered for students' academic excellence is the communication between parents and teachers and the social interactions between them for the betterment of students' academic welfare. Respondents reiterated that, most of the parents do not make follow up on the academic progress of their children, which in turn brings difficulties to teachers in taking care of children due to lack of support from the parents (Hizza, 2012). It is believed that, parents' weakness in making students follow up is among the challenges that influencing poor academic performance of students, especially, in ward secondary schools which are day schools (Hizza, 2012).

2.5 Empirical Studies From Tanzania

Speaking in during Parliament session in 2008, the then minister for Education and Vocational Training Prof. Jummanne Magembe noted that, there was a drop in

Science subject choice for students in secondary schools especially for those going for Advanced Secondary Education in Tanzania.

This was specifically in Mathematics, Biology, Physics and Chemistry whereby the decrease was said to range from 30% in 2005 to 25% in the year 2009 (NECTA, 2005; 2009). Studies reveal that the teaching and learning of Science is more theoretical than observational, experiential and experiment based, this situation affects the interest of students to take these subjects in their higher studies (Speering and Rennie (1996).

Similarly, the studies by Lyon (2005) acknowledged that the decline of interest among young learners in Science subjects in Tanzania is a result of how Science is taught and learnt.Tanzania like many other countries in the world has been making deliberate effots towards developing and improving Science Education. Since independence Tanzania strived to develop the formal Science education apart from Indigenous Science what was there even before the colonial era. The Indigenous Science is not much given priority due to the reason it has no systematic procedures to its approach and also it is not formalized into well organised body of knowledge (Tilya, 2001).

The study (Hizza, 2012) in four selected schools in Moshi observes that Art subjects like Geography, History and Kiswahili have more teachers in each secondary school compared to Science subjects like Physics, Mathematics and Chemistry. Other subjects such as Commerce and Book keeping have fewer numbers of teachers in both schools.

This implies that, the government efforts to increase number of qualified scientists in the country will not be easily attained because of inadequate number of Science subjects' teachers in the country particularly in ward secondary schools where children of the low income earners are studying. These results show the worrying future of scientists in a country, especially, from the newly established ward secondary schools where a very significant number of standard seven leavers are enrolled (ibid).Shortage of teachers and school libraries in most schools has been one of the factors that have contributed immensely to poor students' performance in Tanzania (TLA, 2012).

During the study in Moshi Municipality, (Hizza, 2012) observes that all the schools under study has neither libraries nor laboratories. This is among of the challenges facing most of ward secondary schools in Tanzania (URT, 2010). Despite the absence of libraries and laboratories in the selected schools, still 59% of students want to specialize in Science subject, 24% want to specialize in Arts subject and 07% want to learn Commerce subjects by, and while 10% had no response in the areas which they would love to specialize (Hizza, 2012).The study reveals that, fewer books found in these schools are kept in the head master's office where only teachers can access them (Hizza, 2012).

In Tanzania, admission to secondary school is based on the perfomance at the primary school leaving examination(PSLE). There are seven compursoly subjects at the lower secondary and these include Mathematics and Biology. Before entry into form three, students are advised by their teachers based on their perfomance on selection of subjects in the Arts or Sciences (Unesco,2010).

According to Zsuzsa (1981), the choice of educational programmes is made in direct ratio to information and guidance available to the individual and the breadth of educational opportunities available. The school should therefore ensure that learners make informed choices. Tiqet (1999) revealed that good performance in internal and external examinations in any subject creates an academic discipline commitment and desire to pursue the subject.

Regardless of all the efforts, currently it is observed that the objectives for improving scientific literacy is not archieved, Science enrollment are relatively low, archivements in certain grade level is declining and teachers morale is low.

In the past the more intellectual able students were the ones selected to pursue Science and Mathematics in secondary schools. But nowadays more of these students are more less interested to continue with Science when they join universities (Voogot, 2001).

Table 2.3: Trend of Science Subjects Dropout Rate and Pass Rate in the 2010 Form Four National Examination Results – Tanzania

Subject	Students Registered	Students DroppedSciencesubjects	Studentssatforfinal Exams	Students PassedExams	% ofStudents passed final Exams
Mathematics	350,904	0	350,904	56,467	16.1
Biology	350,904	1910	348,994	106,393	30.5
Chemistry	350,904	212,104	138,800	60,908	43.9
Physics	350,904	257,785	93,119	41,559	44.6

Source: Extracted from Best (2010)

Students start secondary school with an expectation that the school will provide them with an environment that will allow them to freely decide the subjects to study based on their ability and interest. Interest in the subject is regarded as the most important motivational factor in learning (ibid).

The study by Ndalichako (2014) aimed at providing answers to two key questions: 1) Which subjects are most preferred by students in secondary schools? 2) What are the reasons behind the students' interest, or lack thereof, in particular subjects?

Through Observation, Documentary Review and Focused Group Discussion with form three and form four students, The findings showed that the majority of students in secondary schools preferred arts subjects notably because of the challenges they experience in learning Science. The reasons for students preference of a particular subject included the inspirational from significant others, commitment and support provided by the subject teachers, the availability of teachers and their teaching approaches and relevance of the subject to their daily life experiences. (Ndalichako et al, 2014).

Table 2.4: Number of Students, Who Sat For CSEE 2013 in Selected Optional

Subject	Reg. Candidates	% of total candidates
Chemistry	150,010	40.9
Physics	108,609	29.6

Source: Ndalichako (2014)

The study by Mabula (2012) on promoting Science subjects choices for secondary school students in Tanzania revealed that poor quality of Science classroom teaching and a serious decline in interest of students in Science subjects. It is therefore

concluded that, teacher-students interaction and relationships in classroom teaching and learning of Science need improvement. It is suggested that, future research make observations on the influence of social factors in the decline of interest in Science subjects among secondary school students in Tanzania.

People frequently want jobs that meet their academic interests. People in general find that, for whatever reasons, they tend to be interested in certain subjects and disinterested in others from the time they are young children, and no matter what the financial rewards, taking a career in an area where one holds no interest is likely to be unbearable (Ryan, 2000). In this rapidly growing competitive market, industry prefers graduates, who have the potential to meet their research and development needs, and compete effectively with their counterparts worldwide. The overall situation that the wide discrepancy between learners opting for Science and those opting for Arts subjects in Tanzania is a warning that it is less likely Tanzania will improve its local and global leadership in Science unless the Government takes remedial action to produce or import enough experts in these fields (Ibid).

A major goal for education in the 21st century is to create scientifically literate citizens, who are able to think critically, make sense of complex data, and solve problems (NRC, 1996). Research suggests that, if all students are to become scientifically literate, Science instruction must convey greater engagement and meaning to them. To achieve this, Science instruction in secondary schools must provide students with opportunities to explore the world, to apply scientific principles, to sample and analyze data and to make connections among these explorations, their personal lives, and communities (ibid).

2.6 Summary of Literature Review

This chapter has reviewed how various factors influence students' decisions in their choices of subjects in secondary schools. These factors include the individual factors, school factors, social- economic factors and political factors. Wanyama (1996) documented that the labour market is in demand for specific skills that are related to Science subjects.

This makes boys and girls to rate the Humanities subjects lowly. In most cases, especially in Tanzania secondary schools, chemistry subject is taken by all Science students whereas those opting for Art take History as one of their combination subject. Chemistry makes most of the Science combinations and History makes most of the Arts combinations. Mathematics and Biology are compulsory Science subjects in the Tanzania secondary school education system (Ndunguru, 2011). Society also believes that education is a vital asset that brings important benefits to an individual and in the long run to the society. This has therefore destructed learners from pursuing what the society views as marginal subjects (Peninah, 2012).

2.7 Synthesis of Literature Review and Identification of Knowledge Gap

Most of the findings show that the role of motivating students is a teacher's task. Some of the said studies are Murphy (2000), Vygotsky (1986) and Killermann (1988) in USA. A study in Kenya by Peninah (2012) which used form two students as respondents shows that both girls and boys are motivated to make choice of optional subjects mainly by three grouped factors; individual factors, school factor and social economic factors. A case study by Ndalichako and Komba (2014) in Tanzania shows that there are inequalities in terms of how students select subjects in

various schools. The study reveals that majority of students enrolled in ward/community secondary schools make unwise decision contrary to their interest and ability. Ndalichako and Komba (2014) based on pupils performance in CSEE to select schools in different regions in Tanzania for the study. The schools selected for the study were both private and government schools, also both single sex and co – education schools were involved in the study. This study used public and private schools with only co-education system from Kibaha district. The researcher wanted to include both sexes in the evaluation of the study. Therefore gender was considered in this study as an important aspect for students' choice of Science subjects.

The findings show that the majority of students in secondary schools prefer Arts subjects notably because of the challenges they experience in learning Science. The reasons for students preference of a particular subject included the inspirational from significant others, commitment and support provided by the subject teachers, the availability of teachers and their teaching approaches and relevance of the subject to their daily life experiences. (Ndalichako et al, 2014).

The study by (Ndalichako et al, 2014) was silent on why some students choose Science regardless of the challenges they face. The challenges experienced by students in learning Science were not well disclosed. The fact that some students are forced to choose certain subjects was not discussed.None of the study has specifically documented the factors influencing students' decision to choose Science subjects. This study through Questionnare, Observation, Documentary Review and Interviews with form four students studying Science subjects investigated the factors that influence them to decide to take Science subjects at form three level. The

researcher believes that these students made a wise decision of joining Science class with a number of reasons behind them.

The study went further by finding out the factors sustaining students' interests in Science subjects. The researcher believes that after two years of study a student has developed an interest in Science subjects that has sustained the decision of taking Science subjects. Last but not least through form IV mock examination results 2015, the study explored the factors that lead students to achieve the level of performance in Science subjects.

2.8 Conceptual Framework

A conceptualframework is an analytical tool with several variations and contexts. It is used to make conceptual distinctions and organize ideas. Strong conceptual frameworks capture something real and do this in a way that is easy to remember and apply (Henry, 2013). Below is framework of the factors that influence students' choice of Science subjects at secondary school level. The model focuses on the determinants of the choice of Science subjects by students in secondary schools. The variables considered are individual factors, school factors, social economic factors and political policy factors. Each variable in the model affects the students' choice and awareness of Science subject and each interacts with most of other variables. These factors govern the will to decision making as suggested by the choice theory.The theory focuses on the determinants of the individual choices (methodological individualism). The most powerful factors influencing students to choose Science subjects in secondary schools are the individual factors whereby interest and belief are on top of other individual factors.

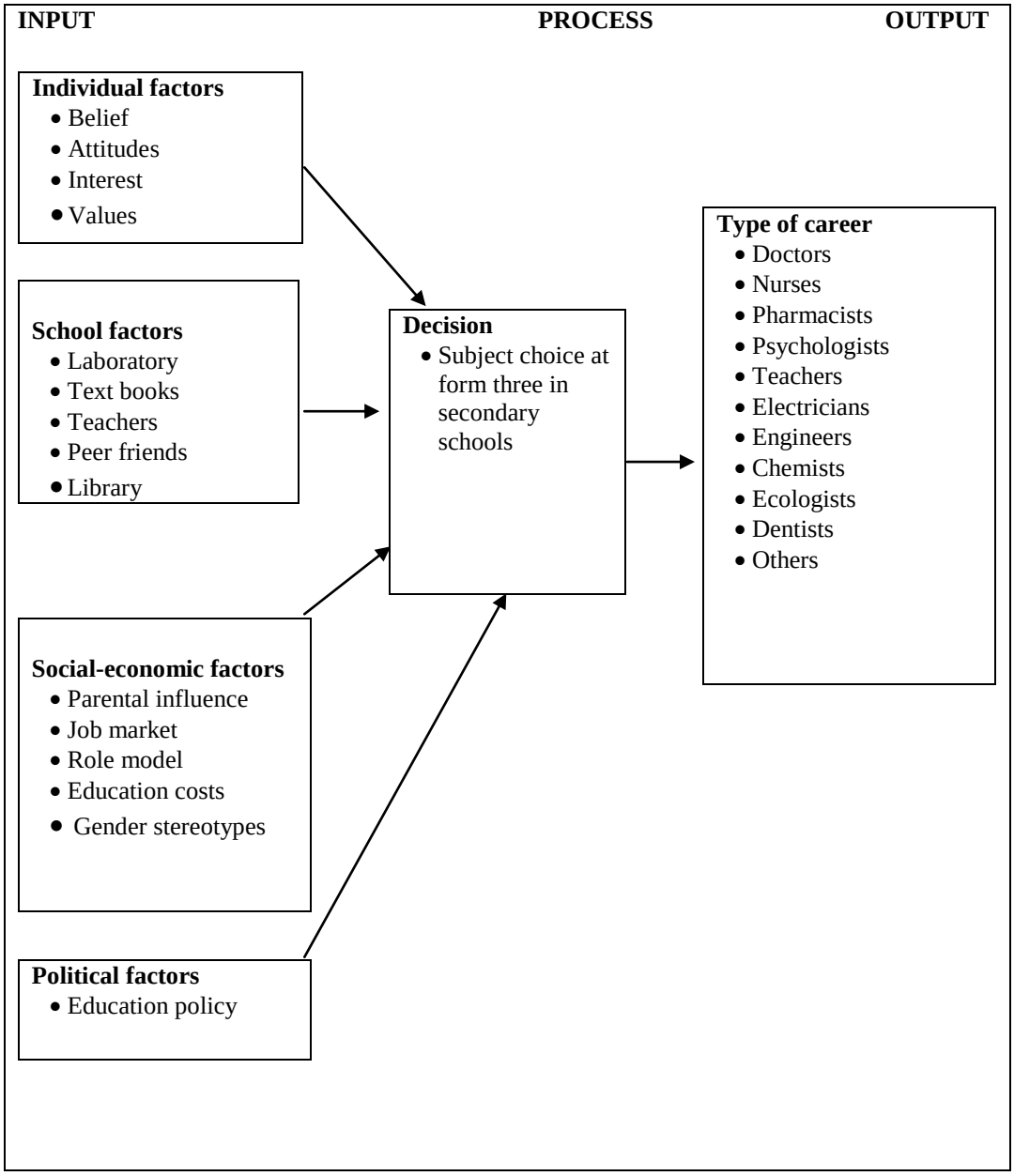

Figure 2.1: Conceptual Framework

Source. Adaptedfrom Peninah(2012)by the researcher

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter briefly discusses research design and methodology that was adopted in various stages of the study. It is concerned with how the research was carried out. The chapter deals with research design, sampling techniques and procedures that were adopted in data collection and finally tools used to collect data. The chapter consists of the following sub-sections namely, Study area, Research Design, Target Population, Sampling and sample Selection, research instruments, validity and reliability of instruments, data collection technique, data analysis, ethical issues, research budget and time frame.

3.2 Study Area

The research was conducted in Kibaha town district in Coast region located 40 km from Dar es Salaam. Kibaha district is the administrative capital of Coast region; the region located in the Western-Southern part of Dar es Salaam region with a total of six administrative districts namely Kibaha town, Kibaha rural, Bagamoyo, Mkuranga, Kisarawe and Rufiji.

This area was chosen becauseit is a place, where the researcher experienced a poor participation of students in studying Science subjects. The researcher taught Science subjects in two different secondary schools in the area of study. In one of the school only 21 students out of 82 form four students were taking Science subjects.

3.3 Research Design

According to Trochim (2005), research design provides the glue that holds the research project together. Research studies are designed in a particular way to increase the chances of collecting data needed to answer a particular question. This study used a case study design in which both the qualitative and quantitative methods of data collection were employed in order to get a better understanding of the issue at hand. The case study design was appropriate because the researcher wanted to have a deep holistic understanding of the factors influencing students to undertake Science subjects. The advantage of the case study research design is that one can focus on specific and interesting case.

According to Merriam (1998), the case study does not claim any specific data collection methods, but "focuses on holistic description and explanation" (p. 29). Within this focus, the case study can be further described as particularistic, heuristic, or descriptive. This study has employed the descriptive case study. The descriptive case illustrates the complexities of the situation, and presents information from a wide variety of sources and viewpoints in a variety of ways.

The conduct of this study includes preparing for data collection, collection of evidence, analysis of the evidence, and composition of the case study report.The process of data collection focuses on the skills of the investigator. It includes the ability to ask questions, to listen actively, to adapt to unforeseen circumstances that may arise, to grasp the issues being addressed, and to identify personal bias. In Yin's (2003b) view, rigorous data collection follows carefully articulated steps: the use of multiple sources of evidence, the creation of a case study database, and the

maintenance of a chain of evidence. The use of multiple sources of data enables the researcher to cover a broader range of issues, and to develop converging lines of inquiry by the process of triangulation.

Stake (1978) commented that “case studies will often be the preferred method of research because they may be epistemologically in harmony with the reader’s experience and thus to that person a natural basis for generalization”. Case studies are featuring descriptions that are complex, holistic and which involve a myriad of interactive variables and the researcher of case study respond to what different audiences wish to know.

House (1980) contends that Case studies are superior to any other mode of inquiry when the purpose is to get better understanding of the social phenomena.Patton (1980) states that “The case study design can be customized to address a wide range of research questions, and types of cases and to incorporate a variety of data collection, analysis and reporting techniques.

3.4 Research Approach

The mixed approach method was used because both qualitative and quantitative data are required. Qualitative data helped the researcher to fulfil specific objectives by gathering data through participants’ own words. The method allowed the direct interaction between the researcher and the participants. Patton (1990) points out that a qualitative method permits the researcher to study selected issues in depth and in detail. The method can produce a wealth of detailed information from a small number of research sites and its cases.

Mixed method approach is more than simply collecting qualitative data from interviews or collecting multiple forms of evidence. It involves the intentional collection of both qualitative and quantitative data and the combination of the strengths of each to answer research questions (Pasick et al, 2009).The quantifiable data that were collected through questionnaires were analysed and presented in tables as absolute and relative frequencies followed by qualitative descriptions. Also percentages were shown.

3.5 Target Population

The target population is "the entire aggregation of respondents that meet the designated set of criteria" (Burns and Grove 1997:236). The targeted population in this study constitutes all (school administrators) Heads of Schools, Second masters/mistress, academic officers and form four students studying Science at form four in 2015 in Kibaha district. The school administrators are actually teachers with the authority to provide the researcher with support such as giving documents for review. Form four Students captured in this study were both boys and girls aged between 16 – 20 years. One of the studied schools was a boarding school while the other five were day schools.

3.6 Sample and Sample Size

A sample is a group or a subset of the population in which a researcher selects for the purpose of the study and from which generation is made about characteristics of the population (Aryl, Jacobs & Razavieh, 1996). Sampling techniques refer to the process of selecting participants of the study constituting the sample. The sample size of a statistical sample is the number of observations that constitute it. The

sample size is typically denoted by n and it is always a positive integer. No exact sample size can be mentioned here and it can vary in different research settings. However, all else being equal, large sized sample leads to increased precision in estimates of various properties of the population (Tedd, 2012).

The study adopted a purposive sampling technique to select schools. The reason for purposive sampling of schools is that the researcher wanted to use the schools with co-education system where both boys and girls study. The researcher wanted to study girls and boys differently and comparing them when it comes to factors influencing them to choose Science subjects.

Since the number of students doing Science subjects at form four is in most cases less than registered candidates. The study involved all candidates registered as Science students in form four. The students taken for the study were under the same school conditions, taught by the same teachers and the same textbooks.

Table 3.1: Number of Form Four Respondents from 6 Schools

	No. of form four registered students			**Science students in 2014 at form three**			**Science students in 2015 at form four**			**% dropout**
School	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	After 1 year
A	140	104	244	36	12	48	14	9	23	52
B	10	14	24	10	14	24	8	4	12	50
C	28	33	61	15	14	29	8	4	12	59
D	28	25	53	10	8	18	10	6	16	11
F	55	45	100	15	20	35	15	18	33	6
G	82	74	156	86	16	102	17	9	26	75
Total	343	295	**638**	172	84	**256**	72	50	**122**	53

Source. Data collected and processed by the researcher in 2015

Thus, a total of 6 administrators and 122 respondents, students taking Science at form four from 3 public secondary schools and 3 private secondary schools were involved in the study. Since Data collection was done during heavy rainy season, 2 of the proposed schools were not reached due to poor condition of the infrastructure system.

3.7 Research Instruments

Research Instruments are measurements tools (for example, questionnaires or scales) designed to obtain data on a topic of interest from research subjects (Cinahl, 2013). This study used questionnaire, interviews, documentary reviews and observation. Each tool has been taken for the study as it fits exactly with the needs of this study. Explanations for selection of each tool are given below.

3.7.1 Questionnaire

A questionnaire is a research instrument consisting of a series of questions and other prompts for the purpose of gathering data from respondents. Although they are often designed for statistical analysis of the responses, this is not always the case (Emmanuel, 2012).Questionnaires administered to the form four students were used to collect data pertaining to the demographic factors, factors that influence students' choices of Science subjects and factors for students' sustainability in Science subjects.

Paper-and-pencil questionnaire administration, where the items are presented on paper was used throughout the process of data collection. Questionnaire was used simply because they yield data that can easily be analyzed statistically. The

questionnaire items and design were arrived at after an extensive review of literature on the problem topic. The questions for students were designed to elicit responses on the background information of the respondents; factors influenced them to make their choice of Science subjects and factors for students' sustainability in Science subjects.

3.7.2 Documentary Review

Documentary review means the use of texts and documents as evidences to support and validate facts (Educadium, 2013). One of the key advantages in conducting documentaryresearch is that you can get access to information that would be difficult to get in any other way. Documentary review was used to obtain data for form four mock examinations results in 2015 to show the performances of the respondents from each school in Chemistry subjects. Therefore the method was used to prepare a compiled table showing students' performance.

3.7.3 Observation

Observation is a fundamental way of finding out about the world around us. As human beings, we are very well equipped to pick up detailed information about our environment through our senses. However, as a method of data collection for research purposes, observation is more than just looking or listening.

Research, simply defined, is "systematic enquiry made public" (Stenhouse, 1975). Firstly, in order to become systematic, observation must in some way be selective. The researcher used observation technique to make an investigation on the presence or absence of school library and laboratories.

3.7.4 Interviews

An interview is a conversation between two or more people where questions are asked by the interviewer to elicit facts or statements from the interviewee (Pung, 2011). Interviews are a standard part of qualitative research. Standardized, open-ended interview will be used in this study where by the same open-ended questions are asked to all interviewees; this approach facilitates faster interviews that can be more easily analyzed and compared (Hackman, 1976).

The researcher interviewed students, who performed worse and those, who performed better in the Science subjects during mock examinations. The researcher was looking for the reasons to why some students performed poorly while others performed well. Students, who got below grade C were considered as poor and those scored above grade C were considered as good performance. Those with grade C were not interviewed as the grade was marginal to a researcher i.e. average performance.

Table 3.2: Showing New NECTA Grading System

Marks	Grade	Comments
75 – 100	A	Distinction
60 – 74	B+	Excellent
50 – 59	B	Very Good
40 – 49	C	Average
30 – 39	D	Low
20 – 29	E	Very Low
0 – 19	F	Unsatisfactory

Source: (NECTA, 2013)

3.8 Validity and Reliability of Instruments

According to Mugenda (1999), V*alidity* is the extent to which an instrument measures what it is supposed to measure and performs as it is designed to perform. It

is rare, if not nearly impossible, that an instrument be 100% valid, so validity is generally measured in degrees. As a process, validation involves collecting and analyzing data to assess the accuracy of an instrument. There are numerous statistical tests and measures to assess the validity of quantitative instruments, which generally involves pilot testing.

The researcher conducted a pilot testing for the questionnaires. During piloting 10 students were randomly selected and questionnaires administered. After going through the respondents' feedback, it was revealed that the instruments measured what was targeted by the researcher.Reliability of the instrument meansthedegree to which, the score are free from measurement errors. According to Kothari (2004), testing the instrument items by actual administration removes possible errors in the instruments. Pretest was done insecondary schools which were not involved in the main study. The responses to research questions helped the researcher to identify those items that were difficult and ambigous. Items found to be ambiguous were modified accordingly. Pretesting also necessitated addition of more items and reduction of others to improve the quality of instrument (Peninah, 2012).

3.9 Data Collection

Questionnaires, Interviews, Observation and Documentary Review were used to collect data. Questions that enabled the respondent to choose and tickYes [ ] NO [ ] were structured carefully. Some items were given blanks to be freely filled by the respondents. Tables were used to summarise the data from respondents, pen and notebook were used to take notes on the observed education environment that was thought to have affected the students' decision in studying Science. Some additional

information was collected from various school documents such as Takwimu za Shule za Sekondari (TSS), 2014. Some data were collected through observation of the school environment and an analysis of mock examination results for students taken as respondents in this study.

3.10 Data Analysis

The study included both qualitative and quantitative data that were collected in the field. Thus, qualitative and quantitative data analysis was employed in the study.Quantitative analysis was done through Microsoft office excel computer program system. These data are presented in the form of graphs and tables. Descriptive statisticsinvolving frequencies, graphs and percentages was used to analyze the data. Descriptive statisticsare numbers that are used to summarize and describe data. With descriptive statistics one is simply describing what is or what the data shows. It is used to present quantitative descriptions in a manageable form.

It helps to simplify large amount of data in a sensible way. Graphs were drawn to make more interpretation of the information obtained. The qualitative data were analyzed during the research process. There were some questions formulated by the researcher on observation while some important themes were noted throughout the research process.

3.11 Ethics Consideration

Name of schools and respondents involved in the study were not identified by their real names for confidentiality purpose. Letters were used to represent the real names. Information provided by the respondents to the researcher was treated

confidential.No any third party was and will be allowed to use such information for any purpose unless the owner of the information (respondent) permits in writing.

After being allowed by the supervisor to collect the data, the researcher requested permission to collect the data from Regional Administrative Secretary (RAS), District Administrative Secretary (DAS) and District Educational Officer (REO). Letters giving permission the researcher are found in the appendix.

Privacy was considered during data collection in the field during answering questionnaires and interview sessions.

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents the findings of the study. It also analyses and discusses the findings of the study as per the objectives of the study stated in chapter one. The chapter begins by providing the demographic profile of the respondents.

4.2 Characteristics of the Respondents

This section provides the characteristics of the respondents in terms of gender, educational level of guardian, economic status of guardian/Parents and level of education aspired by the respondents.

Table 4.1: Gender Distributions of Respondents

Gender of the Respondents	Frequency	Percentage
Boys	72	59
Girls	50	41
Total	**122**	**100**

Source. Data collected and processed by the researcher, 2015

A total of 72 (59%) of the respondents were male and 50 (41%) were female. This clearly indicates that the majority of Science students in secondary schools are males, since all form four students taking Science in each school was involved in the study. This also evidences that the findings were obtained from both gender groups without bias. The total number of form four registered candidates in 2015 from six schools under study is 638 with boys 343 (53.76%) and girls 295 (46.24%). The overall proportional of boys taking Science is 11.3% as compared to 7.8% of girls.

Table 4.2:Educational Level of Parents/Guardians of Respondents

S/N	Parent/Guardian Educational level	Absolute Frequency	Percentages
1.	Never went to school	5	4
2.	Primary Level	31	25
3.	Form Four level	39	32
4.	Form Six level	8	7
5.	Tertiary Education	9	7
6.	University Education	30	25
	Total	**122**	**100**

Source: Data collected and processed by the researcher, 2015

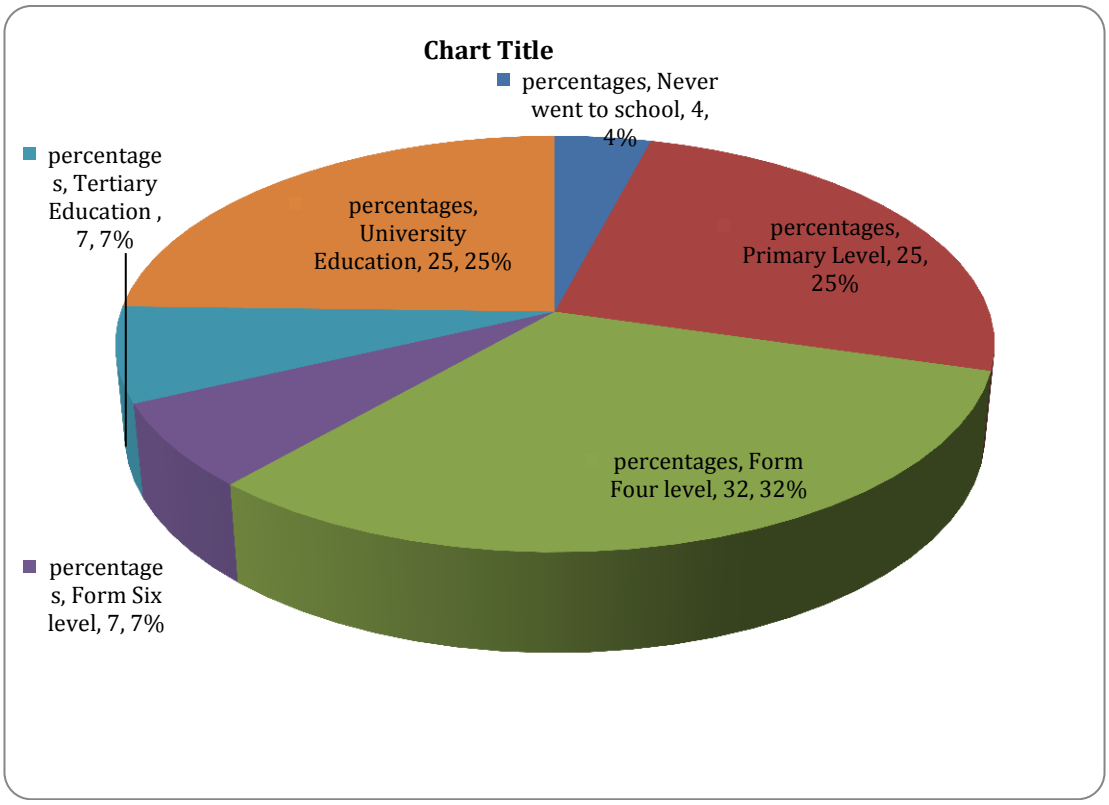

Figure 4.1: Pie Chart Showing Education Level of Parents/Guardians of Students' Respondents

The results show only few parents/guardians never went to school (4%) and 25% acquired a primary education. The researcher believes that the rest of the participants; that is to say the parents educated to Form Four level 32%, six level 7%, Tertiary level 7% and University level 25% could influence their children towards subjects selection at secondary level of education.

Table 4.3: Economic status of Parents/Guardians of respondents

S/N	Parent/Guardian Economic level	Frequency	Percentages
1.	Low economic income	11	9
2.	Medium economic income	94	77
3.	High economic income	17	14
Total		**122**	**100**

Source. Data collected and processed by the researcher, 2015

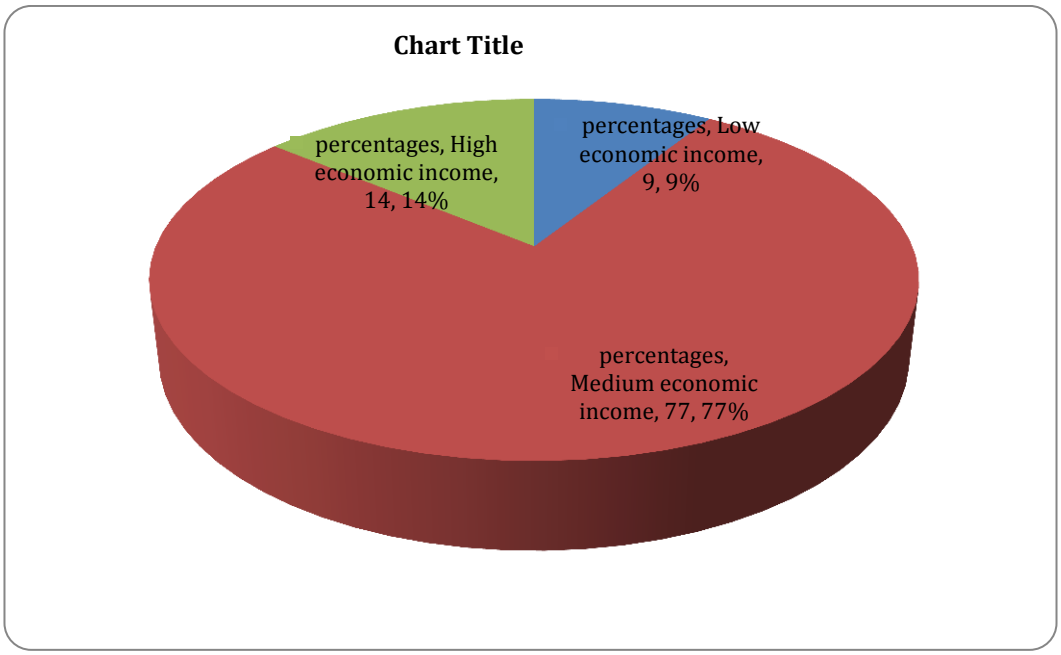

Figure 4.2: Pie Chart showing Economic Status of Parents/Guardians of Student Respondents

There were no any standards established by the researcher. Basing on the students' perception on the economic status of their families, the results show that about 77% and 14% of the student respondents come from families with medium economic income and high income families respectively. This suggests that most of the families can financially support their children in achieving educational goals. On the other hand, 9% of student respondents belong to poor families whose financial support to students is limited.

Table 4.4: Level of Education Aspired by Student Respondents

S/N	Aspired level of education	Frequency	Percentages
1.	Form four to form six	0	0
2.	Tertiary education	2	2
3.	University education	120	98
	Total	**122**	**100**

Source. Data collected and processed by the researcher, 2015

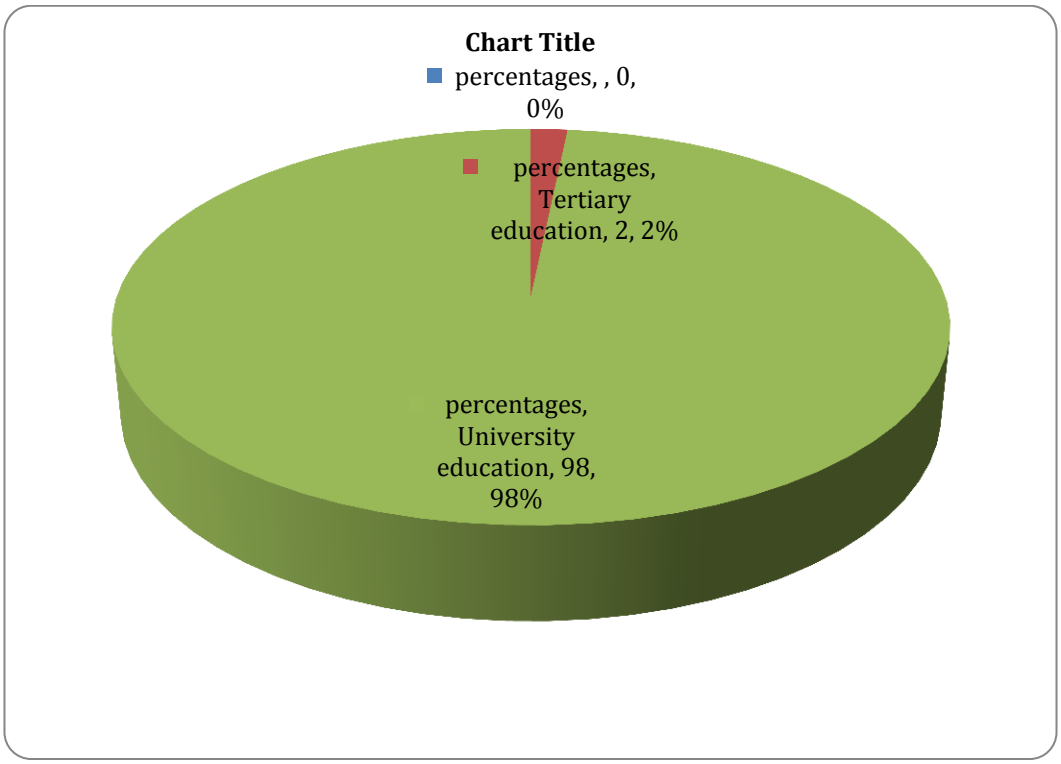

Figure 4.3: Pie chart showing Level of Education Aspired by Student Respondents

Source. Data collected and processed by the researcher, 2015

It is very interesting to find that all students have high ambition and targets. As the study results show 98% want to attain a university education and 2% want to attain tertiary education. This means that students are well informed and understands the importance of being an educated citizen. It also signifies that a certificate in secondary education is no longer valued as it used to be in 1990s.

4.3 Findings of Objective 1

This sub section presents findings for objective 1. The research question seeking response to objective one asked "what factors influence students' choice of Science subjects?" Descriptive statisticsinvolving frequencies, graphs and percentages have been computed to describe the data.

4.3.1 Factors Influencing Boys Choice of Science Subjects

Table 4.5: Factors Influencing Boys Choice of Science Subjects

SN	Reasons for Objective 1	Yes	No	Total	%Yes	%No	%
1	Self interest in Science	67	5	72	93	7	100%
2	Belief on one's ability to do Science	65	7	72	90	10	100%
3	A lot of Science text books	29	43	72	40	60	100%
4	Good library	18	54	72	25	75	100%
5	Teachers' advice	32	40	72	44	56	100%
6	Teaching style	63	9	72	88	13	100%
7	Teachers' force	5	67	72	7	93	100%
8	Friends' influence	14	58	72	19	81	100%
9	Relatives role model	18	54	72	25	75	100%
10	Parents influence	21	51	72	29	71	100%
11	Desire to be a Science specialist	68	4	72	94	6	100%
12	More payment in Science related jobs	37	35	72	51	49	100%
13	Priority to loan access at HESLB	51	21	72	71	29	100%
14	Big Results Now Policy	26	46	72	36	64	100%
15	Government's future plan	41	31	72	57	43	100%

Source. Data collected and processed by the researcher, 2015

Factors that influence boys by more than 50% in choosing Science are; Self interest in Science (93%), belief in one's ability to do Science (90%), teaching style (88%), desire to be a Science specialist (94%), more payment in Science careers (51%), priority in accessing loans at HESLB (71%0 and Government's future plan (57%).

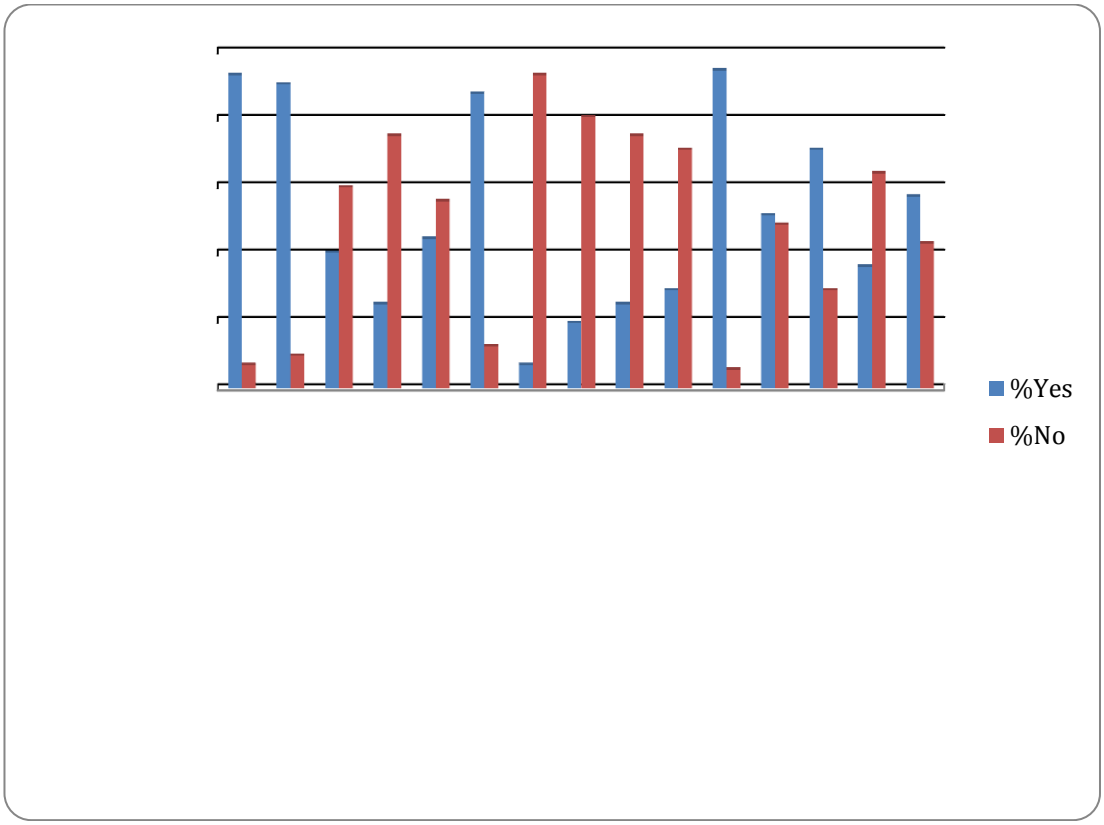

Figure 4.4: Factors Influencing Boys Choice of Science Subjects

Table 4.6: Factors Influencing Girls Choice of Science Subjects

SN	Reasons for Objective 1	Yes	No	Total	Yes%	No%	%
1	Self interest on Science	41	9	50	82	18	100%
2	Belief in one's ability to do Science	47	3	50	94	6	100%
3	A lot of Science text books	13	37	50	26	74	100%
4	Good library	9	41	50	18	82	100%
5	Teachers' advice	17	33	50	34	66	100%
6	Teaching style	28	22	50	56	44	100%
7	Teachers' force	3	47	50	6	94	100%
8	Friends' influence	10	40	50	20	80	100%
9	Relatives role model	11	39	50	22	78	100%
10	Parents influence	8	42	50	16	84	100%
11	Desire to be a Science specialist	44	6	50	88	12	100%
12	More payment in Science related jobs	23	27	50	46	54	100%
13	Priority to loan access at HESLB	28	22	50	56	44	100%
14	Big results now policy	13	37	50	26	74	100%
15	Governments future plan	30	20	50	60	40	100%

Source. Data collected and processed by the researcher, 2015

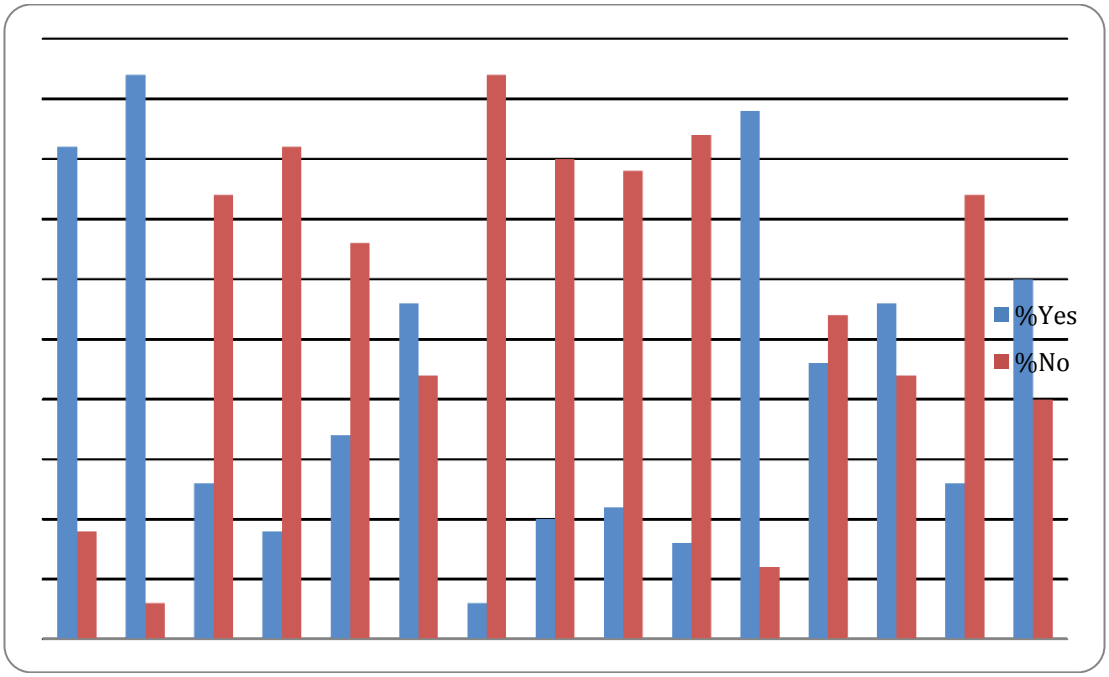

Figure 4.5:Factors Influencing Girls choice of Science Subjects

Factors that influence girls to choose Science by more than 50% as arranged by their weight are; belief in one's ability to do Science (94%), desire to be a Science specialist (88%), Self interest on Science (82%),Governments future plan (60%), teaching style (56%) and Priority in accessing loan (56 %).

Table 4.7: Factors Influencing Students Choice of Science Subjects

SN	Reasons for Objective 1	Yes	No	Total	Yes%	No%	%
1	Self interest on Science	108	14	122	89	11	100%
2	Belief in one's ability to do Science	112	10	122	92	8	100%
3	A lot of Science text books	42	80	122	34	66	100%
4	Good library	27	95	122	22	78	100%
5	Teachers' advice	49	73	122	40	60	100%
6	Teaching style	91	31	122	75	25	100%
7	Teachers' force	8	114	122	7	93	100%
8	Friends' influence	24	98	122	20	80	100%
9	Relatives role model	29	93	122	24	76	100%
10	Parents influence	29	93	122	24	76	100%
11	Desire to be a Science specialist	112	10	122	92	8	100%
12	More payment in Science related jobs	60	62	122	49	51	100%
13	Priority to loan access at HESLB	79	43	122	65	35	100%
14	Big Results Now Policy	39	83	122	32	68	100%
15	Government's future plan	71	51	122	58	42	100%

Source. Collected data and processed by the researcher, 2015

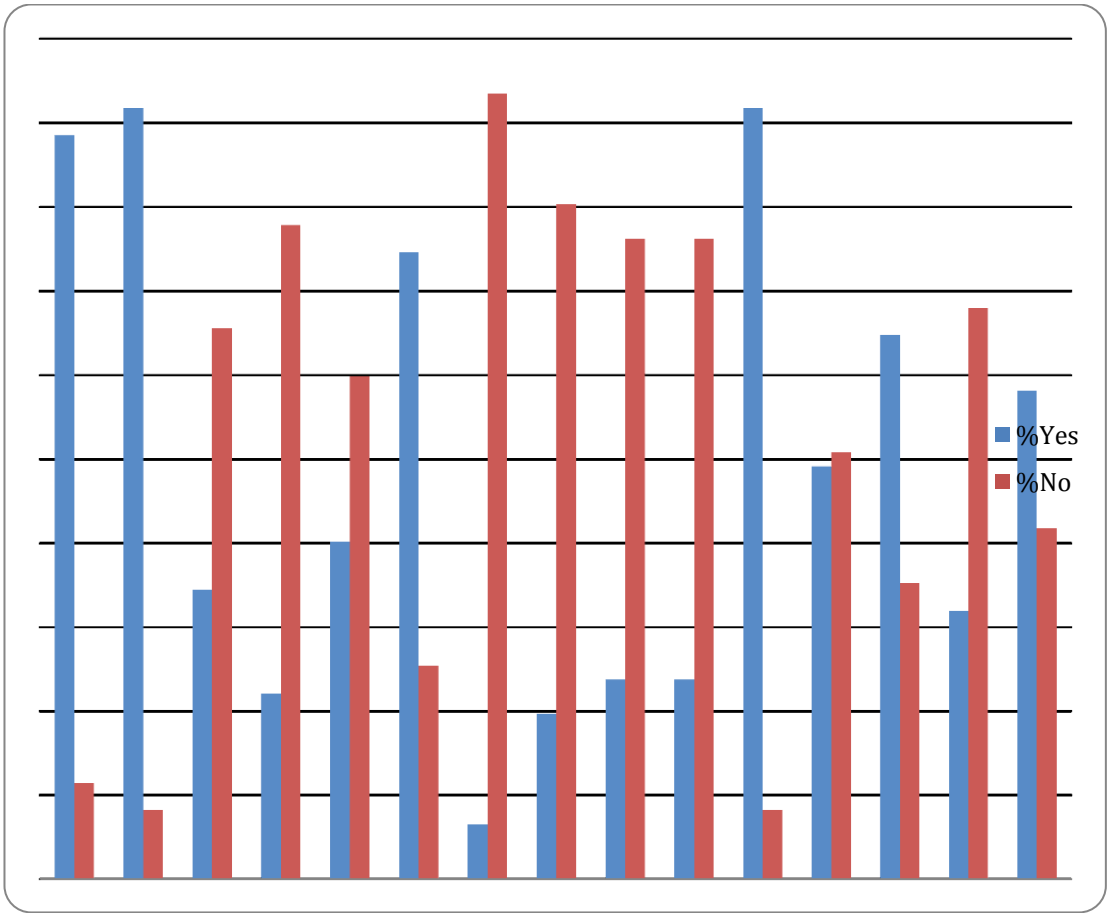

Figure 4.6: Factors Influencing Students Choice of Science Subjects

Although factors influencing choice of Science subjects in boys and girls weighs differently, it is almost the same factors influence boys and girls in the choice of Science subjects in Secondary schools. Factors that influence students in general to choose Science by more than 50% as arranged by their priority are;

(i) Desire to be a Science specialist (92%),

(ii) Belief in one's ability to do Science (92%),

(iii) Self interest in Science (89%),

(iv) Teaching style (75%),

(v) Priority in accessing loan at HESLB (65 %) and

(vi) Government's future plan (58%) in that order.

4.4 Findings of Objective 2

This sub section presents findings for objective 2. The research question seeking response to objective two was "what factors sustain students' interests in Science subjects?" Descriptive statisticsinvolving frequencies, graphs and percentages have been computed to describe the data.

Table 4.8: Factors Sustaining Boys in Science Subjects

SN	Factors for Sustaining Boys in Science	Yes	No	Total	%Yes	%No	%	Weight
1.	Interest and love for Science	72	0	72	100	0	100%	1
2.	Presence of laboratory	68	4	72	94	6	100%	2
3.	Presence of school library	20	52	72	28	72	100%	9
4.	Adequate Science texts	51	21	72	71	29	100%	6
5.	Good Science teachers	65	7	72	90	10	100%	4
6.	Teachers' force	6	66	72	8	92	100%	11
7.	Future expectation	67	5	72	93	7	100%	3
8.	Friends' advice	12	60	72	17	83	100%	10
9.	Parental influence	27	45	72	38	63	100%	8
10.	Good education policy	48	24	72	67	33	100%	7
11.	Teachers' influence	60	12	72	83	17	100%	5

Source. Data collected and processed by the reseacher, 2015

There are about seven most sustaining factors to boys as listed below in order of their priority. (1)Interest and love for Science 100%, (2) presence of laboratory in schools 94%, (3) students' future expectation 93%, (4) good Science teachers 90%, (5) teachers influence 83% (6) adequate Science text books 71% and (7) good education policy 67%.

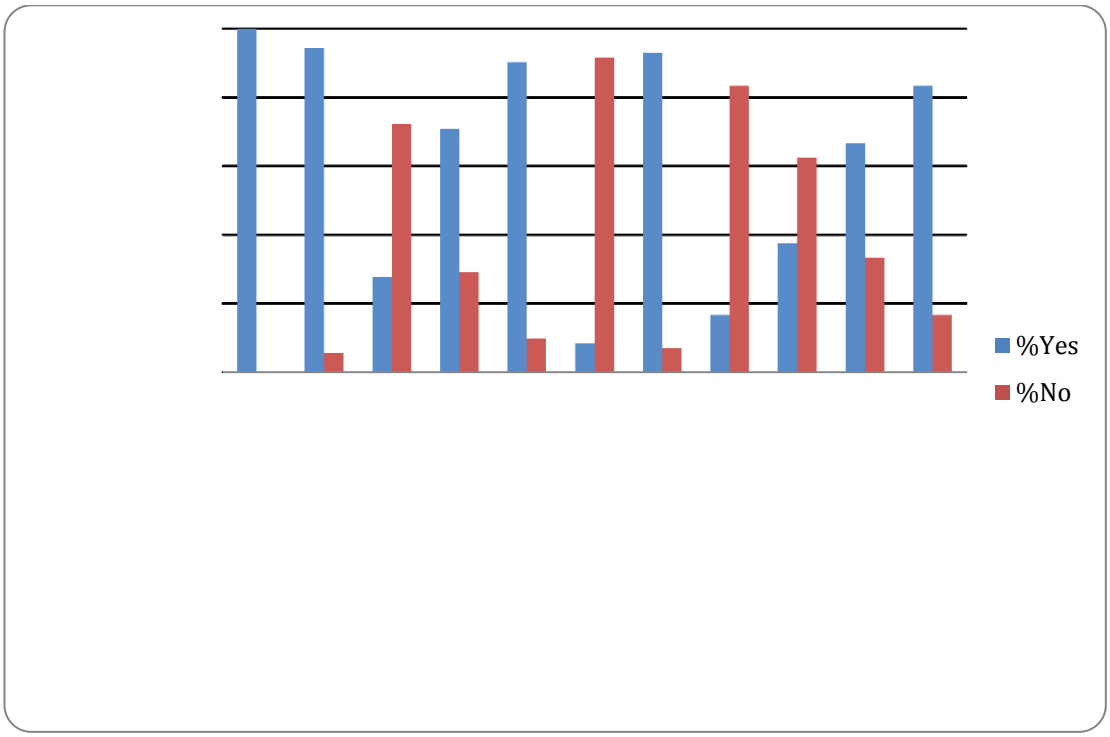

Figure 4.7: Factors Sustaining Boys in Science Subjects

Table 4.9: Factors Sustaining Girls in Science Subjects

SN	Factors Sustaining Girls in Science	Yes	No	Total	Yes%	No%	%	Weight
1	Interest and love for Science	50	0	50	100	0	100%	**1**
2	Presence of laboratory	45	5	50	90	10	100%	**4**
3	Presence of school library	17	33	50	34	66	100%	**9**
4	Adequate Science texts	37	13	50	74	26	100%	**7**
5	Good Science teachers	47	3	50	94	6	100%	**3**
6	Teachers' force	1	49	50	2	98	100%	**11**
7	Future expectation	49	1	50	98	2	100%	**2**
8	Friends' advice	5	45	50	10	90	100%	**4**
9	Parental influence	12	38	50	24	76	100%	**10**
10	Good education policy	29	21	50	58	42	100%	**8**
11	Teachers' influence	39	11	50	78	22	100%	**6**

Source. Data collected and processed by the researcher, 2015

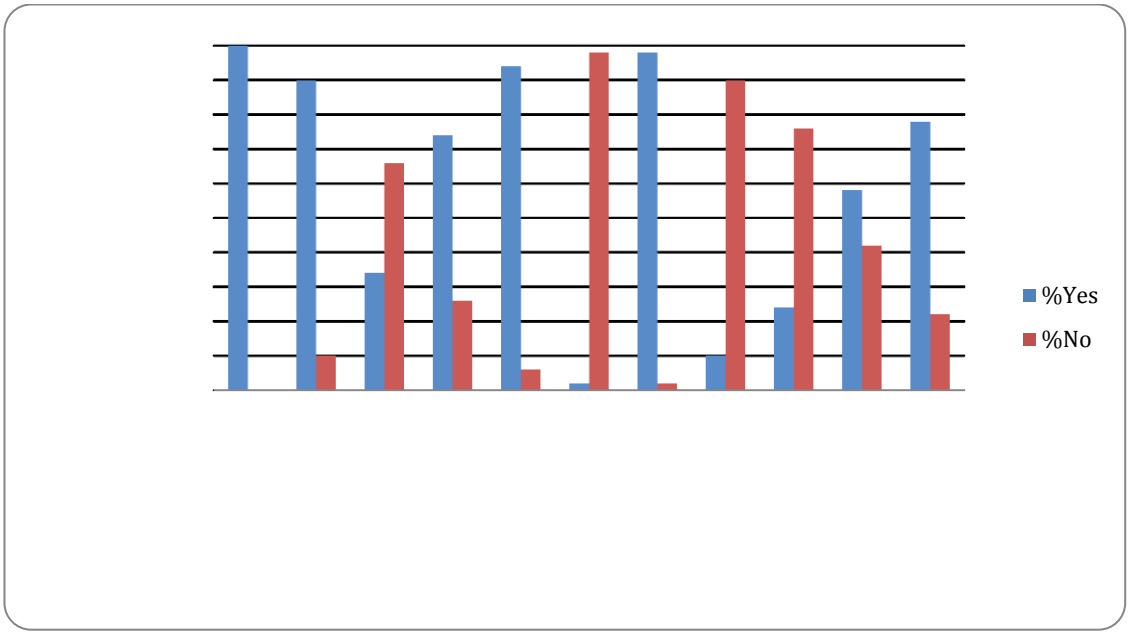

Figure 4.8: Factors for Sustaining Girls in Science subjects

There are about seven most sustaining factors to girls as listed below in order of their priority. (1)Interest and love for Science 100%, (2) students' future expectation 98%, (3) good Science teachers 94%, (4) presence of laboratory in schools 90%, (5) teachers influence 78% (6) adequate Science text books 74% and (7) good education policy 58%.

Table 4.10: Factors for Sustaining Students in Science Subjects

SN	Factors for Sustaining Students in Science	Yes	No	Total	%Yes	%No	%	Weight
1.	Interest and love for Science	122	0	122	100	0	100%	**1**
2.	Presence of laboratory	113	9	122	93	7	100%	**3**
3.	Presence of school library	37	85	122	30	70	100%	**9**
4.	Adequate Science texts	88	34	122	72	28	100%	**6**
5.	Good Science teachers	112	10	122	92	8	100%	**4**
6.	Teachers' force	7	115	122	6	94	100%	**11**
7.	Future expectation	116	6	122	95	5	100%	**2**
8.	Friends' advice	17	105	122	14	86	100%	**10**
9.	Parental influence	39	83	122	32	68	100%	**9**
10.	Good education policy	77	45	122	63	37	100%	**7**
11.	Teachers' influence	99	23	122	81	19	100%	**5**

Source. Data collected and processed by the researcher, 2015

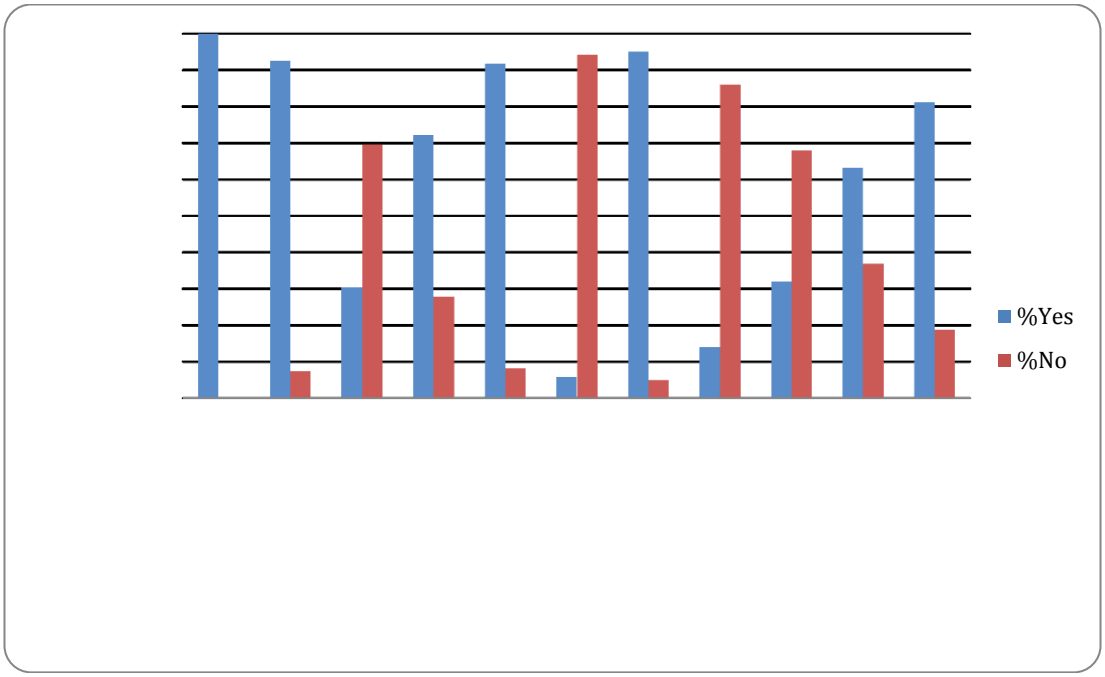

Figure 4.9: Factors for Sustaining Students in Science

It is very interesting to find that the same factors sustain both boys and girls. This study shows that after interest and love for Science weighing 100% in both boys and girls, the second sustaining factor in boys is presence of laboratory in schools which weighs 94% while in girls the second strongest factor is students' future expectation which weighs 98%. Presence of school laboratory is the fourth sustaining factor for girls with 90% weight. The difference might be due to divergence in social and cultural practices towards boys and girls in coast regions of Tanzania.

4.5 Findings of Objective 3

This sub section presents findings for objective 3. The study question seeking response objective three asked; "what factors lead students to achieve the level of performance in Science subjects?" It describes the factors that lead students to perform poorly or well. Through observation, documentary review and interview the researcher reaches the following remarks on the question.

4.5.1 Observations and Documentary Reviews

This sub section presents the findings of the study made through observations and documentary reviews.

4.5.1.1 School F Received the following Amounts of Science Books in 2015

With an exception of Basic Mathematics textbooks, Physics, Chemistry and Biology text books produced by Oxford Company Ltd are normally in the format that, forms I and II topics are all covered in a single text book whereby forms III and IV are each produced separately.

Table 4.11(a): Number of Science Books Received at School F in 2015

Subjects	**Number of copies received**				
	Form I	**Form II**	**Form III**	**Form IV**	**Total**
Mathematics	49	50	26	46	171
Biology	87		22	41	150
Chemistry	87		11	20	118
Physics	87		11	20	118

Source. Data collected and processed by the researcher, 2015

Table 4.11(b): The Status of Laboratory as Observed by Researcher

School	Status of Laboratory
A	Present, in use
B	Present, in use
C	Present, in use, Under Construction
D	Present, in use, Poorly organized
F	Present, in use, Few Apparatuses
G	Completely Under Construction

Source. Data collected and processed by the researcher, 2015

Table 4.11(c): The Status of Library Observed by Researcher

School	Status of Library
A	Absent
B	A library without furniture was found
C	Absent
D	Absent
F	Absent
G	Absent

Source. Data collected and processed by the researcher, 2015

4.5.2 Kibaha District Mock Examination Results 2015

Table 4.12(a): Chemistry Results for Girls - Mock Examination 2015

School	A	B	C	D	F	G	Total	%
Below C	6	4	4	5	15	6	40	80
C	2	0	0	1	1	2	6	12
Above C	1	0	0	0	2	1	4	8
Total	**9**	**4**	**4**	**6**	**18**	**9**	**50**	**100**

Source. Data collected and processed by the researcher, 2015

Table 4.12(b): Chemistry Results for Boys - Mock Examination 2015

School	A	B	C	D	F	G	Total	%
Below C	9	6	7	4	14	10	50	69
C	3	1	1	3	0	4	12	17
above C	2	1	0	3	1	3	10	14
Total	**14**	**8**	**8**	**10**	**15**	**17**	**72**	**100**

Source. Data collected and processed by the researcher, 2015

Table 4.12(c): Form Four Chemistry Subject Mock Examination Results 2015- Kibaha District

School	Registered Science Students in 2015	Students Scored Below C		Students Scored C		Students Scored Above C		Total
		Boys	Girls	Boys	Girls	Boys	Girls	
A	23	9	6	3	2	2	1	23
B	12	6	4	1	0	1	0	12
C	12	7	4	1	0	0	0	12
D	16	4	5	3	1	3	0	16
F	33	14	15	0	1	1	2	33
G	26	10	6	4	2	3	1	26
Total	122	50	40	12	6	10	4	122
	%	74		15		11		100

Source. Data collected and processed by the researcher, 2015

Most of the students performed poorly in Science subjects during mock examination. About 74% of all students, who did Chemistry exam during mock examination scored below grade C (40%), 15% scored grade C and 11% scored above grade C. On the other hand, 80% of girls, who attempted Chemistry examination scored below grade C as compared to boys, who 69% of them scored below grade C. 14% of the boys scored above grade C while 8% of girls scored above grade C. This indicates that girls are more challenged by Science subjects than boys. This is perhaps due to perceptions, social and cultural practices that draw back girls' performance in Science subjects.

4.5.3 Results From Interviewed Students

(i) Most of the Students declared that they didn't deserve what they scored.

(ii) Most of the students expect to score more in National examinations than what they scored in the mock examinations.

(iii) Science combinations preferred by students as ranked in order of preference are; PCB, PCM and CBG. Many boys prefer PCB followed by PCM and few CBG and PGM whereas girls prefer more PCB, CBG and few PCM.

(iv) Most of the students wish to continue with Science career even if it happens they do not meet the criteria for joining further studies through Public schools. They may join private schools or certificate programmes. Few students will switch to Arts subjects if they perform poorly in Science subjects during National examinations.

(v) Factors that may lead into good performance as suggested by the respondents are:

(a) Studying hard through discussion and revision on covered topics.

(b) Solving past papers through discussions and teachers' guide.

(c) Good teaching methods.

(d) Physical fitness during studying and examination.

(e) Presence of books and other studying materials.

(f) Good marking systems and entering of data from the score sheets.

(g) Presence of a well-designed laboratory.

(h) Full coverage of the syllabus.

Factors that may lead to poor performance of students in Science subjects as suggested by the respondents are:

(a) Guessing and forgery of answers during examination.

(b) Laziness in studying.

(c) Lack of learning material such as books and others.

(d) Devoting little time during studying.

(e) Failure to complete the syllabus within time.

(f) Poor marking system and data entering by the examiners.

(g) Transferring of students from one school to another.

(h) Being physically or mentally unfit during examination.

4.6 Summary of the Findings

Although factors influencing the choice of Science subjects for boys and girls weigh differently, it is almost the same factors which influence boys and girls regarding their choice of Science subjects in Secondary schools. Factors that influence students in general to choose Science by more than 50% as arranged by their weight are; desire to be a Science specialist (92%), belief in one's ability to do Science (92%), self interest in Science (89%), effective teaching style (75%), priority in accessing loan at HESLB (65 %) and Government's future plan (58%).

It is very interesting to find that the most factors sustaining boy students in Science subjects are the same factors sustaining girl students in Science subjects regardless of the fact that the weight of most of the factors differ in boys and girls. This study shows that after interest and love for Science weighing 100% in both boys and girls, the second sustaining factor in boys is the presence of laboratory in schools, which weighs 94% while in girls the second strongest factor is students' future expectation, which weighs 98%. Presence of school laboratory is the fourth sustaining factor in girls with 90% weight. During observation, the researcher noted some schools without laboratories and none of the school had a library. The performance of girls is too poor compared to that of boys. 80% of girls scored below grade C while that of

boys was 69%. Students, who did well in Chemistry subject during Mock examination, are 8% for girls and 14% for boys.

4.7 Discussion of the Findings

Although there is a minor dispersion in the magnitude of the effect of the factors, both boys and girls secondary school students are influenced to choose Science subjects and sustained in Science subjects by the same factors. The strongest factor influencing boys' choice of Science subjects is self interest in Science, 93%, while girls are strongly influenced by the belief in their abilities to do Science, 94%. This is perhaps due to the effect of the ongoing National slogan "Women can do it". The campaign has gone so far in various aspects apart from education arena; it is widely practiced in politics where women are highly encouraged to participate. While boys are strongly sustained in Science subjects by being interested and attracted by funny activities done in the laboratories, girls show more concern with their future expectations. The study concurs with that ofCounc and Wendy (2000), who assert that boys choose Mathematics and Science with excitement and anticipation because Science offers practical hands on learning connecting to many of the things that excite the imagination such as space, cars and airplanes. Also Peninah (2012) argues along the same line that factors influencing student's subject choice in both boys and girls are; career aspirations and aspired level of education.

Robinson and Ochs (2008) found that friends are important influencing factor for pursuing high school students for taking Science. Peninah (2012) adds more that family background and peer socialization contribute to students' choice of optional subjects. Under this study friends have little influence. The study shows that less

than 50% of students choosing Science subjects are influenced by their friends. This may be due to the difference in nature of the subject of interest whereby for a long time Science has been labeled by students as difficult and tough subject. Therefore most of the families lack a member, who is a scientist, who could in one way or another influence the student.

Absence of libraries and laboratories affects negatively students' choice of Science subjects. Most of the schools as observed by the researcher completely lack Libraries and well designed laboratories.In that case, the researcher concur with Ndalichako et al, 2014 who found that Teaching style and School Environment was affecting students' interest during subject selection.

The findings show that most of the Students have not performed well in the mock examination. The possible causes could be due to most of teachers having not covered all topics for the students as observed in some teachers' schemes of work by the researcher as well as students comments. Teachers should not be blamed because the examination was done in May, 2015 while the syllabi for subjects are prepared to be covered during the year.

Since most of the schools lack libraries and well maintained laboratories, the Science practicals for mock examination were conducted in normal classes, that is to say even Science teaching practices have been taking place for all time in normal classes. Most of the schools have got no Science apparatuses, models and charts although teachers indicates in their scheme of work that they will be using these tools. That means a scheme of work is written just as a formality.

The researcher therefore support the argument by TLA, (2012), that shortage of teachers and school libraries in most schools has been one of the factors that have contributed immensely to poor students' performance in Tanzania schools.

Most of the students' believes that they can't fail in their NECTA exams to the level that they become unfit in Science careers. Most of the students wish to join CBG, PCB and PCM classes after form four education. Most of the students have shown to keep the interest of studying Science to their final destination although some few responded that they are ready to switch to other Art subjects depending on their performance.

Students seem to be well informed and are aware of what Science combinations to take to meet their career aspirations. Most of the students, who want to join Science professions choose PCB, PCM, CBG and PGM. Majority of them wish to be doctors, nurses, pharmacists, ecologists and engineers.

With all effort done, still the performance of girls' students in Science subjects lag behind as compared to that of boys. This is perhaps due to little time they devote in studying as compared to boys. For most of the day school students in Tanzania, it is expected and it is usual for girls to assist their mothers in domestic activities after school time, while boys may have little duty or none at all. This is one of the factors that lead to differences in performance between boys and girls students.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents conclusion, recommendations and suggestions for further studies.

5.2 Conclusion

After presentation of the findings and discussion, the study makes the following conclusion.

(i) Parents play very little part in influencing their children to select Science subjects.

(ii) Teachers do not force students to select Science subjects. They advise students to select Science subjects.

(iii) Most of the schools lack well designed laboratories and libraries. Absence of these school facilities affects students' performance and students' decision in selecting Science subjects. Also Performance in Science subjects in secondary schools is a product of good supportive school environment.

(iv) Presence of laboratories and scientific Teaching/Learning tools in schools influence students to select Science.

(v) Big Results Now Policy is not well communicated to students.

(vi) Intrinsic factors are mostly powerful factors in influencing and sustaining students in studying Science subjects.

(vii) Performance of students in Science subjects depends on; coverage of the syllabus, physical fitness during exams, presence of well planned laboratories,

marking system which is fair and just and time devoted in studying by students and availability of learning materials.

(viii) The performance of girl students in Mock Science subjects is poor as compared to that of boys.

5.3 Recommendations

In the light of the research findings the study wishes to make the following recommendations.

(i) Since there have been shortage of Science textbooks in Schools, and little information is available to students on why should they study Science subjects, Students should be provided with adequate Science books and information about Science subjects to attract them to select Science subjects.

(ii) For the reason that most of the Schools were found to have their laboratories under construction, but no libraries, after the completion of a campaign for laboratory construction in all schools, another campaign for libraries construction for all schools should be mounted.

(iii) As it has been discussed earlier in this study, that most of the students are unaware of the educational policies. Thus, any introduced policy that affects students' welfare and education need to be well communicated to students.

(iv) All education stakeholders should find and play their part in encouraging, influencing and sustaining students studying Science subjects. It should not be left to teachers alone as the study shows.

(v) Since students are influenced and sustained to join in Science subjects by access to loan from HESLB, I recommend the Government through its

Ministry of educational and Vocational Training to empower the organ to the level that its service can benefit the students undertaking Certificate and diploma courses so as to attract more students in Science subjects.

5.4 Suggestions for Further Studies

(i) The impact of the constructed school laboratories in accessing Science education.

(ii) The assessment of the use of the capitation grant in promoting the studying of Science subjects.

(iii) The Influence of a Teaching Styles as an Enhancing Factors in Students' Subjects Selection.

(iv) The role of motivation to Secondary School Students in Tanzania to study Science Subject.

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APPENDICES

Appendix 1: List of Questionnaires to Students

You have been selected to participate in this exercise because of the decision you made at form three. Remember that at form three you decided to join a Science class due to a number of reasons. Please go through this questionnaire just to assist the community to be well informed on what is behind the decision of students when it comes to subject selection at form three. The information you provide will be respected and treated with confidentiality.

SECTION A: General Questions. (Put **Tick[√]** where necessary and fill the blanks with your own words)

Qn1. What is your gender?

Male [ ]

Female [ ]

Qn2. Please indicate your parent/guardian's highest level of education attained.

Never went to school [ ]

Primary school [ ]

Form four [ ]

Form six [ ]

Tertiary level college [ ]

University degree [ ]

Qn3. Please indicate the level of your guardian/parent economic status.

Low [ ]

Medium [ ]

High [ ]

Qn4.Do you feel your school provided you with adequate information to guide you in your choice of optional subjects?

i)Yes [ ]

ii) No [ ]

Q5. Please indicate your highest aspired level of education you want to attain. (Tick only one).

i) Form Four [ ]

ii) Tertiary college [ ]

iii) University degree [ ]

SECTION B

Objective 1: Factors Influencing Students Subject Choice

The following list of factors is assumed to influence your decision of taking Science subject at form three in 2014.

Please Tick[√] The Most Appropriate

A. Intrinsic factors.

(i) You decided to join Science because you have interest in it.Yes[ ]No [ ]

(ii) You decided to join Science because you believe you can do itYes[ ]No[ ]

B. School factors.

(i) You decided to join Science because your school has a lot of Science books Yes [ ] No[ ]

(ii) You decided to join Science because your school has a good library …….Yes [ ] No [ ]

(iii) You decided to join Science because your teacher advised you to do it…YES [ ] NO [ ]

(iv) You decided to join Science because your teachers teach you well ……Yes [ ] No [ ]

(v) You decided to join Science because your teacher forced you to do it ……Yes [ ] No [ ]

C. Social – Economic factors.

(i) You decided to join Science because one of your friends also studies it ……Yes[ ] No [ ]

(ii) You decided to join Science because one of your relative is a scientist … …….Yes [ ] No [ ]

(iii) You decided to join Science because your parents want you to do it ……. ……..Yes [ ] No [ ]

(iv) You decided to join Science because you want to be a Science specialist …….....Yes [ ] No [ ]

(v) You decided to join Science because Science career pay more than others… Yes [ ]No [ ]

D. Political factor.

(i) You decided to join Science because Science students have high priority in accessing loans at University education level…….. Yes [ ] No [ ]

(ii) You decided to join Science because you have been influenced by big results now slogan Yes [ ] No [ ]

(iii) You decided to join Science because you are aware of the Governments future plan through different education policies…….. Yes [ ] No [ ]

E. Others

State any other factor that is not described above but you believe influenced you a lot in your decision to opting Science. (Only if you have).

(i) ……

(ii) ……

Objective 2: Factors which have sustained your interest in Science Subjects.

Qn1.What factors have kept high your interest or have made you remain in studying Science since you joined the Science class 2014?

Please Tick [√] The Most Appropriate Response.

(i) You have self interest and love for Science…….. Yes [ ] No [ ]

(ii) Your school has laboratories…….Yes [ ] No [ ]

(iii) Your school has a school library……....Yes [ ] No [ ]

(iv) Your school has adequate number of Science books ……Yes [ ] No [ ]

(v) Your school has good teachers in Science……...…..Yes [ ] No [ ]

(vi) You are taking Science due to a force from your teacherYes [ ] No [ ]

(vii) You are taking Science because of your future Science plan….. ……. Yes [ ] No [ ]

(viii) You are taking Science because of your friends advice.. Yes [ ] No [ ]

(ix) You are taking Science because of your parents advice.Yes [ ] No [ ]

(x) You are taking Science because of good education policyYes [ ] No [ ]

(xi) You are taking Science because of teachers' influence on the importance of the Science subjects ……..Yes [ ] No [ ]

Qn2.What do you want to be after school? (Tick only one).

(i) Doctor [ ]

(ii) Nurse [ ]

(iii) Teacher [ ]

(iv) Ecologist [ ]

(v) Other (specify)…….

(vi)

Qn3. Do teachers provide information on the careers that one can pursue in reference to specific Subjects? (i)Yes [ ] (ii) No. [ ]

Qn4. What do you think the Government should do for you to attain your career plan? _____

Appendix 2: Observation schedule

Items for Observation	Present/Absent	level of Utilization
Laboratory		
Science books		
Chemicals for experiments and demonstrations		
Apparatus for experiments and demonstrations		
Science models		
Science teachers		
Science charts		
Performance of form four 2015students in mock examination		

Appendix 3: Interview Schedule

The Interview schedule is divided into two groups. Group A will comprise with students with good performance in mock examination and group B will comprise with students, who will perform poorly in mock examination.

Group A

S/N	Interview item	Response
1	Do you think you deserve the grade you got in Chemistry?	
2	Do you think you will score the same or more than this grade in the coming National examination?	
3	What will you do to maintain or improve your performance?	
4	Which combination will you take at Advanced level next year?	
5	What if you fail to score above grade C in Chemistry Necta examination, will you continue with Science subject's at Advanced level?	
6	What factors have made you attain this good grade?	

Group B

S/N	Interview item	Response
1	Do you think the grade you got in Chemistry you deserved it?	
2	Do you think you will score the same or more than this grade in the coming National examination?	
3	What will you do to improve your performance?	
4	Which combination will you take at an Advanced level next year?	
5	What if you fail to score above grade C in Chemistry National examination will you continue with Science subject's at Advanced level?	
6	What factors have made you fail in Chemistry in the Mock examination?	

Appendix 4: Responses from the Student's Interview

Student 1 – I don't deserve this grade; I wish to score more than this. I know for this to happen, I have to study hard, do a lot of exercise and solve many past papers because sometimes in Necta questions are repeated. I like to take PCB at A – level. If it happens I prove failure, I will switch to any combinations according to my performance (*interview, student, school A*, 15/7/2015).

Student 2 – I deserve the grade although to me it sound fails, I know it has happened like this because during mock examination I lost one of my parents, it was a hard time for me to couple with the situation while examinations are on. Otherwise I would have performed better than this. I don't mind, I hope to improve in Necta since I know myself I am capable. I wish to take PCM at A – level study because I want to be an engineer (*interview, student, school A*, 15/7/2015).

Student 3 - I don't deserve this grade, there was poor marking in my paper 1, some questions were not marked and others were marked incorrectly. I claimed to a teacher, and I was told to come down and focus on the future, but I'm still not comfortable. If I don't pass chemistry in Necta, my decision for taking Science at A –level will depend on other subjects, but I wish God to help me do better. I know for me to pass well in exams I will have to study hard, cooperate with fellow students in discussion, ask for teachers' assistance where necessary and look for tuition if my dad agrees to give me money. (*Interview, student, school A*, 15/7/2015).

Student 4 - I got B in chemistry but that is not enough. My target is to get A in chemistry, Physics and Mathematics. I want to join Mzumbe secondary school or

Kibaha secondary school for PCB or PCM. Failure is not in my head, I always think about how will I get A and not B and C. I have covered all topics before teachers in these subjects. I love them and I want to be a doctor in my life. (*Interview, student, school A,* 15/7/2015).

Student 5 –Yes sir, I have failed in chemistry, but that was not my target. I think I did not put enough effort in dealing with volumetric analysis calculations because in paper 2 this question contribute 20 out of 50 and I scored nothing, also in section C of paper 1 there was another question for volumetric which had large marks, I also left the question un attended. Thus, I will have to prepare myself better in all topics so that I escape another fail. I wish to take PCB because I want to be a doctor. (*Interview, student, school B,* 15/7/2015).

Student 6 – of course, the score I got is not good. I think one of my problem in this examination is that some of the topics appeared in the exam were not ready covered by our teacher. Therefore I failed to answer questions properly. I guessed some answers but I was not correct although some I got right. Even if I fail in Necta I will continue fighting for Science careers. I don't think I will fail to the level that I don't fit even in nursing course. I will try to work hard to make sure that I pass in the Necta. If I do it nicely I will go for CBG at A – level studies. (*Interview, student, school B,* 15/7/2015).

Student 7 –. I have passed the exam simply because I prepared myself well for the exam. I don't deserve the score because if you count the marks in my paper 1, you get 56 but what has been indicated in score sheet is 50. I wonder why? I'm sure I will

get more than this in the Necta exam because some unfished topics by our teacher will be finished and my confidence in practical was not so good during mock exams, by that time I expect to be more prepared for practical. (*Interview, student, school C,* 16/7/2015).

Student 8 – I could get more than this if I was placed in a real laboratory. You know sir during practical exam one of my apparatus felt down and broke, it totally took me out of control, I lost my confidence then I decided to cook data. This wrong data led me to obtain wrong results. I wish the constructed laboratory to finish in time before august or September so that we carry a lot of activities in the laboratory to be used to it before the final exam. (*Interview, student, school C,* 16/7/2015).

Student 9 – I don't deserve the grade I got. I think I will score more than this in Necta exam. I will make sure that I study hard; I revise a lot and get out of fear when facing examinations. I expect to take CBG at A – level. If I don't do well in Science I will be flexible to take Art subjects. One of my biggest challenges in the previous exam was just a fear for exam. (*Interview, student, school D,* 16/7/2015).

Student 10 – honestly, I don't deserve the grade. I did not expect although I knew after the exam that the situation was not good. I think this will not happen again because I have changed my studying technique, I now do it by attempting different questions and seeking help from friends and teachers. I want to take CBG. I don't think I will drop Science in my future by any means. One of the reasons for my failure is that when I moved to this school from school X, I found my classmates

were far away in coverage, so I was so behind as compared to others in the class. (*Interview, student, school D,* 16/7/2015).

Student 11 - I think my performance will improve because I have decided to concentrate more on Science subjects. We have formed a studying group at home of nearby students from different schools for studying purposes. I used to study alone at home, that is why I have not performed well. In fact, I don't expect to fail in all Science combination. (*Interview, student, school A,* 15/7/2015).

Student 12 - I don't deserve the grade because I'm able to get more than that. I don't expect to fail to the level that I don't fit in any Science career. I have failed because during mock examination I was sick, due to that, some of the exams I did not attend. I wish to take PCB if God wishes. (*Interview, student, school G,* 17/7/2015).

Student 13 – No, I don't deserve the grade. I expect to get more than this in Necta exam. I have started to make revision from form one topics, I also solve different past papers to make myself more familiar with many questions. If it happens my results are not good in Science, no way I will go for art subjects depending on the performance. (*Interview, student, school G,* 17/7/2015).