FACTORS INFLUENCING CHOICE OF PHYSICS IN PUBLIC SECONDARY SCHOOLS IN KANGUNDO DISTRICT, MACHAKOS COUNTY

BY

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DECLARATION

This project is my original work and has not been submitted to any other study programme or degree in any other university.

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DEDICATION

This project is dedicated to the almighty God for giving me good health to undertake and accomplish the project writing within the university required time frame.

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ABSTRACT

The importance of physics as a basis for technology is obvious although the number of students taking physics as their choice in secondary school is declining. This study sought to determine the factors influencing the choice of physics in public secondary schools in Kangundo district. The study was guided by the following objectives: i) To determine the student factors that influence enrolment in Physics. ii) To establish the influence of Physics teachers in the students' choice of Physics. iii) To investigate the effect of the school environment on students' choice of Physics. The findings of the study may be useful to policy makers in the education sector to help put policies in place which may increase the number of students who choose Physics in Kangundo district. To guide the study, literature on student factors, teacher influences and school environment factors that influence the choice of Physics was reviewed. The study adopted descriptive survey design to collect data on factors that influence the choice of physics in public secondary schools in Kangundo district. From a target population of 12,548 students and 52 physics teachers, using stratified sampling, 4 schools were selected in three strata that is mixed schools, Boys schools and Girls schools. The sampled schools represented 30% of the target public secondary schools. In each sampled school, one Physics teacher was involved in the study which represented 23% of the target population. Further, in each sampled school only 40 form three and 40 form four students were involved in the study which represented 7.6% of the target student population. A total of 892 respondents gave information for the study, out of 972 giving a response rate of 92%. Data were collected using questionnaires for the Physics teachers and form three and four students in the sampled schools. Analysis of the data was done using SPSS program. The findings were summarized and reported in percentages, means and frequencies using distribution tables, bar graphs and pie charts. The study found that students were influenced in their choice of Physics through their career goals, their poor attitude towards Physics, their perception of Physics as difficult, poor study habits, poor previous performance and their gender. The study also found that teachers influenced the students' choice of Physics through their missing of classes, poor relationship with students, unsuitable pace of content delivery and poor methods of teaching. The study finally found that school environment influenced the choice of Physics by the type of school and the availability of laboratory equipment. The study concluded that students, teachers and school environment characteristics influenced the choice of Physics in Kangundo district. The study recommended that students should be encouraged and given opportunities to develop positive attitude towards Physics. Further the study recommended that the teachers should cultivate a good relationship with students to improve the students' negative attitudes. Finally the study recommended that schools should ensure that their environment is favorable for Physics by establishing laboratories which are well equipped with learning materials for practical lessons. For further research the study recommended that another study be done to evaluate the influence of parents in the choice of Physics which was not a concern of this study.

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LIST OF ABBREVIATIONS AND ACRONYMS

DEO	District Education Office
EFA	Education for All
INSET	In-service Training
KCSE	Kenya Certificate of Secondary Education
KIE	Kenya Institute of Education
MDGs	Millennium Development Goals
UK	United Kingdom
UNESCO	United Nations Education, Scientific and Cultural Organization
SMASSE	Strengthening of Mathematics and Science in Secondary Education
SPSS	Statistical Package for Social Sciences

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The world is fast evolving because of new technology. Throughout history, the development of new technology has been absolutely vital for both human survival and progress. One of the main tools with which human beings adapt to changing conditions is the discovery and utilization of new technologies. Since technology is the primary vehicle through which humanity progresses, it could serve to reduce much of the problems facing human beings such as world hunger, poverty, lack of access to education and other issues. Physics is very important because it is a major source of skills and attitudes required for the development of technology. The importance of physics therefore cannot be over emphasized.

While the numbers attending high school has increased dramatically, the percentage enrolled in the physics course continues to drop. Studies by Bolstad and Hipkins (2005) in New Zealand, Lyons (2005) in Australia, Smither and Robinson (2006) in the UK, Dekkers and De-laeter (2001) in Western Nigeria observe that the number of senior students who choose physics is relatively small and has shown a declining tendency.

Further, literature reveals that senior secondary students' decisions to opt for physics seem to be based on a comprehensive consideration of a long list of factors which influence their decision making. Studies by Crawley and Black (1990), Lyons (2005), Nahashon's (2003), Cleaves (2005), Munro and Elsom (2000), Woolnough and Cameron

(1991) show that schools and science teachers have been identified to exert important influences on students decisions about taking physics by providing students with enabling learning environment and career information.

A study done in Indonesia by Abu Hassan as cited by Salleh (2004) on the assessment of basic physics laboratory reported that the approach to laboratory work was traditional in nature. It does not contribute towards conceptual understanding and the development of physics thinking.

The Africa-Asia confidential (June 2009) observed that struggling with poor facilities, little money for equipment and inadequate training, Kenyan physics teachers in science and mathematics departments are used to low numbers of students taking their subjects and poor grades from those who do choose to enroll. Students are uninspired by their teachers, whose 'chalk and talk' mantra does little to bring science to life.

Kibera (1993) in a study in Kiambu, Kajiado and Machakos Districts found that career aspirations and expectations are not merely outcomes of curriculum studied, rather they were a product of a variety of factors including school quality (quality of staff, equipment, workshops and school practices) and gender composition of students in schools. According to the Kenya National Examination Council (2005) Kenyan schools that have adopted the country's official system of education, that is 8-4-4, subject selection must be based on the availability of teachers and equipment in schools.

Studies by George (2000), Hausser and Hoffmann (2000), Hoffmann (2002), Juceviciene and Karenauskaite (2004), Rosier and Banks (1990), Simpson and Oliver (1995) and Trumper (2006) show that the interest of students in physics is declining. According to Miller, Parkhouse, Eagle and Evans (1999) positive attitudes have been associated with interest in and enjoyment of science among secondary students.

George and Taylor (2001), Hoffman (2002), Parkhouse, Eagle and Evans (1999), Munro and Elsom (2003) found that students' early science learning experiences and perceptions of school science were influential in students physics enrolment decisions. Further, according to George and Taylor (2001), students who enjoyed their learning experience in junior secondary and achieved good results in science were found to be more confident in their abilities and more likely to enroll in physics.

Students' self perception of own competence in science and physics was accounted as an important reason for explaining students physics enrolment. Hoffman (2002) states, 'in explaining the interest in physics as a school subject, the best predictor is the concept a student has about his or her confidence in good performance'. According to Salleh (2004) labels that physics is difficult, dry, dull have remained so for many decades. Such perceptions appear universal. Somehow the traditional system of physics education has not been able to overcome this problem.

Studies by Crawley and Black (1990), Fullarton and Ainley (2000), South Australia (2006), Wood and Delaeter (1986) showed that students perception of the value of

learning physics for their future life, in terms of university or career aspirations was also suggested to play a major role in their enrolment decisions. Obonyo (1994) in his study of educational and career expectations of form three girls at Nyabururu and Kereri schools, Kisii district, found out that teachers did not attempt to create career awareness nor provide sufficient information on career preferences. A study by Mutua (2007) in Kitui district revealed that there were few career guidance sessions in schools and although there were guidance teachers they were not trained to handle careers. Further studies by Panizzon and Levins (1997), Talton and Simpson (1985) showed that peers' attitudes towards physics affected its choice.

Milliron (2007) notes that if we outfit our students with skills such as critical thinking, creativity and courage they will be ready for a better life in a globally connected world. One way of doing this is through the teaching of physics in secondary schools. Physics endeavors to understand the underlying laws governing our universe. By understanding those laws, we can better interact with and harness our environment.

To gain perspective into how much physics has contributed to our livelihoods Pravica (2005) considers the following miracles from physicists; alternating current, hydroelectric power, electric motors, radio, microwave, ovens, satellites, radar, modern rocketry, nuclear magnetic resonance, magnetic resonance imaging, x-rays, lasers, transistors, light emitting diodes, oscilloscopes, television, holography and the world web among many others. There is a deep symbiosis between discovery in physics and new technology. We all benefit from the priceless contributions of physics. Contributions from physics

generate many trillions of dollars for the world economy and aid our existence immeasurably. Only science with physics as its foundation can solve many of the impending crises facing our society, such as global warming, overpopulation, waning energy and other natural resources, and the poisoning of our planet.

The 2002 syllabus requires students to take three core subjects namely; Mathematics, English and Kiswahili. The students must also choose at least two sciences from biology, physics and chemistry. One subject from the humanities is required for students sitting for KCSE. The candidates can then choose an additional subject (or two more) from sciences, humanities, foreign languages or technical subjects. These optional subjects vary from school to school and are determined by the individual school administration. Table 1.1 below shows the enrolment of science subjects by gender in 2009 and 2010 KCSE examination.

Table 1.1: Enrolments in KCSE Examination in Mathematics and Science Subjects in Kenya

Subject	**2010**					**2009**				
	Total enrolment	**Females**	**%**	**M ales**	**%**	**Total enrolment**	**Females**	**%**	**Male**	**%**
Mathematics	353,871	157,816	44.5	196,055	55.5	335,014	151,915	45.3	183,099	51.7
Biology	315,063	148,729	42	166,334	47	299,302	143,359	42.7	155,943	46.5
Physics	109,072	29,964	8.5	79,108	22.4	104,188	29,233	8.7	74,955	22.3
Chemistry	347,378	155,725	44	191,653	54.2	328,922	149,755	44.7	179,167	53.4

Source: http://www.scribd.com/doc/49933701/ KCSE-Statistics

From the table it can be seen that the number of students who take physics at KCSE level are few as compared to other science subjects. At the same time the number of girls who take Physics are even less than the number of boys. The same problem is witnessed in Kangundo district where the number of students who took Physics at KCSE level in the year 2009 and 2010 is low as compared to those who took Chemistry and Biology. Table 1.2 below shows the enrolments in Mathematics and Sciences in Kangundo district in the year 2009 and 2010.

Table 1.2: Enrolments in KCSE Examination in Mathematics and Science Subjects in Kangundo District

	2010	2009
Subject	Enrolment	
Mathematics	3022	2968
Biology	2915	2830
Chemistry	2853	2778
Physics	361	329

Source: District Education Office, Kangundo

1.2 Statement of the Problem

Physics is not only important to a country's economic progress but also to individuals to be able to cope with the rapidly changing society as a result of advances in technology. Salleh (2004) states that through research activities in Physics our knowledge and understanding of matter continues to expand. The cycle of knowledge, understanding and

probing the world of matter continues endlessly. Omosewo (1999) adds that the rate of development of any nation is determinable by the rate of technological advancement of the nation concerned. Stokking (2000) states that knowledge of Physics and Physics related sciences are indispensable in many professions and for economic development. Yet in Kenya, statistics show that few students are opting for Physics in their KCSE level and even fewer girls than boys opt for physics. Further, statistics show that there are few students opting for Physics at KCSE level in Kangundo district.

1.3 Purpose of the Study

The purpose of the study was to find out the factors which influence the choice of Physics in public secondary schools in Kangundo District.

1.4 Objectives of the Study

i) To determine the student factors that influence enrolment in Physics at KCSE level in public secondary schools in Kangundo district.

ii) To establish the influence of the Physics teachers in the students' choice of Physics at KCSE level in public secondary schools in Kangundo district.

iii) To investigate the effects of the school environment on students' choice of Physics at KCSE level in public secondary schools in Kangundo district.

1.5 Research Questions

i) What student factors influence enrolment in Physics at KCSE level in public secondary schools in Kangundo district?

ii) What is the influence of the Physics teacher in the students' choice of Physics at KCSE level in public secondary schools in Kangundo district?

iii) What school environment related factors influence the students' choice of Physics at KCSE level in public secondary schools in Kangundo district?

1.6 Significance of the Study

The findings of the study may be useful to policy makers and stakeholders in the education sector to help put policies in place which may increase the number of students who choose physics. The study may also be useful in teacher training institutions in relation to the preparation of teachers. Further the results of the study may be a point of reference by quality assurance and standards officers in organizing in-service courses for physics teachers. Lastly, since vision 2030 aims to capitalize on knowledge in science, technology and innovation which physics is a main ingredient the study may be useful in gauging the viability of the vision 2030.

1.7 Assumptions of the Study

The researcher in this study assumed that the respondents would co-operate and give correct information. The researcher further assumed that the respondents would not to influence each other on the responses they gave especially on the part of student respondents.

1.8 Limitations of the Study

Kangundo district is a large area and therefore due to the time frame given by the university it was not possible for the researcher to cover the whole of the district. Further, the researcher was not in a financial position to cover the whole district, therefore few schools were sampled to represent Kangundo district public schools. Since the state of infrastructure in the district was not good the researcher sampled schools near the main road therefore the study was not balanced regionally.

1.9 Delimitations of the Study

The study was limited to Kangundo district and not other districts in the country and only involved the form three and four students who had already made the choice to either take or not take physics.

1.10 Theoretical Framework

The study was guided by Atkinson (1964) achievement motivation theory. According to this theory, achievement is associated with past task engagements over a time. For individuals with a subjective history of success, a past achievement elicits a feeling of pride. This achievement pride produces anticipatory goal reactions that energize and direct behaviour to approach the new task. For individuals with a subjective history of failure, on the other hand, a new task elicits a feeling of shame. This achievement shame produces anticipatory goal reactions that energize and direct behaviour to avoid the new task.

According to De cecco (1968) motivation refers to those factors which increase and decrease the vigor of an individual's activity and achievement motivation as the expectancy of finding satisfaction in mastering challenging and difficult performances. There is a strong correlation between motivation to learn and student achievement. One reason why some students try harder than others is because they differ in achievement motivation, that is, their willingness to strive to succeed at challenging tasks and to meet high standards of achievements.

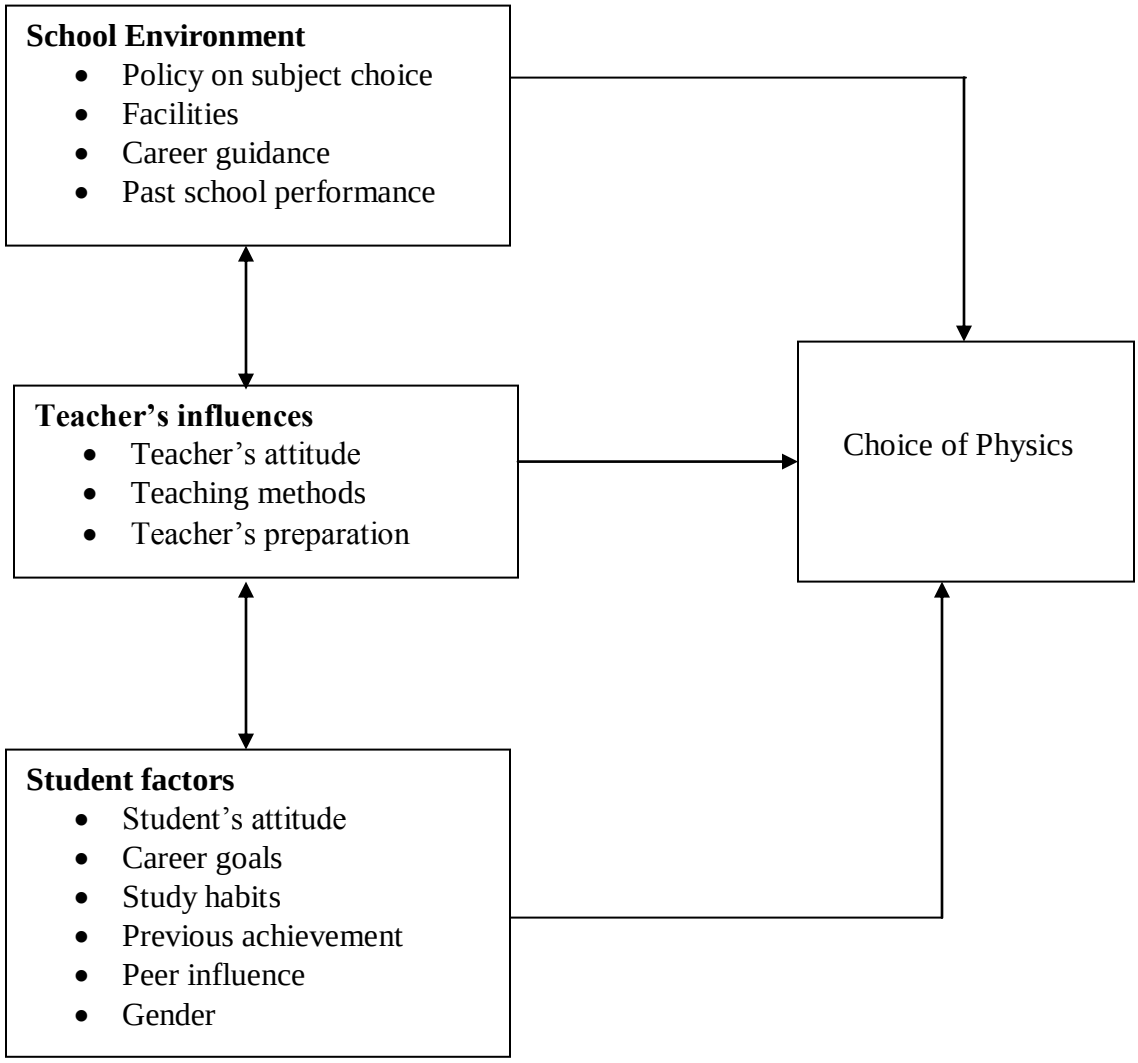
According to Atkinson and Feather (1966) a central conflict facing children is the drive to succeed and the urge to avoid failure. To work out this conflict, children evaluate whether or not they expect to succeed in a task up against the premium placed on either success or failure. In this kind of a situation students make choices. Brophy (1987) states that motivation to learn is a competence acquired through experience but immediately encouraged through modeling, statement of expectations and instruction by significant others. To this end what takes place in the classroom and school setting is critical to student success. What is taught and how it is taught exert tremendous influence on the students' motivation to learn. With that in mind, teachers are heavily weighted variables in the equation of motivation. According to De cecco (1968) the teacher must help the student who lacks the desire to achieve to acquire the desire or the motive.

Repeated success will build confidence and the urge to move on and discover more but repeated failure kills the morale to proceed especially where the student lacks support of the colleague, teacher, school administration and even the parent.

These motivational characteristics could be shaped by the parent, teachers, learners themselves and the school administration. Thomas (1980) and others have demonstrated a strong relationship between student attitudes towards school and towards themselves as learners on the one hand, and their achievement motivation and academic success on the other. A number of educators believe that student attitudes and academic success or failure are in large part due to the nature of their relationships in and with the school. Covington (1984) found that children who consistently do poorly in school tend to believe that they are not academically capable as other children.

1.11 Conceptual Framework

Figure 1.1: Conceptual Framework



Source: Adopted and modified from Hyde (1995)

1.12 Definition of Terms

Attitude: refers to the positive or negative evaluation of Physics.

Curriculum: refers to all that is selected, organized integrative, evaluative and innovative learning meant to achieve designated learning outcomes.

Enrolment: refers to the total number of students who have registered for the Physics course for examination at KCSE level.

Junior secondary: refers to form one and two where all students take Physics.

Motivation: refers to the internal or external factors from the students, teachers and the school administration that stimulate desire and energy in students to be continually interested in Physics.

Performance: refers to the grades obtained by students in Physics.

Senior secondary: refers to form three and four where students make a choice to either take or not take Physics for examination at KCSE level.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter introduces physics by looking at the concept physics and its importance and the current situation of the choice of physics. Further the chapter reviews literature related to the factors which affect the choice of physics among students in secondary schools. The factors reviewed include students', teachers' and school environment related factors. The chapter also summarizes the literature review and identifies the knowledge gap.

2.2 Concept of Physics and its Importance

According to Beauchamp (1981) there are three broad categories of knowledge which include humanities, natural science and social sciences. The natural sciences include mathematics, physics, chemistry, biology and even geology. These disciplines serve all other disciplines. From these basic divisions of knowledge come areas of applied (practical) knowledge which includes architecture, engineering, education and law among others.

According to Salleh (2004) Physics is a branch of knowledge about the material world. Nature provides all the material resources that human beings need to live and manage their living. The human beings-material resources interaction must be based on some understanding on the properties of matter, how they behave and the laws that they are subjected to. Physics is one of the sciences in the secondary school curriculum. Like

other subjects it performs some vital roles which help in the achievement of some national goals. Goodstein (1999) believes that "a solid education in Physics is best conceivable preparation for the lifetime of rapid technological and social change that our young people must expect to face".

The K.I.E (2002) syllabus presents Physics as a body of knowledge about the physical environment. It employs a systematic scientific methodology of study to arouse learners' way of reasoning and create a positive attitude. To this end the use of teacher/learner discussion, teacher demonstration and group/class experiments as methods of instruction is encouraged. The syllabus not only emphasizes the understanding of the fundamental scientific concept and principles, but also the experimental approach of investigation. The experimental approach should prepare the learner to present scientific concepts and ideals in the modern technology. Further the syllabus presents project work and this approach provides the learner with opportunities in undertaking investigations for purposes of finding solutions to problems. According to Salleh (2004) advancement in science and technology is coupled with the deterioration of the ecosystem and greater use of chemicals and technologies that affect our health systems, we therefore need the relevant science or physics knowledge and understanding that can help us understand the physical world around us.

According to Hooper (1971) it is not enough that a child should have knowledge of his needs, he must also be able to weigh one need against another and determine his priorities. Kenya Institute of education (2002) outlines that students must choose at least

two sciences or chooses all the three which include physics, chemistry and Biology. Statistics in 2010 and 2009 KCSE indicate that few students had chosen physics as one of the two or three sciences. This indicates that there are factors which inhibit the choice of physics.

2.3 Factors Influencing the Choice of Physics

Following the low enrolment rates in Physics at KCSE level there must be factors hindering students from pursuing the subject up to form four and may be take courses related to Physics at the tertiary colleges and universities. The researcher will explore literature on factors related to students, teachers and school environment.

2.3.1 Students' Influence on Choice of Physics

Perceived and actual level of difficulty of the subject by the students has been shown to influence the choice of Physics. According to Nicholls and Miller (1984) students' judgment about the difficulty level of school tasks clearly affect their achievement related cognitions. Tasks perceived by the student as difficulty (in to his/her skill level) engender lower expectations for success, perceptions of control and perceptions of self efficacy than easy tasks. Most learners admit that they consider mathematics and science a difficulty subject. A study by Jones and Mooney (1981) revealed that students felt that sciences have calculations associated with mathematics that was traditionally thought to be difficulty and was equated to failure. Eboda (1974) agrees with Jones and Mooney Ibid for he observed that generally students from the western state of Nigeria did not choose to study Physics in secondary school. When these students were interviewed, they

gave the reason as there are mathematical calculations associated with Physics at the school leaving examination, inadequate teaching resources and learning resources, poor teaching methodologies among others. Musyoka (2000) found that a majority of students who were not taking physics for instance were scared of its quantitative nature and the conception that physics is too abstract especially when taught theoretically.

Difficulty and prior achievement are strongly linked to course uptake and there is a relationship between them. Sharp, Hutchison and Keys (1996) in their survey teachers perceived difficulty as the highest factor that discouraged take up of science followed by negative subject image. There is evidence that past or previous performance of Physics influence its choice. According to Weiner (1992) attributions for past performance influence future performance. Real academic performance is influenced by the importance that students attach to good performance. According to Aduda (2003) students shun physics when given an option and this especially applies to girls. That is given a choice a student would rather drop physics in favour of other science subjects. For a long time physics has been mystified as difficult and hence some schools do not offer it. Cheng, Payne and Witherspoon (1996) as cited by Smyth and Hannan (2006) say that prior success within science in terms of performance is associated with subsequent take up of scientific subjects.

Further Smyth and Hannan (2006) found out that students are more likely to take science subjects if they find them interesting and useful and if they do well in science, and are less likely to take the subjects if they find science difficult. Polard et al. (2003), Wikeley

and Stable (1999) as cited by Owoyele and Toyobo (2008) found that performance of students in junior school examination determine students placement in the senior school level. It is noted that students took account of their previous experiences academically in making option choices.

Attitudes of students towards Physics have been found to influence its choice. According to Adesina and Akinbobola (2005) attitudes are acquired through learning and can be changed through persuasion using a variety of techniques. Attitudes once established help to shape experiences the individual has with object, subject or person. Although attitudes can change gradually, people constantly form new attitudes and modify old ones when they are exposed to new information and experiences. Gagne (1979) define attitudes as an internal state that influences the personal actions of an individual, he recognized attitude as a major factor in subject choice.

According to Hoofman (2002) as cited by Semela (2010) the choice of Physics as a major field of study or taking higher Physics courses is shaped by student's interest, motivation and prior achievement. Existing literature show that interest in Physics is strongly related to Physics self concept. Bloom (1976) found that twenty five percent (25%) of the variance in achievement could be attributed to students' attitude towards science. Kempa and Dude (1974) reported that student's interest in science is associated with their achievement in science. Olatonye (2002) agrees with the two that student's attitudes towards science have significant direct effect on student achievement.

Students' enjoyment and liking for the subject are reported to be very significant factors in course choice by students and teachers alike. Reid and Skryabina (2002) noted that in Scotland in contrast with the rest of the UK and other countries, Physics is the fourth most popular subject at higher grade students take at age 18.

Literature shows that career goals influence the students' choice of Physics. Perceived strategic usefulness of Physics is a significant predictor of the choice. Teachers and students rate career intentions as an important influence on school student course choice. Students report that they choose Biology for interest but tend not to choose the physical sciences for this reason. Tinto (1993) as cited by Ogunkola and Fayombo (2009) asserted that well defined career plans or goals positively influence decisions of students to remain in college. In addition Hull-Blanks et. al (2005) found that students with a well defined job related career goal were more likely to decide to persist in college than students without such a career goal. Further, Ting (1997) found that setting long term career goals predicted positive academic achievement.

Study habits have been found to contribute significantly to students' physics achievement. Studies like Okpala and Onocha (1988) and Olatonye and Ogunkola (2008) as cited by Ogunkola and Fayombo (2009) indicated that study habits makes significant contribution to the prediction of physics achievement. This implies that if a physics student exhibits negative study habits (e.g. lacks concentration, feels bored, tired and sleepy while studying physics, spends little time on physics and does not map out immediate goals to attain), it is likely that the student may lack the impetus to engage

adequately in productive physics learning during allocated school time and during his or her personal study time. Nouhi, Shakoori and Nakhei (2008) added that mastering skills by students makes study more enjoyable and effective which in turn strengthen the students' interest so that he/she spends more time studying.

According to a study by Owoyele and Toyobo (2008) students' choice of subjects at school is influenced by jointly peer pressure, parental will and academic ability but it is influenced more by peer pressure and parental will than their academic ability. A study by Tella et.al (2007) as cited by Owoyele and Toyobo (2008) indicated that peer pressure has a positive effect on students' subject selection and achievement growth. Further results of a study by Ablard (1997) reported that adolescents enjoy peer support on choice of school subjects and vocational aspirations. Owoyele (2007) found out that peer support has also been found to be positively related to adolescents' academic achievement and choice of school subjects. According to Dryler (1999) as cited by Smyth and Hannan (2006) peer groups have also been found to be influential, with boys' and girls' choices correlating with the choices of their same sex classmates, but not with those of opposite sex classmates.

Gender differences emerge when other factors come into play which can compromise self concept of performance in physics. A study by Balogun (1985) showed that more boys than girls tend to opt for all the basic sciences at school certificate level examination because boys are more generally disposed to science and mathematics than girls. Parents have great influence on their children especially when they are young. A study by

Labudde et. al (2000) as cited by Tuaundu (2009) revealed that there should be a strong bond between Physics contents and students everyday experiences. This implies that students who are exposed to technological toys and games (which in most cases are boys) will have greater interest in mathematics and science because of the existing knowledge that they have. This knowledge plays an important role in the understanding of mathematics and science. Gilbert and Calvert (2003) as cited by Tuaundu (2009) found out that most young women do not see themselves as being capable of studying and succeeding in mathematics and science, therefore they are not interested in it.

The myths and realities of women progressing in mathematics and science field were studied by David et al (1996) in Tuaundu (2009) concluded that the attitudes adopted by girls from parents, teachers, friends, and society have a significant influence on the girls choice and performance in science and mathematics.

2.3.2 Teachers' Influence on Students' Choice of Physics

Hargreaves (1989) says that what the teacher believes, what the teacher thinks, what the teacher assumes, all these things have powerful implications for the change process. According to Hewson and Hewson (1989) as cited by Freitas,Jimenex and Mellado (2004) science teachers are considered as having conceptions about the nature of science, about scientific concepts and about how to learn and teach them. These are usually deeply rooted conceptions and a teachers' first step in his or her education and professional development is to reflect on these conceptions critically and analytically. Teachers do not change their conceptions easily, however and even less so their teaching

practices. In some cases this is because their conceptions are the fruit of many years they themselves spend at school.

Teacher preparation and mastery of subject influence effectiveness of teaching. According to Huibregtse and Wubbels (1994 many teachers use pedagogical methods that are similar to those they preferred in their own teachers when they were students or simply teach in the same way they themselves were taught. Further Bell and Gilbert (1994) as cited by Freitas, Jimenez and Mellado (2004) say that teachers feel satisfied with certain teaching models that have been consolidated by professional experience or because they do not have any teaching strategies readily available that they find better for real daily work of teaching their specific subjects and for the students learning. The teacher is the mediator who transforms content into depictions that are comprehensive to the students. Teachers' educational strategies depend very much on the material being taught, and their classroom practice and activities relating to the subject matter.

A study by Kiboss (1997) as cited by (Kiboss (2000) showed that students conceptions about science might be negatively affected by the way the teacher presents the subject. For example the use of such techniques as lecturing, giving notes and drilling students on past examination papers, which most teachers find as useful strategies, may make pupils perceive science subjects as the mastery of some formulas and / or as away of receiving and storing information. According to Linder (1992) and Simpson and Oliver (1990) as cited by Kiboss (2002) this eventually makes them lose interest in the subjects.

Risala (1985) recommended that science teachers should use a variety of teaching methods. A study by Kumar and Altschuld (2002) showed that video- based science methods influenced the knowledge and understanding of effective ways of teaching science. The vedio –based science methods enabled teachers to plan and teach science with confidence, in addition to relating science with other disciplines and societal issues in classrooms.

UNICEF (2009) asserts that in many developing countries, a higher percentage of teachers lack the prerequisite levels of education and training needed to rise from challenges of school reforms geared for improved performance. Further Torongey (1986) established that science teachers especially Physics teachers characteristics such as pace of content delivery, comments made in class, frequency of missing lessons among others contributes to negative attitudes by students towards science.

According to Rono (1985) some teachers even go a head to use very difficulty terms that students could not easily understand as an excuse to hide their ignorance. A 1988 report on science achievement (international association for the evaluation of educational achievement, 1988) stated that elementary and secondary schools were not laying a satisfactory foundation for advanced science and engineering education and this was due to poor preparation in mathematics and science. The way in which physics is taught within the school at junior cycle also influences students' attitudes and orientations to the subject and thus their likelihood of continuing to take physics.

Further, teacher student relationship affects the performance of Physics. A study by Brekelmans et al. (1990) found that student perceptions of the teacher influence are related to cognitive outcomes. The higher a teacher was perceived on the influence dimension, the higher the outcomes of students were on a Physics test.

2.3.3 Effect of the School Environment on Students' Choice of Physics

Whether or not a subject is provided in a school is clearly a matter of policy for that particular school. School organization may facilitate or constrain the choice of physics. According to Okakes, Selvin, Karoly and Guiton (1992) as cited by Smyth and Hannan (2006) schools are found to make assumptions about the abilities and needs of their student intake, assumptions which guide their decisions about which courses to offer. Roger and Duffield (2000) found that schools can influence course up-take indirectly through subject packaging for optional subjects and more subtle encouragement of the take-up of particular types of subjects. Aduda (2003) asserts that despite the fact that physics is an important subject in economic, scientific and technological development most schools have made it optional in form three and four and others do not offer it at all.

According to Smyth and Hannan (2006) schools vary in the way in which scientific subjects are made available within the school; they may allow certain ability groups to take particular subjects or they may set prerequisite for taking certain subjects (e.g., a student may need to achieve a certain grade in order to be allowed to take a subject). At upper secondary levels, schools vary in the way in which scientific subjects are made available within the school and the way they are time tabled against each other are

factors which affect the take –up of physics. Kitchen (1999) in Smyth and Hannan (2006) highlighted the way in which timetabling requirements for physics produced a gendered take up in other subject areas.

According to Ditchburn and Martin (1986) and Stables (1990) in Smyth and Hannan (2006) single sex schools have a positive effect on attitudes to, and take-up of mathematics and science especially for girls. However Daly and Shuttle worth (1997) found that coeducation has no significant effect on take-up patterns when adequate account is taken of the more selective nature of student intake into single sex schools.

According to Millican, Richards and Mann (2005) physics is an experimental subject. General principles and concepts are more easily understood if they are demonstrated in the laboratory. Laws and relationships are more fully appreciated if the student investigates and verifies them at the laboratory bench. According to Shiundu and Omulando (1992) the school management should endeavor to provide necessary resources for the support of teaching and learning especially the purchase of relevant textbooks, building and equipping laboratories with correct apparatus and chemicals to facilitate effective learning in the school. School with less provisions, fewer teachers, poor school buildings and inadequate facilities will have a negative influence on the attitudes and academic achievements of the learners.

A study conducted by Yildiz, Akpiner, Aydogdu and Ergn (2006) showed that having no science laboratories or inadequate equipment in science laboratories in schools affect

teachers attitudes towards the aims of science experiments in a negative way. Science experiments are inseparable and indispensable parts of learning experiences. The experiments provide both acquiring science concepts and learning scientific method for learning experiences.

According to NTI (2007) physics as a subject is activity oriented and the suggested method for teaching it is guided discovery method and is resource based. This suggests that the mastery of physics concept cannot be fully achieved without the use of instructional learning materials. The teaching of physics without learning materials will certainly result to poor performance. According to Bolorunduro (1998) as cited by Alabi (2008) provision of necessary facilities in schools will provide a challenging environment for students to learn and for effective teaching by the teachers. On the other hand Olubor (1998) says that lack of adequate facilities such as textbooks, ill-equipped classrooms, laboratories, workshops and library are among the probable causes of students' poor performance in examinations.

Sobdewski and Doran (1996) as cited by Smyth and Hannan (2006) found that teachers experience and instructional facilities have also been found to shape physics take up. Further Smyth and Hannan (2000) indicate that science take up tends to be higher in schools which emphasize practical work and students' participation in classroom activity at both lower and upper secondary levels.

According to Owoyele and Toyobo (2008) professional guidance and counseling services are needed to guide students on how to choose subjects based on their academic ability, interest and relevance of such subjects to their future career aspirations. Schools must endeavour to organize academic and career counseling services before such students are asked to select subjects. Subject choices are considered to be significant in determining career paths. Students need information about the structure and content of the science subjects they want to study. This will help influence their choice of the subject. Research by Igun (2007) and Obayan (2007) in Oriahi, Uhumuavbi and Aguele (2010) showed that students need information about what they are considering providing an understanding of what in particular a discipline involves.

According to Peel (1998) in Oriahi, Uhumuavbi and Aguele (2010) students often receive conflicting advice from parents, teachers, friends and career advisors, and upon entering senior secondary school there can be a mismatch between expectations and actual experiences. The difficulty students may have in obtaining informed advice can influence their choice of science subjects. According to Millican, Richards and Mann (2005) one of the major difficulties inspiring students about careers in engineering is that their main source of information, their teachers, are usually not much better informed than the students themselves.

2.4 Summary

The literature review has shown that there are several factors which influence the choice of physics. The factors reviewed are related to students, teachers and the school environment.

Different studies reviewed have shown that student' attitudes, career goals, study habits, previous achievement, peer pressure and gender influence the choice of Physics. Studies by Olatonye (2002), Tinto (1993), Olatonye and Ogunkola (2008), Hoofman (2000), Owoyele and Toyobo (2008) and Dryler (1999) found that the choice of Physics is shaped by the above factors though the studies have not gone further to show how these factors affect Physics enrolment in public secondary schools in Kangundo district.

Further literature review has shown that teachers' attitudes, teaching methods and their preparation influence the choice of physics. A study by Torongey (1986) carried out in Kericho district established that science teachers especially Physics teachers characteristics such as pace of content delivery, comments made in class, frequency of missing lessons contribute to students negative attitudes towards science. This study did not go further to show how these teacher characteristics influence students' choice of Physics in public secondary schools in Kangundo district.

Finally studies on school policies have also been found to influence the choice of physics. A study by Roger and Duffied (2000) found that schools can influence course up-take indirectly through packaging for optional subjects but the study did not show the effect of

this on students' choice of Physics. Also studies on facilities have shown that they affect the performance of physics. A study by Olubor (1998) found that lack of adequate facilities are probable causes of poor performance in examinations but did not go further to show the effect of poor performance on Physics choice. Guidance and counseling as shown by various studies play a significant role in the choice of physics. A study by Peel (1998) found that the difficulty students have in obtaining informed advice can influence their choice of science subjects but the study did not go further to show the effect of this on choice of Physics in public secondary schools in Kangundo district.

From the studies reviewed it is evident that there are factors which influence the choice of physics. However none of these studies has looked at the factors influencing the choice of physics in public secondary schools in Kangundo district. The researcher intends to fill this knowledge gap.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the study design used, location of the study, population and sampling strategies, data collection instruments, piloting of the study, data collection and analysis procedures.

3.2 Research Design

The study used descriptive survey design. According to Mouton (1996) a survey is used to collect data for describing a population too large to observe directly. A survey obtains information from a sample of people by means of self report, that is, the people respond to a series of questions posed by the investigator (Polit and Hungler (1993). In this study the information was collected through self administered questionnaires distributed to the subjects by the researcher. The design helped to describe the factors that influence the choice of Physics in public secondary schools in Kangundo district. According to Ogula (1999), descriptive research design attempts to accurately describe a given situation. This design was used to collect information, record the information collected, analyze and report conditions that existed.

3.3 The Study Locale

The study was conducted in Kangundo district in Eastern Province. The District boarders; Mwala district to the east, Yatta district to the North, Thika district to the North West, Nairobi city to the West and Kathiani district to the South. According to the DEO of

Kangundo, there were 40 public secondary schools and an estimated enrolment of 12,548 students from form one to four in the year 2010.

3.4 The Target Population

The district has a total of 40 public secondary schools with an estimated enrolment of 12,548 students. The study targeted form three and four students and their physics teachers in 40 public secondary schools.

3.5 Sample and Sampling Procedures

The researcher sampled twelve schools using stratified random sampling. According to Heiman (2002), stratified random sampling is a sampling technique that involves the identification of important subgroups in a particular population. In this case the subgroups were mixed schools, boys' schools and girls' schools. To allocate the sample size in the three strata that is mixed schools, boys' schools and girls' schools the researcher used equal allocation method. In equal allocation Orodho (2009) states that subjects are selected in equal numbers per stratum. Thus in the three strata, one third of the sample was selected from each stratum.

At the school level the study used purposive sampling. Therefore the study only involved form three and four students who have already made their subject choice. Finally at the class level the researcher used simple random sampling. According to Orodho (2009) simple random sampling is a procedure in which all the individuals in the defined population have an equal and independent chance of being selected as a member of the

sample. In mixed schools the researcher further used equal allocation to ensure boys and girls were equally represented. The table 3.1 below shows the representation of the strata in the three categories of schools.

Table 3.1: Representation of Strata in the Categories of Schools

Strata / Nature of school	**Form three & Four Per school**	**Sample size**
Mixed schools	80	320
Girls schools	80	320
Boys schools	80	320
		960

3.6 Research Instruments

The study employed questionnaires for teachers and students. The questionnaires included both open and closed ended items. According to Orodho (2009) the closed ended items were used because they are easy to fill, relatively objective and easy to tabulate. The open ended items were used to allow teachers and students to express themselves freely without restriction. The questionnaires consisted of two sections where section one contained items that generated demographic data while section two contained items on factors influencing choice of Physics.

3.7 Piloting the Study

Oluoch (1982) warns that plans do not always work out as envisaged. The purpose of piloting was to assist the researcher to identify any item in the questionnaires that was ambiguous or unclear to respondents and adjust them appropriately. It also helped the researcher to be familiar with the administration of the instruments. The researcher carried out piloting in three schools (one from each stratum). The researcher did not carry out the research in the piloted schools.

3.7.1 Reliability of Instruments

According Mugenda and Mugenda (1999) reliability is a measure of the degree to which an instrument yields consistent results or data after repeated trial. The split half technique was employed to test the reliability of the instruments. The technique requires only one testing session. In this approach, an instrument is designed in such a way that there are two parts. Therefore, the researcher divided the questionnaires in to two halves and then compared the responses on the two halves using Spearman Brown prophecy formula to determine reliability of the instruments. The researcher used sample data to test on the reliability of the instruments. A coefficient of 0.70 is considered adequate but a coefficient of 0.8 is good according to Gay (2003). The researcher got a coefficient of 0.75 for the students' questionnaires and 0.77 for the teachers' questionnaires. Reliability was further ensured by minimizing biasness in data collection. This was ensured by the researcher administering the questionnaires and ensuring confidentiality. The researcher also ensured the student subjects did not discuss the instrument but gave own responses.

3.7.2 Validity of the Instruments

According to Mugenda and Mugenda (1999) validity is the accuracy and meaningfulness of inference, which are based on researchers results. Validity is the degree to which results obtained in the analysis of the data, actually represent the phenomena under study. According to Borg and Gall (1989) as cited by Tuaundu (2009) pilot study helps to improve face validity of the instruments and its content validity is improved through expert judgment. Therefore the researcher sought the assistance of experts to improve on content validity.

3.8 Data Collection Procedure

The researcher first obtained a research permit from the Ministry of Education which allowed her to collect data from the sampled schools in Kangundo district. The researcher also sought permission from the DEO which allowed her to get the information from the schools in the study area. The researcher also booked for appointments with the principals of the sampled schools to arrange for the date of data collection in their schools. This was to familiarize herself with the schools and to get to know the approach she was to use in the administration of the instruments to the respondents. The researcher also ensured that the respondents of confidentiality in dealing with their responses. This was done by having a cover letter to the respondent in each instrument. The researcher finally visited the schools as per the appointments and administered the instruments.

3.9 Data Analysis Procedures

After administration of the instruments to the respondents the data collected was examined for completeness and appropriately coded. The data was then entered in the computer for analysis by the use of Statistical Package for Social Sciences (SPSS). Descriptive statistics such as percentages, means and frequencies were used to present data. The findings were reported in summary form using frequency distribution tables, bar graphs and pie charts.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSION

4.1 Introduction

This chapter presents data analysis, presentation and discussion of the study findings. Data was collected from 892 (880 students and 12 teachers) respondents out of the 972 targeted respondents from the 12 secondary schools in Kangundo District. This gave a response rate of 92 %. The findings of the study are presented as per objectives of the study. The objectives of the study were to determine: student factors that influence enrolment in Physics, teacher influences on the students' choice of Physics and school environment effect on students' choice of Physics at KCSE level in Kangundo district.

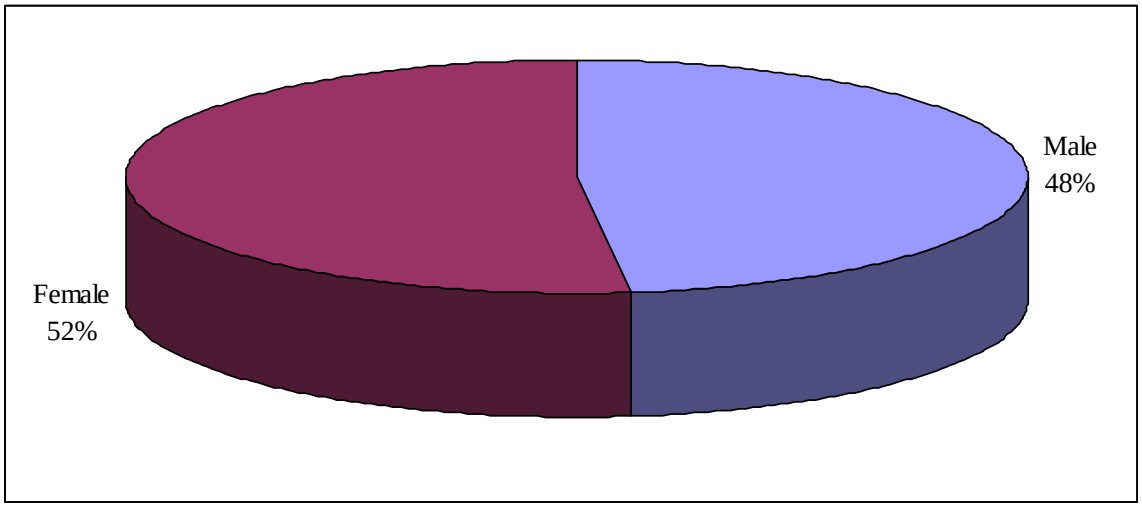
4.2 Student factors that Influence Enrolment in Physics at KCSE Level

In this section, the study sought to find the distribution of students by gender, composition of students taking Physics in terms of gender, reasons for choosing Physics, reasons for not choosing Physics, students' attitude towards Physics, perception of Physics, reasons for perceiving Physics to be difficult, students' interest when studying Physics, the experience they get when studying Physics, the frequency of studying Physics and the effect of peer pressure on the choice of Physics by students.

4.2.1 Distribution of the Student Respondents by Gender

When student respondents were first asked to indicate their gender, 52% (458) of the students were female while 48% (422) were male. The findings of the study were as presented in Figure 4.1.

Figure 4.1: Distribution of the Respondents by Gender

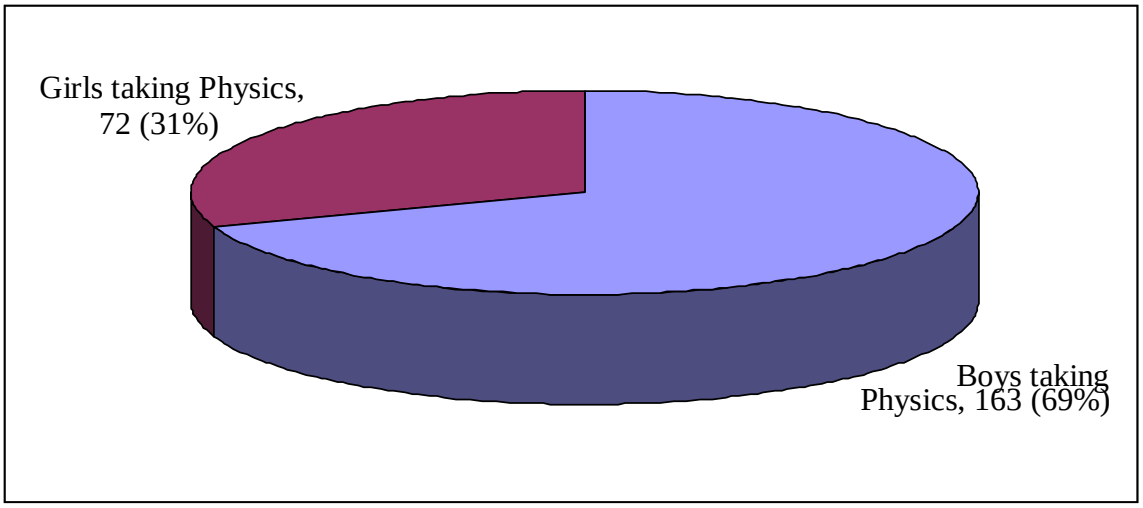


From the findings of the study, it can be said that female students are more than their male counterparts in secondary schools in Kangundo District. These findings could be attributed to the fact there are more girls' schools than the boys' schools in Kangundo district. Again, they could be attributed to the fact that the general Kenyan population of females is higher than for males and due to free secondary education both boys and girls have equal opportunity to join secondary school. According to Summer (1992) educating girls yields a higher rate of return than any other investment available in the developing world. In the recent past there has been a campaign which emphasizes girl education. When girls go to school, they tend to delay marriage, have fewer but healthier children and contribute more to family income and national productivity. From the findings this emphasis has born fruit in Kangundo district as most of the students are girls.

4.2.2 Composition of Students Taking Physics in Terms of Gender

The study found that 69% (163) of the students taking Physics were boys while 31% (72) were girls. The findings of the study were as presented in Figure 4.2.

Figure 4.2: Composition of Students Taking Physics in Terms of Gender



From the findings of the study, it can be said that majority of the students taking Physics in secondary schools in Kangundo district are boys although the girls population in the district is higher. Therefore it can be concluded that the gender of the students affected their choice of Physics as only a few girls chose Physics. These findings concur with those from a study by Gilbert and Calvert (2003) who found that most young women do not see themselves as being capable of studying and succeeding in Mathematics and science, therefore they are not interested in it. In Kangundo district this could be attributed to the fact that there are few female Physics teachers who should act as role models for the girls. Further, it could be due to the fact that generally boys are more disposed to science and Mathematics than girls. The findings also agree with those from a

study by Aduda (2003) who found that students especially girls shun Physics when given an option.

4.2.3 Reasons given by those who Chose Physics

The student respondents who had chosen Physics were asked to mention the reasons why they chose physics. The study found that among those taking Physics (235), 83% (195) indicated that their career goals required physics, 9% (21) indicated that the subject was interesting, 5% (11) indicated that it was due to good previous achievements and 3% (8) indicated that it was due to their friends' choice of physics. None of the respondents indicated that it was due to teacher's inspiration in form one and two. From the findings of the study, it can be said that the major reason for the choice of Physics was because their career goals required Physics. This could be attributed to the perceived strategic usefulness of Physics in the field of technology where there seem to be employment opportunities. It is worth noting that none of the student respondents chose Physics because they were inspired by teachers. These findings agree with those from a study by Hull-Blanks et.al (2005) who found that students with a well defined job related career were more likely to persist. The findings of the study were as presented in table 4.1.

Table 4.1: Reasons given by those who Chose Physics

Reasons for choosing Physics	Frequency	Percentage
Career goals require physics	195	83
Subject is interesting	21	9
Good previous achievements	11	5
My friends choose Physics	8	3
Teachers' inspiration in form 1&2	0	0
Total	**235**	**100**

4.2.4 Reasons for not Choosing Physics

The student respondents who had not chosen Physics were asked to state the reasons for not choosing Physics. The study indicated that 42% (270) did not choose Physics because the Physics teacher did not inspire them in form one and two, 40% (260) indicated it was due to poor performance, 9% (57) indicated that their career goals did not require Physics, 5% (33) indicated their friends did not choose Physics and 4% (25) indicated that the subject was boring. From the study it can be concluded that Physics teachers' lack of inspiration and students' poor performance were the major reasons why many students did not choose Physics. The findings concur with findings of a study by Africa-Asia confidential (June, 2009) which found that students are uninspired by their teachers. Cheng, Payne and Witherspoon (1996) as cited by Smyth and Hannan (2006) found that prior success is associated with subsequent take up of scientific subjects. The findings of the study were as presented in Table 4.2.

Table 4.2: Reasons for not Choosing Physics

Reasons for not choosing Physics	Frequency	Percentage
Physics teacher was not inspiring in F1&2	270	42
Poor performance in Physics	260	40
Career goals did not require Physics	57	9
Friends did not choose Physics	33	5
The subject was boring	25	4
Total	**645**	**100**

4.2.5 Attitude of Students towards Physics as rated by Teachers

The teacher respondents were asked to rate the attitude of the students towards physics. The study found that 50% (6) of the teachers rated students as having a poor attitude towards Physics, 33% (4) had a satisfactory attitude, 17%(2) had a good attitude and none of the teachers rated the students as having an excellent attitude towards Physics.

From the findings of the study, it can be said that students' poor attitude influenced their choice of Physics as indicated by 50% of the teacher respondents. The poor attitude of students towards Physics could be attributed to teachers' lack of inspiration as indicated by 42% of the student respondents who did not choose Physics. These findings concur with those of a study done in Lagos, Nigeria by Olatonye (2000) on school factors as determinants of science achievement which found that students' attitudes towards science have significant direct effect on students' achievement which influence the choice of Physics. The findings of the study were as presented in Table 4.3.

Table 4.3: Students' Attitude towards Physics as rated by Teachers

	Teachers	
	Frequency	**Percentage**
Poor	6	50
Satisfactory	4	33
Good	2	17
Excellent	0	0
Total	**12**	**100**

4.2.6 Perception of Physics

The student respondents were asked to mention how they perceived Physics. The teacher respondents were also asked to indicate the perception of Physics by students. The study found that among the teachers, 42% (5) indicated that the students perceived Physics to be more difficult than other subjects, 33% (4) indicated that it is like mathematics, 17% (2) indicated that it is abstract and only 8% (1) indicated that students perceived it as easy. Among the students, 30% (263) indicated that it is more difficult than other subjects, 28% (247) indicated that it is like Mathematics, 24% (209) indicated that it was abstract and 18% (161) indicated that it was easy. From the findings of the study most of the students in Kangundo district perceived Physics to be more difficult than other subjects. This perception affected their choice of Physics as only a small number chose Physics (235). The findings of the study were as presented in Table 4.4.

Table 4.4: Perception of Physics

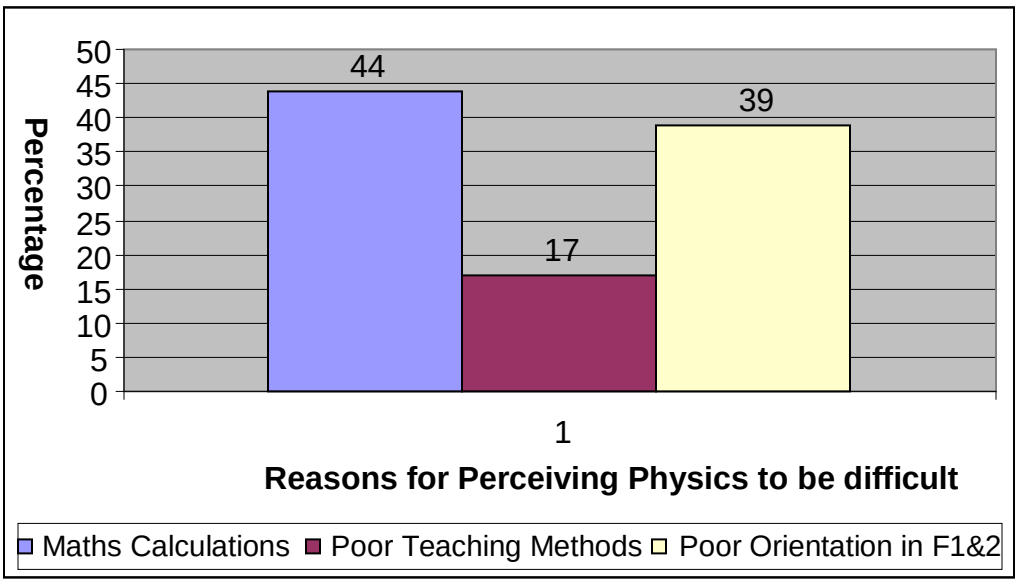
	Teachers		Students	
Perception	**Frequency**	**Percentage**	**Frequency**	**Percentage**
More difficult than other subject	5	42	263	30
Like mathematics	4	33	247	28
Abstract	2	17	209	24
Easy	1	8	161	18
Total	**12**	**100**	**880**	**100**

4.2.7 Reasons for Perceiving Physics to be Difficult

Those who perceived physics to be difficult (263) were further asked to mention reasons why they perceived Physics to be difficult and 44% (115) indicated that it was due to calculation associated with mathematics, 39% (103) indicated that it is due to poor orientation in form one and two and 17% (45) indicated that it was due to poor teaching methods. From the findings of the study, the students who perceived Physics as difficult said that they perceived Physics to be difficult because of Mathematics calculations. Therefore the Perception that Physics is difficult was because of calculations associated with Mathematics and this could have affected the choice of Physics. The findings further agree with those of a study done in Machokos County, Kenya by Musyoka (2000) on factors influencing choice and participation in sciences in secondary schools who found that majority of students were not taking Physics because they were scared of its quantitative nature and the conception that physics is too abstract especially when taught theoretically. From the findings poor teaching methods is not a main reason for perceiving Physics to be difficult in Kangundo district, this could be attributed to

SMASSE INSET which has been taking place yearly since the year 2004. The findings of the study were as presented in figure 4.3.

Figure 4.3: Reasons for Perceiving Physics to be Difficulty

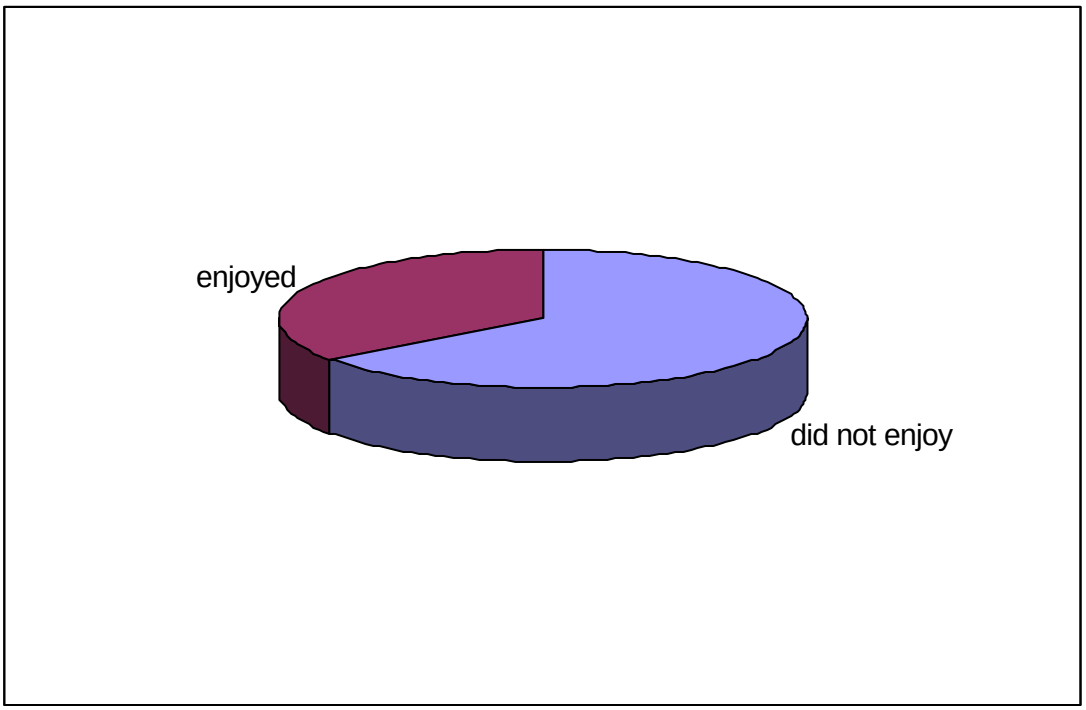


4.2.8 Interest in Studying Physics

The student respondents were asked if they enjoyed studying physics in form one and two. The study found that 65% (572) of all the student respondents did not enjoy studying Physics while 35% (308) enjoyed studying Physics. The study further found out that among those taking Physics, 91% (214) indicated that they enjoyed studying physics while 9% (21) indicated that they did not enjoy studying physics. From the findings it is evident that most of the students in Kangundo district who did not choose Physics were not interested in Physics as they did not enjoy studying the subject. This affected their choice of Physics as majority of those who did not enjoy studying also did not choose Physics. The findings of this study agree with those from a study done by Hoofman

(2002) who found that the choice of Physics is shaped by students' interest. This could be attributed to teachers' remarks in class which could be discouraging as indicated earlier in the study by 42% of those who did not choose Physics. The findings of the study were as presented in Figure 4.4.

Figure 4.4: Interest in Studying Physics

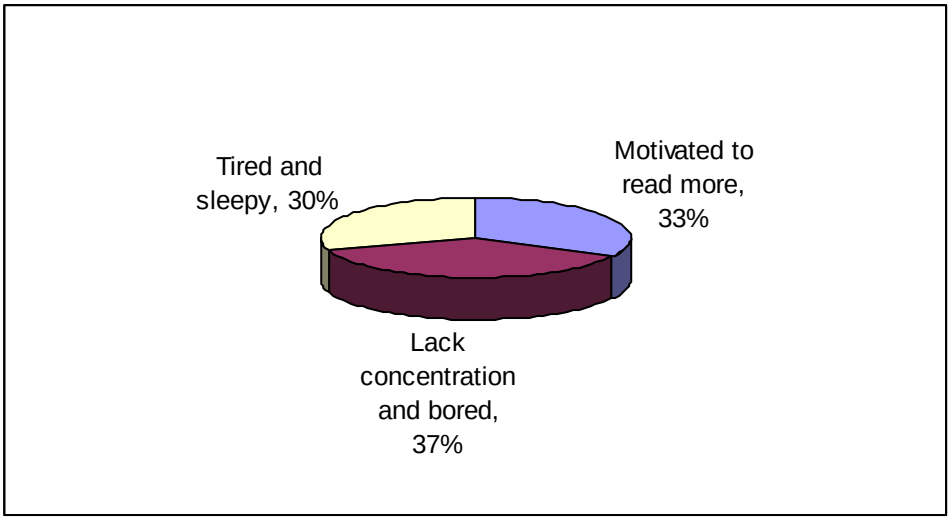


4.2.9 Experience when Studying Physics

The student respondents were asked to mention what their experience was when studying physics in form one and two. The study found that 37% (326) of all the student respondents lacked concentration and were bored when studying Physics, 33% (290) were motivated to read more and 30% (264) felt tired and sleepy when studying Physics. The study further found out that among those taking Physics, 93% (219) indicated that

they were motivated to read more while 7% (16) indicated that they lacked concentration and were bored and felt tired and sleepy. From the findings, 67% of the respondents had negative study habits. It can be concluded that study habits influence the choice of Physics as majority of those who did not choose Physics had negative study habits in junior secondary. These findings agree with those from a study by Olatonye and Ogunkula (2008) which found that study habits makes a significant contribution to the prediction of Physics achievement. The negative study habits could be attributed to the students' poor performance as indicated earlier by 40% of the students who did not choose Physics. A study done in Ethiopia among university students on who is joining Physics and why by Semela (2010) found that choice of Physics is shaped by students' prior achievement. The findings of the study were as presented in figure 4.5.

Figure 4.5: Experience when Studying Physics



4.2.10 Frequency of Studying Physics Individually

All the student respondents were asked to rate the frequency of studying Physics individually in junior secondary. The study found that 34% (299) of the student respondents indicated that they studied during examinations, 27% (238) spend little time on Physics, 23% (202) never studied Physics at all and 16% (141) indicated that they dedicated most of their time to Physics. The study also found that among those taking Physics (235), 51% (120) indicated that they dedicated most of the time to Physics, 38% (89) indicated that they spend little time on Physics, 6% (14) indicated that they never studied at all and5% (12) indicated that they studied during examinations. From the findings it is clear that most students studied during examinations in junior secondary and could be an indicator that most students did not master the skills in Physics which makes it interesting and enjoyable to study therefore this affected their choice of Physics. A study by Nouhi, Shkoori and Nakhei (2008) found that mastering skills makes study more enjoyable and effective which in turn strengthen the students' interest to spend more time studying. The findings of the study were as presented in Table 4.5.

Table 4.5: Frequency of Studying Physics individually

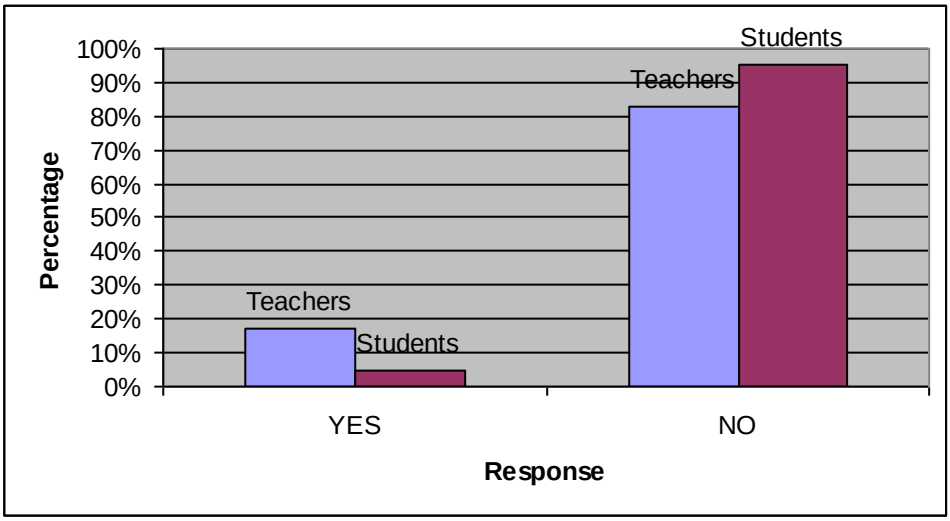
Frequency of studying Physics	Students	
	Frequency	**Percentage**
Study only during examination	299	34
Spend little time on Physics	238	27
Dedicate most of the time to Physics	201	23
Never study Physics at all	144	16
Total	**880**	**100**

4.2.11 Effect of Peer Pressure on the Choice of Physics by Students

Teacher respondents were asked whether peer pressure among the students influenced their decision to choose physics. The study found that 17% of the teachers indicated that peer pressure influenced the choice of Physics among students while 83% indicated that peer pressure did not affect the choice of Physics. The student respondents indicated that 95% were not influenced by their peers to choose or not to choose Physics and only 5% were influenced. The findings of this study show that most of the students are not affected by peer pressure in choice of Physics. These findings disagree with findings of Owoyele and Toyobo (2008) who found out that peer pressure influenced choice of Physics. This could be attributed to fact that most students in Kangundo district were

guided on career choice as the study showed that most schools in the district have career guidance offices. The findings of the study were as presented in figure 4.6.

Figure 4.6: Effect of Peer Pressure on the Choice of Physics by Students



4.3 Influence of Physics Teachers in the Students' Choice of Physics

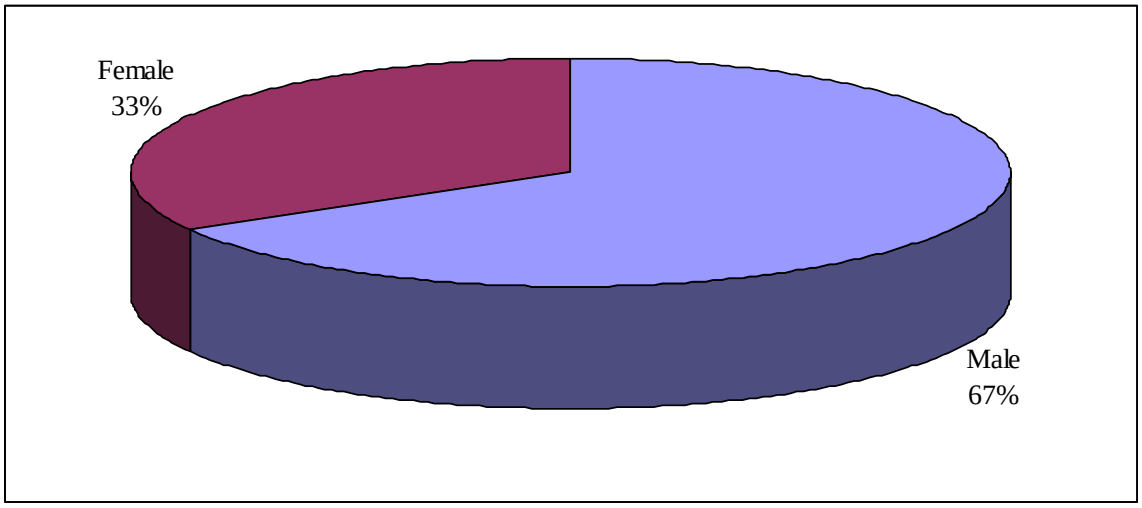
In this section, the study sought to establish effect of distribution of teachers by gender, the type of students preferred by Physics teachers, orientation of students on Physics in form one and two, preparation for lessons before attending, missing of Physics classes, compensating for missed classes and the rate of the pace of content delivery in class.

4.3.1 Distribution of Teachers by Gender

To determine the distribution of teachers by gender, teacher respondents were asked to indicate their gender. The study found that 67% (8) of the teacher respondents were male while 33% (4) were female. These findings show that in Kangundo district the few female teachers may have contributed to low enrolments amongst girls in Physics

because they lacked role models. The findings agree with those of a study by Gilbert and Calvert (2003) who found that most young women do not see themselves as being capable of studying and succeeding in Mathematics and Science therefore they are not interested in it. The findings of the study were as presented in Figure 4.7.

Figure 4.7: Distributions of Teachers by Gender



4.3.2 Types of Students Preferred by Physics Teachers in Senior Secondary

Teacher respondents were asked to indicate the type of students they preferred chose Physics. The study found that 59% (7) of the teachers indicated that they preferred those whose previous performance was good. The study also found that 33% (4) indicated that they preferred those who were interested in Physics and 8% (1) indicated that they prefer red those who were good in Mathematics. From the findings of the study, it can be said that most teachers preferred students who had a good previous performance in Physics in junior secondary. This implies that the students who did not perform well would be negatively influenced by the teacher therefore shun choosing Physics. This could be

attributed to the fact teachers are required to produce high mean grades which determine their promotion and therefore are concerned with performance than anything else. These findings agree with those from a study by Sharp et.al (1996) who found that prior achievement are strongly linked to course uptake and there is a relationship between them. The findings of the study were as presented in Table 4.6.

Table 4.6: Types of Students Preferred by Physics Teachers

Type of students Preferred by Physics	Frequency	Percentage
Those whose previous performance in Physics is good	7	59
Those interested in Physics	4	33
Those good in Mathematics	1	8
Total	**12**	**100**

4.3.3 Orientation to Physics in Junior Secondary

The teacher respondents were asked to indicate whether they introduced the Physics courses well to their students in form one and two. All the teacher respondents indicated that they had introduced the course and outlined the benefits to their students. The student respondents who indicated that they were introduced to Physics were 73% (642) while 27% (238) of the respondents indicated that they were not oriented to Physics. The findings of the study further show that among those who chose Physics (235), 89% (209) were oriented while 11% (26) were not oriented to Physics. From the findings of the study it can be said that majority of the students were oriented to Physics. Those who missed out the orientation could have reported late to school during the first term of form one and therefore had a poor start in Physics. From the findings of the study, it can be

concluded that majority of the students did not shun Physics because they were not oriented therefore this did not affect their choice of Physics. The findings differ with those from by International Association for the Evaluation of Educational Achievement (1998) which found that orientation to Physics at junior level influences the take up of Physics. This could be attributed to the fact that orientation to Physics is the part of the first chapter of form one Physics syllabus. The findings of the study were as presented in Table 4.7.

Table 4.7: Orientation on Physics in form One and Two

Orientation to Physics	**Teachers**		**Students**	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Yes	12	100	640	73
No	0	0	240	27
Total	**12**	**100**	**880**	**100**

4.3.4 Preparation before Attending Physics Lesson

Teacher respondents were asked whether they prepared before attending Physics lessons. The study found that 92% (11) of the teachers prepared before attending Physics Lessons while 8% (1) of the teachers did not prepare before attending Physics lessons. From the findings of the study, it can be said that most of the Physics teachers planned for the presentation of the Physics lessons. This implies that most Physics teachers in Kangundo district planned for Physics lessons prior to presentation in class. Prior preparation

enables teachers to present the content to students well. Therefore it can be concluded that preparation before attending the Physics lesson did not influence the choice of Physics positively although it was well done. The findings of the study were as presented in Table 4.8.

Table 4.8: Preparation before Attending a Physics Lesson

Preparation	Frequency	Percentage
Yes	11	92
No	1	8
Total	**12**	**100**

4.3.5 Missing of Classes by Physics Teachers

The student respondents were asked to indicate whether their physics teachers missed classes in form one and two. The study found that that 62% (543) of the student respondents indicated that their teachers missed lessons while 38% (337) indicated that their teachers did not miss Physics lessons. From the findings most of the teachers missed Physics lessons in junior secondary and this could have prompted the students not to choose Physics in senior secondary as this may have shown lack of commitment on the part of the teacher. These findings concur with those from a study done in Kericho, Kenya by Torongey (1996) on problems experienced by girls in learning Physics who established that frequency of missing lessons contributed to negative attitude by students which affected the choice of Physics. The missing of lessons could be attributed to the fact that most Kangundo schools do not house teachers hence most of them reside in

Kangundo and Tala markets. These two markets drive the economy of Kangundo district and most teachers run small businesses which may influence their absence in the classrooms. Further the missing of classes by teachers could be attributed to poor supervision of curriculum and instruction by school principals and this explains generally why the district was the poorly performing in national examination in eastern province. The findings of the study were as presented in Table 4.9.

Table 4.9: Missing of Classes by Physics Teachers

Missing Classes by Physics Teachers	Frequency	Percentage
Yes	543	62
No	337	38
Total	**880**	**100**

4.3.6 Compensating for Missed Lessons by Physics Teachers

The students who indicated that their Physics teachers missed classes in junior secondary were further asked to indicate whether their teachers had makeup classes. The study found that 80% (269) of the students indicated that their teachers had makeup classes while 20% (78) indicated that their teachers did not have makeup classes. None of the teacher respondents indicated they did not have makeup classes for the lessons they did not teach. From the findings, the teacher and student respondents differed may be because the teachers were not truthful in their response. It can be concluded that most teachers had makeup classes although some did not which may have influenced the students' choice of Physics negatively. A study by Torongey (1986) found that frequency

of missing lessons contribute to negative attitude by students towards Physics. The findings of the study were as presented in Table 4.10.

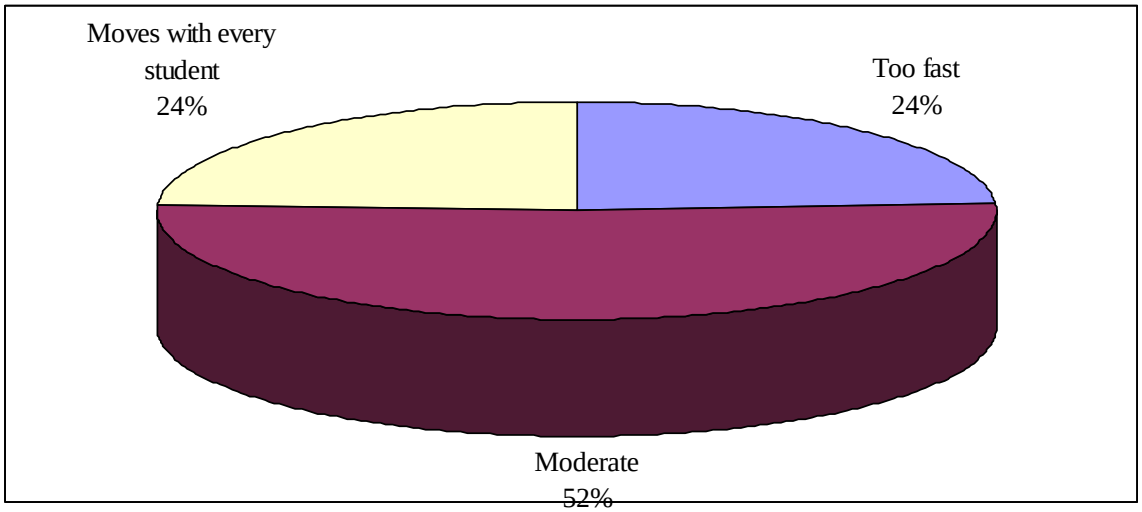
Table 4.10: Compensating for Missed lessons by Physics Teachers

Makeup classes by	Teachers		Students	
teachers	Frequency	Percentage	Frequency	Percentage
Yes	12	100	269	80
No	0	0	78	20
Total	**12**	**100**	**337**	**100**

4.3.7 Rating the Pace of Content Delivery by Physics Teachers

The student respondents were asked to rate the pace of content delivery by physics teachers in junior secondary. The study found that 52% (458) of the students respondents indicated that the teacher was moderate, 24% (211) indicated that the teacher moved with every student and another 24% (211) indicated that their teachers were too fast. From the study it can be concluded that most teachers in Kangundo district were moderate which is not good enough to encourage students to choose Physics. This could be due to pressure to finish the syllabus early in order to start revision of past papers in preparation for KCSE. A study by Torongey (1996) found that teachers pace of content delivery affects students' attitude which will further affect choice of Physics. The findings are presented in figure 4.8.

Figure 4.8: Rating the Pace of Content Delivery by Physics Teachers



4.4 The Effect of School Environment on Students Choice of Physics

In this section, the researcher sought to establish distribution of respondents who chose Physics by type of school, school policy on the sciences chosen by students, laboratory equipment, frequency of using the laboratory, teaching methods in the laboratory, teaching methods out of the laboratory, reasons for not teaching practical lessons in the laboratory, guidance on career choice, source of information and sufficiency of information got on career choices.

4.4.1 Distribution of Respondents who Chose Physics by Type of School

The student respondents were asked to indicate their type of school and the subject they chose. The study found that 52% (123) of the respondents were from boys' schools, 26% (61) from girls' schools and 22% (51) from mixed schools. From the mixed schools only 22% (11) were girls. From the findings it can be concluded that most of those who chose Physics were from boys' schools and the least from mixed schools. This implies that the

type of school influenced the choice of Physics because single sex schools had a higher number of those who chose Physics. This could further imply that single sex schools favour the choice of Physics in Kangundo district. These findings agree with those of a study done in Ireland by Smyth and Hannan (2006) on school effects and subject choice who found that single sex schools have a positive effect on attitudes to, and take up of Mathematics and science especially for girls. The findings were as presented in table 4.11.

Table 4.11: Distribution of Respondents who Chose Physics by Type of School

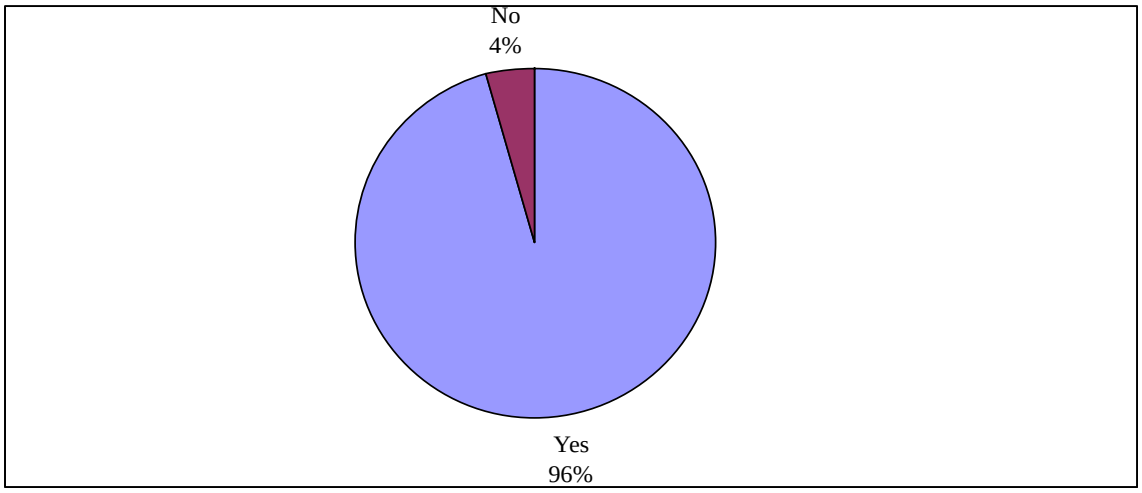
Type of school	**Students**	
	Frequency	**Percentage**
Mixed school	123	52
Girls school	61	26
Boys school	51	22
Total	**235**	**100**

4.4.2 Schools Policy on Subjects Offered

The student respondents were asked to indicate whether their schools offered all the three science subjects in senior secondary. The study found that 96% (845) of the respondents indicated that their schools offer all the three sciences while 4% (35) indicated that all the three sciences were not offered in their school. From the findings of the study, it can be said that most of the schools in Kangundo district offered all the three sciences in line

with the 2002 syllabus requirements, therefore most of the schools have not packaged the science subjects. Therefore it can be concluded that school policy on subject offered did not influence the choice of Physics. The findings of the study do not agree with those of a study by Roger and Duffield (2000) who found that schools can influence course up-take indirectly through subject packaging for optional subjects and more subtle encouragement of the take-up of particular types of subjects. The findings of the study were as presented in Figure 4.9.

Figure 4.9: School Policy on Subject Offered

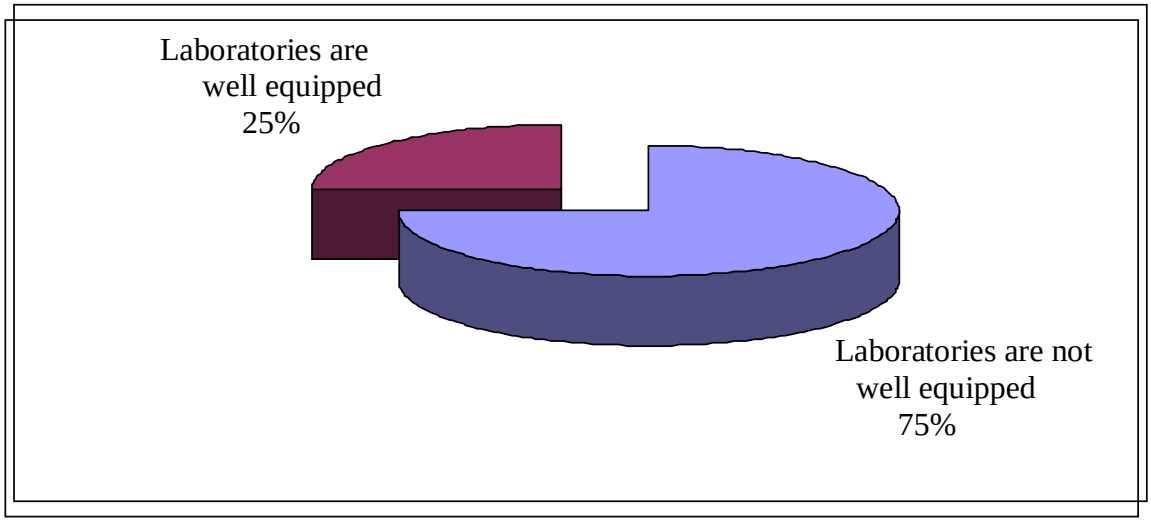


4.4.3 Laboratory Equipment

Teacher respondents were asked to indicate whether their school laboratories were equipped or not. The study found that 75% (9) of the respondents indicated that their laboratories were not well equipped while 25% (3) indicated that their laboratories were well equipped. The findings of the study show that most of the laboratories in Kangundo district schools are not well equipped. This could be attributed to the fact that the student

population in most schools in the district has grown due to Free Secondary Education against the same facilities. This implies that the most popular method of teaching Physics is demonstration. The teaching of Physics without learning resources results to poor performance which negatively affect the choice of Physics as found out by the study. This explains why a small number chose Physics in Kangundo district. These findings agree with Shiundu and Omulando (1992) that inadequate facilities have a negative influence on the attitudes and academic achievements of the learners. Further the lack of facilities could be due to the fact that most schools in the district are upcoming schools which have not become stable financially. The findings of the study were as presented in Figure 4.10.

Figure 4.10: Laboratory Equipment



4.4.4 Frequency of Using Laboratory

The respondents were asked to indicate the frequency with which they used the laboratory. The study found that 64% (564) of the student respondents indicated that they used the laboratory during double lesson, 26% (229) indicated that they used the laboratory in all physics lessons and 10% (87) indicated that they never used the laboratory. The study also found that 83% (10) of the teachers indicated that they used the laboratory during double lessons while 17% (2) indicated that they used the laboratory in all physics lessons. From the finding of the study it can be concluded that the laboratory was mainly used during the double lesson. This could be because of sharing the laboratories with other science subjects. This implies that students involve themselves in practical work only during the double lesson. A school with inadequate facilities has a negative influence on the attitudes and academic achievement of learners. This finding concurs with findings of a study by Yildiz, Akpiner, Aydogdu and Ergn (2006) found that science experiments are inseparable and indispensable parts of learning experiences. From these findings it can be concluded that most schools in Kangundo district do not have access to science laboratory for all the lessons. This means that most teachers in Kangundo district do not have the necessary facilities for effective teaching and this affects the choice of Physics negatively. A study by Bolorunduro (1998) in Alabi (2008) found that provision of necessary facilities in schools provides a challenging environment for students to learn and for effective teaching by teachers. The findings of the study were as presented in Table 4.1.

Table 4.12: Frequency of Using Laboratory

Frequency of Using Laboratory	Teachers		Students	
	Frequency	Percentage	Frequency	Percentage
During double lesson	10	83	564	64
All physics lessons	2	17	229	26
Never use the laboratory	0	0	87	10
Total	**12**	**100**	**880**	**100**

4.4.5 Teaching Methods in the Laboratory

The respondents were asked to indicate how teaching of practical lessons was done in the laboratory. The study found that 80% (704) of the students indicated that they were taught through teacher demonstrations while 20% (176) indicated that they were taught through experimental approach. The study also found that 75% (9) of the teacher respondents indicated that they taught through teacher demonstrations while 25% (3) indicated that they taught through experimental approach by each student. The findings of the study were as presented in Table 4.13.

Table 4.13: Teaching Methods in the Laboratory

Teaching practical Lessons	Teachers		Students	
	Frequency	Percentage	Frequency	Percentage
Teacher's Demonstration	9	75	704	80
Experimental approach by each student	3	25	176	20
Total	**12**	**100**	**880**	**100**

From the findings it can be said that most lessons in the laboratory were taught through teacher demonstrations. This could be because most laboratories in Kangundo are not well equipped. This suggests that the mastery of Physics concepts cannot be fully understood without practicals as Physics requires an experimental approach of investigation by every student. This in turn leads to poor performance of Physics which influence the choice of Physics negatively. From the study 40% of the students who did not choose Physics failed to choose because of poor performance. According to NTI (2007) Physics as a subject is activity oriented and the suggested method of teaching is guided discovery which is resource based.

4.4.6 Teaching Methods out of the Laboratory

Those who said that they were not taught all practical lessons in the laboratory (651) were further asked to mention the teaching methods used by the teachers out of the laboratory. The study found that 50% (324) of the student respondents indicated that they were taught through demonstrations, 36% (238) indicated lecture method/notes dictation, 13% (83) indicated teacher/learner discussion and 1% (6) indicated that they were taught through drilling on past papers. The teacher respondents (5) who indicated that not all practical lessons were taught in the laboratory were to mention the methods of teaching they use. The teachers respondents who indicated that they use demonstration method were 80% (4) and 20% (1) indicated that they use teacher/ learner discussion. The findings of the study were as presented in Table 4.14.

Table 4.14: Teaching methods out of the laboratory

Teaching Methods	Teachers		Students	
	Frequency	Percentage	Frequency	Percentage
Demonstration	4	80	324	50
Lecture/Notes dictation	0	0	238	36
Teacher/ Learner discussion	1	20	83	13
Drilling on past papers	0	0	6	1
Total	**5**	**100**	**651**	**100**

From the findings of the study, it can be said most teachers who did not teach all lessons in the laboratory used demonstration method. These findings could be attributed to the fact that some schools use the laboratory alternatively therefore some lessons have to be taught in the classroom through demonstration by the teacher. The use of the demonstration could further be attributed to the fact that the laboratories are not well equipped therefore the teacher has to carry out the practicals as the students watch. Physics requires experimental approach of investigation by every student to connect theory and practice therefore teacher demonstration may result to students' poor performance and hence influence the Physics take up negatively. A study by Smyth and Hannan (2000) indicated that science take up tends to be higher in schools which emphasize practical work and students' participation in classroom activity at both lower and upper secondary levels.

4.4.7 Reasons for not teaching Practical Lessons in the Laboratory

Students who said that they were not taught practical lessons in the laboratory (651) were further asked to give the reasons why they were not taught in the laboratory. The study found that 81% (527) indicated that there were no materials in the laboratory 17% (113) indicated that teachers were not taking students to the laboratory and 2% (11) indicated that there were no laboratories. The findings of the study were as presented in table 4.15.

Table 4.15: Reasons for not teaching Practical Lessons in the Laboratory

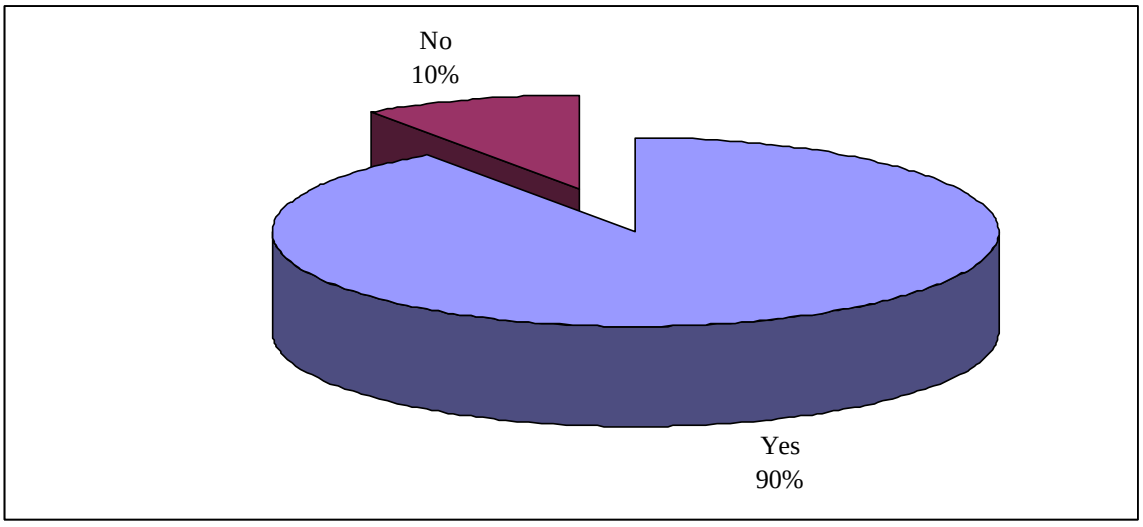
	Frequency	**Percentage**
No materials in the Laboratory	527	81
Teacher not taking students to the lab	113	17
No laboratory	11	2
Total	**651**	**100**

From the findings of the study most of the laboratories in schools in Kangundo district are not well equipped. This could be attributed to the fact that most schools are starting especially the category of mixed schools were most schools are starting through the constituency development funds and may lack funds to equip their laboratories. If the laboratories are ill-equipped then students are not going to participate fully in practical work which has been found to influence Physics take up. These findings concur with findings by Olubor (1998) who found that lack of adequate facilities such as laboratories are probable causes of students' poor performance in examinations which influence Physics take up.

4.4.8 Guidance on Career Choice

The respondents were further asked to indicate whether they were guided on career choice. The study found that 90% (792) of the respondents indicated that they were given career guidance while 10% (88) were not given career guidance. From the findings of the study most of the students in Kangundo district were career guided before they chose their subjects. It can be concluded that guidance on career choice did not affect choice of Physics. This could be attributed to the fact that in most schools in Kangundo there is an office for career guidance and counseling. According to Owoyele and Toyobo (2008) professional guidance and counseling services are needed to guide students on how to choose subjects based on their academic ability, interest and relevance of such subjects to their future career aspirations. Research by Igun (2007) and Obayan (2007) showed that students need information about what they are considering providing an understanding of what in particular a discipline involves. The findings of the study were as presented Figure 4.11.

Figure 4.11: Guidance on Career Choice



4.4.9 Source of Information on Career Guidance

The respondents who were career guided (792) were asked to indicate where they got the career information. The study found that 49% (380) of the respondents got information from teachers. The study also found that 22% (174) of the respondents got the information on career from parents, 17% (153) indicated that they got the information from career advisors and 12% (95) got the information from friends. From the findings of the study, it can be said that the major source of information on career in secondary schools were teachers. This implies that most students got the right information on their career choice. This could be attributed to the fact most schools in Kangundo district have career guidance offices. The findings of the study were as presented in Table 4.16.

Table 4.16: Source of Information on Career Choice

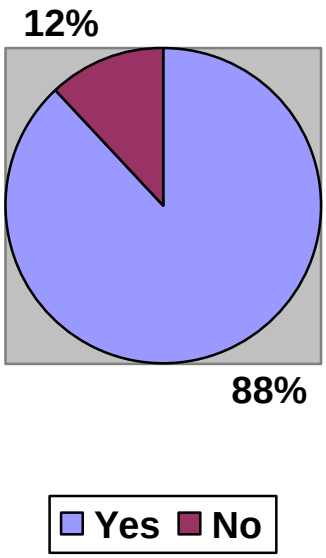
Source of Guidance	Frequency	Percentage
Teachers	388	49
Parents	174	22
Career advisors	153	17
Friends	95	12
Total	**792**	**100**

4.4.10 Sufficiency of Information got on Career Choice

The respondents were further asked to indicate whether the information they got on career was sufficient enough to help them make the right decisions on career choice. The study found that 88% (697) of the respondents indicated that the information they got was sufficient while 12% (95) indicated that the information they got was insufficient. From

the findings it can be concluded that the information got on career choice was sufficient, therefore this did not affect the students choice of Physics in Kangundo district The findings of the study were as presented in Figure 4.12.

Figure 4.12: Sufficiency of Information got on Career Choice



The findings could be attributed to the fact that most information was from teachers therefore delivering the right information was easy. Research by Igun (2007) and Obayan (2007) showed that students need information about what they are considering providing an understanding of what in particular a discipline involves. Those who were not guided were asked whether they got information on career choice. The study found that 80% (70) of the respondents got information on career choice while 20% (18) did not get information. The findings of the study were as presented in Table 4.17.

Table 4.17: Getting Information on Career Choice

Getting information on Career Choice	Frequency	Percentage
Yes	70	80
No	18	20
Total	**88**	**100**

Those who were not guided but got information on career choice were further asked to indicate whether the information they got was matching. The study found that 93% (65) of those who were not guided indicated that the information they got was matching while 7% (5) indicated that the information was not matching. According to Peel (1998), students often receive conflicting advice from parents, teachers, friends and career advisors, and upon entering senior secondary school there can be a mismatch between expectations and actual experiences. The difficult students may have in obtaining informed advice can influence their choice of science subjects. The findings of the study were as presented in Table 4.18.

Table 4.18: Matching of the Information got by Students

Matching of the information got	Frequency	Percentage
Yes	65	93
No	5	7
Total	**70**	**100**

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Findings

This section presents the summary of the findings of the study, conclusions and recommendations.

5.1.1 Students Influences on Choice of Physics

Regarding the student factors influencing the choice of Physics in Kangundo district, the study found that 83% of the student respondents who chose Physics indicated that their career goals required physics therefore students' career goals influenced the choice of Physics in Kangundo district. The study also found that students' poor attitude towards physics influenced their choice as indicated by 50% of the teacher respondents. Students' perception of the subject also influenced their choice where those who perceived Physics to be easy chose it as indicated by 46% while those who perceived physics to be difficult did not choose it as indicated by 39% of the student respondents.

Poor performance influenced the choice of Physics in Kangundo district as indicated by 40% of students' respondents who did not choose Physics. The study further found that poor study habits by students in Kangundo district influenced the choice of Physics. This is indicated by 37% who indicated that they lacked concentration and were bored when studying Physics and 37% who indicated that they only studied during examination portraying lack of interest in the subject.

From the study, gender was a main factor that influenced the choice of Physics in Kangundo district. The study found that only 31% of those taking Physics were girls yet

the female respondents were more (52%) than the male respondents (48%). The study further found that peer pressure was not a major factor to consider in the choice of Physics in Kangundo district. This was evidenced by the small number of students who were influenced to choose Physics. Only 17% of teacher respondents and 5% of students' respondents indicated there was influence by peer pressure in the choice of Physics.

5.1.2 Teachers Influences on Choice of Physics

With regard to the influence of Physics teachers on choice of Physics, the study found most of the teachers were male (67%) and the females were (33%) which could have affected the enrolment of the girls in Physics which was only 31% of the students who took Physics. Further the study found that most Physics teachers preferred students who had good performance in junior secondary as indicated by 59% of them. It can be concluded that the teachers could have influenced the students as indicated by 40% who did not choose Physics because of poor performance. Missing of classes by Physics teachers in junior secondary affected the choice of the subject by students as indicated by 62% of the students who did not take Physics. Further, lack of inspiration by Physics teachers in junior secondary influenced choice of Physics as indicated by 42% of those who did not choose Physics. Also, the pace of content delivery by Physics teachers influenced the choice of Physics as only 24% of the student respondents indicated that the teacher moved with every student. If students do not follow the lesson this affects their attitudes negatively and therefore they shun Physics. Most of the students' choice of Physics was not affected by teachers' orientation to Physics in junior secondary as 73% of the students indicated that they were introduced well to the Physics course but only a

small number chose Physics. Lastly teacher preparation before attending the Physics lesson had little effect on the choice of Physics in Kangundo district as 92% of the teacher respondents indicated that they planned for the lesson before attending yet only a few chose Physics.

5.1.3 School Environment Influences on the Choice of Physics

Regarding the influence of the school environment on choice of Physics, the study found that the type of school influenced the choice of Physics. From the study most of those who chose Physics were from boys' schools (52%) and the least from mixed schools (22%). Methods of teaching were found to influence the choice of Physics in Kangundo district. This was evidenced by the way practical lessons were taught in the laboratory. The study found that most teachers used demonstration method as indicated by 75% of teacher respondents and 80% of student respondents. Lack of opportunities for direct contact with laboratory instruments leads to poor alignment of theory and practice and this leads to poor performance. Poor performance leads to low enrolments in Physics as 40% of those who did not choose Physics had poor previous achievement in Physics. This leads to poor internalization of theory to practice hence poor performance which affects choice of Physics negatively. Availability of career counselors and availability/adequacy of information on career was not a major influence on students' choice of Physics as only 10% indicated that they were not career guided. Further, only 12% indicated that the information they got on career guidance was not adequate. Finally school policy on subject offered did not affect the students choice of Physics as 96% of the schools offered all the science subjects.

5.2 Conclusions

From the findings of the study, it can be concluded that in Kangundo district students' career goals, poor attitude and the perception that Physics is difficult, past poor performance in junior secondary, lack of interest when studying, poor study habits and gender influence students' choice of Physics in Kangundo district.

Further, it can also be concluded that the gender of the teachers, missing of classes by Physics teachers, failure to compensate for the missed lessons, their lack of inspiration for the students and unsuitable pace of content delivery influence the students' choice of Physics in Kangundo district.

Finally, it can be concluded that in Kangundo district the type of school and the laboratory equipment available influence the methods of teaching used in the laboratories which in turn influence students' choice of Physics.

5.3 Recommendations

From the findings, the study recommends the following in order to increase Physics enrolment in Kangundo district at KCSE level;

1. Teachers should encourage and give students the opportunity to develop positive attitude towards Physics as a subject. This will make them enjoy the subject thus change their perception that Physics is difficult.

2. Physics teachers should avoid missing classes and headteachers should take their responsibility of curriculum instruction and supervision and ensure lessons are not missed and if they are missed there should be makeup classes.
3. Physics teachers should cultivate a good relationship with students to inspire them hence improve the students' negative attitudes towards Physics.
4. Physics teachers should ensure that the pace of content delivery in a Physics class is suitable to all learners to ensure that they understand the Physics concepts well hence make the subject interesting.
5. School administrations should consider separating the mixed schools to single sex schools. The single sex schools seemed to favour choice of Physics than mixed schools hence separating the mixed schools might increase enrolment in Physics.
6. School administrations should establish laboratories which are well equipped with learning materials to facilitate experimental approach by each student during practical lessons to improve performance which will surely encourage Physics take up.
7. School administrations should motivate teachers to be more committed in their work by providing housing within the school compound which increases the contact hours with the students therefore cultivate a positive attitude in the students.
8. Policy makers/Ministry of Education should ensure proper curriculum implementation by Physics teachers and increased enrolments in the Physics course by pegging promotions and salary increment to enrolments as well as good performance at KCSE level.

5.4 Recommendations for Further Research

This study was carried out in public secondary schools in Kangundo district. The researcher therefore recommends that another study be done in the district to evaluate the influence of parent factors in the choice of Physics which was not a concern of this study.

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APPENDICES

Appendix I: Physics Teachers' Questionnaire

Dear Respondent,

This questionnaire is designed to gather information on the factors that influence the choice of physics in public secondary schools in Kangundo district.

The study is carried out for a partial fulfillment of the master of education degree of Kenyatta University.

The information in this questionnaire will be treated with confidentiality and in no instance will your name be mentioned in this research. Also, the information will not be used for any other purpose other than this research.

Your assistance in facilitating the same will be highly appreciated. A copy of the research report will be available to you upon request.

Thank you for your cooperation

Instructions

Fill all sections by providing the information required by either ticking (√) or explaining where necessary.

SECTION ONE

Demographic Data

1. What is your gender? Male ( ) Female ( )

2. State the type of your school

Boys' school ( ) Girls' school ( ) Mixed school ( )

3. Are you trained to teach Physics? Yes ( ) No ( )

4. What is your highest academic qualification?

Diploma ( ) Degree ( ) Masters ( )

5. What is your teaching experience?

0-5 years ( ) 5-10 years ( ) Over 10 years ( )

SECTION TWO

School Environment Influences

6. Does the school offer all the three sciences for choice i.e. Biology, Chemistry and Physics?

Yes ( )

No ( ), what subjects are offered……..and ……

7. If you do not offer all science subjects for choice, why?

i) The classrooms are not enough ( )

ii) The teachers are not enough ( )

iii) The laboratories are not enough ( )

iv) The practical materials are not provided ( )

v) Poor performance ( ), in which subject……

8. If your school offers all the three sciences, what is the policy on choosing?

i) Students are free to take all the three sciences ( )

ii) Students are allowed to freely choose 2 sciences ( )

iii) Chemistry is compulsory, choice is between Biology and Physics ( )

iv) Biology is compulsory, choice is between Chemistry and Physics ( )

v) Physics is compulsory, choice is between Biology and Chemistry ( )

9 (a) Are there set prerequisite for taking Physics? Yes ( ) No ( )

(b) If yes, what?

i) Previous performance ( )

ii) Career aspirations of the student ( )

iii) Teacher's choice ( )

iv) Availability of teaching learning resources ( )

v) Availability of the teachers ( )

10. How are science subjects timetabled on the block timetable?

i) Each of them individually ( )

ii) Chemistry blocked with Physics ( )

iii) Chemistry blocked with Biology ( )

iv) Physics blocked with Biology ( )

11. Are students career guided before choosing their subjects? Yes ( ) No ( )

12 (a) Is there professional career guidance and counseling in your school?

Yes ( ) No ( )

(b) If there are no trained career advisors, who guides the students?

i) subject teachers ( ) ii) Peers ( ) iii) Parents ( )

Teachers' Influences

13. (a) What is your subject combination?.....

(b) Which subject would you rather teach? ……

14. Do you enjoy teaching Physics? Yes ( ) No ( )

15. What type of students would you recommend for Physics?

i) Those good in Mathematics ( )

ii) Those interested in Physics ( )

iii) Those whose previous performance is good ( )

16. Are the laboratories well equipped? Yes ( ) No ( )

17. Do you find the training you got in college adequate to handle the whole Physics syllabus?

Yes ( )

No ( ), what do you think can be done to make you more efficient across the Physics syllabus…….

18. Do you teach all practical lessons in the laboratory? Yes ( ) No ( )

If no, which methods do you use?

i) Lecture method/ Notes dictation ( )

ii) Drilling on past papers ( )

iii) Teacher demonstration ( )

iv) Teacher / Learner discussion ( )

19. Do you engage your students in project work? Yes ( ) No ( ).

20. Do you take time to prepare before attending a Physics lesson? Yes ( )

No ( )

21. Do you orient the students to Physics in form one? Yes ( ) No ( )

Students' Influences

22. What perception do your students have about Physics?

i) More difficulty than other subjects ( ) ii) Abstract ( ) iii) like Mathematics ( )

iv) Easy ( )

23. Does Mathematics play a role in the choice of Physics? Yes ( ) No ( )

24. Does the previous achievement affect the students' subject choice?

Yes ( ) No ( )

25. What is the number of boys and girls who chose Physics inform three and four?

Boys…….Girls…….

26. How would rate the attitude of the students toward Physics?

i) Very good ( ) ii) Good ( ) iii) Satisfactory ( ) iv) Poor ( )

27. What reasons would you give for your students who chose Physics?

i) Interest ( ) ii) Career prospects ( ) iii) Performance ( )

28. What kind of study habits do the Physics students' exhibit?

i) Dedicate most of the time to Physics ( ) ii) Spend little time on Physics ( )

iii) Lack concentration ( ) iv) Study only during examinations ( )

v) Never study Physics at all ( )

29. Was there peer influence in the way the students chose their subjects?

Yes ( ) No ( )

30. Does gender play a role in the choice of Physics? Yes ( ) No ( )

Appendix II: Students Questionnaire

Dear Respondent,

This questionnaire is designed to gather information on the factors that influence the choice of physics in public secondary schools in Kangundo District. The study is carried out for a partial fulfillment of the master of education degree at Kenyatta University.

The information in this questionnaire will be treated with confidentiality and in no instance will your name be mentioned in this research. Also the information will not be used for any other purpose other than this research. Your assistance in facilitating the same will be highly appreciated.

Thank you for your cooperation.

Instructions

Fill all questions by providing the information required by either ticking (√) or explaining where necessary.

SECTION ONE

Demographic Data

1. What is your gender? Male ( ) Female ( )

2. State the type of your school

Boys school ( ) Girls school ( ) Mixed school ( )

SECTION TWO

School Environment Influences

3. Does your school offer all the three sciences? Yes ( ) No ( )

If yes, what is the criterion for choosing the science subjects?

i) Students are let free to choose ( ) ii) Teachers choose for the students ( )

iii) Following previous performance ( )

4. If the school does not offer all the three sciences, what two sciences are offered? ……and……

5. Which science subject did you choose?

i) Biology ( ) ii) Chemistry ( ) iii) Physics ( )

6. Were you career guided before making subject choices?

Yes ( ) No ( ) If yes, who guided you? i) Teachers ( ) ii) Career advisors ( ) iii) Parents ( ) iv) Friends ( )

7. Did you find the information you got sufficient? Yes ( ) No ( )

8. If you were not guided, did you get information about career choice?

Yes ( ) No ( )

9. The information you got was it matching? Yes ( ) No ( ) or contradicting? Yes ( ) No ( )

Teachers' Influences

Part I: To be filled by Students who Chose Physics

10. Were you oriented to Physics in form one and two? Yes ( ) No ( )

11. How would rate the attitude of the Physics teacher towards Physics?

i) Excellent ( ) ii) Good ( ) iii) Satisfactory ( ) iv) Poor ( )

12. Does the Physics teacher miss any lessons? Yes ( ) No ( ), If yes does he or she make up for the missed lessons? Yes ( ) No ( )

13. How is your relationship with the Physics teacher?

i) Very good( ) ii) Good ( ) iii) Satisfactory iv) Poor ( )

14. Are all practical lessons taught in the laboratory? Yes ( ) No ( )

If not, how does the teacher teach? i) Demonstrate ( )

ii) Lecture method / notes dictation ( ) iii) Teacher/ Learner discussion ( )

iv) Drilling on past papers ( )

15. If the practical lesssons are not taught in the laboratory, why?

i) There is no laboratory ( )

ii) The teacher does take us to the laboratory ( )

iii) The laboratory has no materials ( )

16. If the laboratory is available how frequent does the Physics teacher use it?

i) Only during the double lesson ( )

ii) During all the Physics lessons ( )

iii) Never use the laboratory ( )

17. How are you taught practical lessons in laboratory?

i) Teacher demonstration ( )

ii) Experimental approach of investigation by every student ( )

18. Are you given project work? Yes ( ) No ( )

19. Do you enjoy the lesson presentation of the Physics teacher?

Yes ( ) No ( ) If no why don't you enjoy?

i) The teacher is boring ( )

ii) The teacher does not explain well ( )

iii) The teacher does not involve students ( )

20. How would you rate the pace of content delivery of the Physics teacher?

i) Too fast ( ) ii) Moderate ( ) iii) Moves with every student ( )

21. What comments does the Physics teacher make in class?

i) Inspiring comments ( ) ii) Discouraging comments ( ) iii) Never concerned ( )

22. What kind of language does the teacher use in class during content delivery?

i) Simple language ( )

ii) Difficulty terms which he/she explains ( )

iii) Difficulty terms he/she does not explain ( )

Part II: To be filled by those who did not Choose Physics

23. Were you properly oriented to Physics in form one and two? Yes ( ) No ( )

24. How would you rate the attitude of the Physics teacher towards Physics in form one and two? i) Excellent ( ) ii) Good ( ) iii) Satisfactory ( ) iv) Poor ( )

25. Did the Physics teacher miss any lessons? Yes ( ) No ( ), If yes did he or she make up for the missed lessons? Yes ( ) No ( )

26. How would rate your relationship with the Physics teacher?

i) Very good( ) ii) Good ( ) iii) Satisfactory iv) Poor ( )

27. Were all practical lessons taught in the laboratory? Yes ( ) No ( )

If not, how did the teacher teach?

i) Demonstrate ( )

ii) Lecture / notes dictation ( )

iii) Teacher/ Learner discussion ( )

iv) Drilling on past papers ( )

28. If the practical lesssons were not taught in the laboratory, why?

i) There was no laboratory ( ) ii) The teacher did not take us to the laboratory ( )

iii) The laboratory had no materials ( )

29. If the laboratory was available how frequent did the Physics teacher use it?

i) Only during the double lesson ( )

ii) During all the Physics lessons ( )

iii) Never use the laboratory ( )

30. How were you taught practical lessons in laboratory?

i) Teacher demonstration ( )

ii) Experimental approach of investigation by every student ( )

32. Were you given any project work in form one and two? Yes ( ) No ( )

33. Did you enjoy the lesson presentation of the Physics teacher in form one and two? Yes ( ) No ( ) If no why?

i) The teacher was boring ( ) ii)The teacher did not explain well ( )

iii) The teacher did not involve students ( )

33. How would you rate the pace of content delivery of the Physics teacher?

i) Too fast ( ) ii) Moderate ( ) iii) Moves with every student ( )

34. What comments did the Physics teacher make in class?

i) Inspiring comments ( ) ii) Discouraging comments ( ) iii) Never concerned ( )

35. What kind of language did the teacher use in class during content delivery?

i) Simple language ( )

ii) Difficulty terms which he/she explained ( )

iii) Difficulty terms h he/she did not explain ( )

Students' Influences

Part I: To be filled by Students who Chose Physics

36. Why did you choose Physics?

i) The subject is interesting ( )

ii) Good previous achievement ( )

iii) Career goals require Physics ( )

iv) My friends chose Physics ( )

v) The Physics teacher was inspiring in form one and two ( )

37. How would you rate your attitude toward Physics?

i) Excellent ( ) ii) Good ( ) iii) Satisfactory ( ) iii) Poor ( )

38. What perception do you have about Physics?

i) More difficulty than other subjects ( )

ii) Like Mathematics ( )

iii) Abstract ( )

iv) Easy ( )

39. If you perceive Physics as more difficulty than other subjects, why?

i) Because it has calculation associated with Mathematics ( )

ii) Poor teaching methods ( )

iii) Poor orientation in form one and two ( )

40. Do you enjoy studying Physics? Yes ( ) No ( )

41. What feeling do you have when studying Physics?

i) Motivated to read more ( )

ii) Lack concentration and bored ( )

iii) Tired and sleepy ( )

42. How frequent do you study Physics on your own?

i) Dedicate most of the time to Physics ( )

ii) Spend little time on Physics ( )

iii) Study only during examination ( )

iv) Never study Physics at all ( )

Part II: To be filled by Students who did not Choose Physics

43. Why did you not choose Physics?

i) The subject was boring ( )

ii) Poor performance in Physics ( )

iii) Career goals did not require Physics ( )

iv) My friends did not chose Physics ( )

v) The Physics teacher was discouraging in form one and two( )

44. What is your attitude toward Physics?

i) Excellent ( ) ii) Good ( ) iii) Satisfactory ( ) iii) Poor ( )

45. What perception do you have about Physics?

i) More difficulty than other subjects ( )

ii) Like Mathematics ( ) iii) Abstract ( ) iv) Easy

46. If you perceive Physics as more difficulty than other subjects, why?

i) Because it has calculations associated with Mathematics ( )

ii) Poor teaching methods ( )

iii) Poor orientation in form one and two ( )

47. Did you enjoy studying Physics? Yes ( ) No ( )

48. What feeling did you have when studying Physics?

i) Motivated to read more ( )

ii) Lack concentration and bored ( )

iii) Tired and sleepy ( )

49. How frequent did you study Physics on your own?

i) Dedicate most of the time to Physics ( )

ii) Spend little time on Physics ( )

iii) Study only during examinations ( )

iv) Never study Physics at all ( )

Appendix III: Permit