ATTITUDES TOWARDS PHYSICS IN SECONDARY SCHOOLS IN IMENTI SOUTH CONSTITUENCY OF MERU COUNTY, KENYA

BY

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Attitudes towards Physics in secondary

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This project is my original work and has not been submitted for a degree to any other University.

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DEDICATION

First and foremost, I dedicate this work to the Almighty God. I also dedicate this work to my husband and friend, Dr. Soita Timonah, whose support has been unwavering, and to my lovely kids Ocran Timonah and Hazel Wanja.
ACKNOWLEDGEMENT

I would like to sincerely thank my supervisors Prof. Jack Green Okech and Dr. Charles M. Magoma for their guidance and support. Finally, I would like to thank all those who in one way or another made this work possible.
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<th>Full Form</th>
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<tbody>
<tr>
<td>ACER</td>
<td>Australian Centre for Education and Research</td>
</tr>
<tr>
<td>ACOST</td>
<td>Advisory Committee on Science and Technology</td>
</tr>
<tr>
<td>DEO</td>
<td>District Education Officer</td>
</tr>
<tr>
<td>K.C.S.E</td>
<td>Kenya Certificate of Secondary Education</td>
</tr>
<tr>
<td>K.I.E</td>
<td>Kenya Institute of Education</td>
</tr>
<tr>
<td>KNEC</td>
<td>Kenya National Examinations Council</td>
</tr>
<tr>
<td>MoE</td>
<td>Ministry of Education</td>
</tr>
<tr>
<td>MoEST</td>
<td>Ministry of Education Science and Technology</td>
</tr>
</tbody>
</table>
ABSTRACT

In secondary schools in Kenya, science curriculum is organized as three distinct subjects: Biology, Physics and Chemistry. With Physics being optional, very few students are opting to choose it. This trend is worrying because Kenya as a growing economy needs physicists for technological advancement. The study analysed attitudes towards Physics in secondary schools in Imenti South constituency of Meru County. The study was guided by the following objectives: to find out the teachers’ attitudes towards Physics curriculum; to investigate factors that influence the teachers’ attitudes towards the teaching of Physics; to find out the students’ attitudes towards Physics curriculum; to investigate factors that influence the students’ attitudes towards the learning of Physics; and to determine the school principals’ attitudes towards offering of Physics in their schools. The study may be of significance in that it may help students to visualize the role their attitudes play in selecting Physics and what influence that has on their career choices. The curriculum developers would also find the results of the research useful as they structure the learning content and learning resources to make them more learners friendly. This study was guided by component theory of attitudes and self-efficacy theory. The study adopted a descriptive survey design and target 138 physics teachers, 1,864 students and 61 principals from 61 public secondary schools in Imenti South Constituency. Purposive sampling method was used to select the six principals who participated in the study whereas simple random sampling was used to select 14 Physics teachers and 220 students, yielding a total of 240 respondents. The instruments used in this research were questionnaires for students, Physics teachers and principals in the selected schools. Data collected was both quantitative and qualitative. Quantitative data was analyzed using descriptive statistics such as frequency counts, percentages, means and standard deviation. On the other hand, qualitative data was thematically presented in line with the research objectives. Results of the analysis were presented using tables, pie charts and bar graphs. The study established that principals and teachers had a positive attitude towards Physics curriculum. Majority of the teachers felt that both female and male students were capable of performing well in physics and therefore, physics was not a male domain subject. With regard to students’ attitude, the study found out that physics students’ had a positive attitude towards the subject while most of the Biology students had a negative attitude towards physics. However, the two groups perceived Physics as a difficult subject and therefore stated that the teachers’ role had a great impact towards their attitudes to the subject. The major factors which influenced teachers’ attitude were: students’ interest towards the subject, availability of teaching and learning materials and also students’ attitude towards the subject. Moreover, students mentioned the following as the major factors which influenced their attitudes: peer group influence, career interest, teachers’ delivery of the subject content and availability of teaching and learning resources. The study recommends that: (1) the government, through the Ministry of Education, should ensure that Physics teachers are provided with constant workshops and seminars. This would help them to be conversant with the changing curriculum and also improve their teaching methodologies; (2) the school administrators should ensure that students have a conducive environment to express themselves without fear so that their concerns are understood and attended to promptly and adequately.
CHAPTER ONE

1.0 Introduction

This chapter is devoted to giving a general introduction to the study. The background to the study which expounds on the importance of Physics to the society is first presented followed by the statement of the problem. The background of the study also gives the trends in enrolment over a couple of years in science subjects with a view of giving basis to the statement of the problem. This chapter also outlines the purpose of the study, the objectives of the study, research questions, significance of the study, assumptions of the study, limitations of the study, theoretical and conceptual frameworks and definition of central terms.

1.1 Background to the Study

Science is recognized as being of very great importance internationally both for economic well being of nations and because of scientifically literate citizenry. Knowledge of science and technology is also a requirement in all countries and all people globally due to the many challenges that people are faced with. These challenges include emergencies of ecological impact of modern technology, energy crisis, global warming and climate change among others (Minishi, Muni, Mutai, Munyoke, Omolo, 2004).

Physics is widely recognized to be the most fundamental of all the sciences and also a foundation of our society (Pravica, 2005). This is because many of the advances in science and technology that we know and enjoy today have been as a result of scientific research where physics played a key role. The discoveries made in Physics not only broaden our view of fundamental processes, but frequently are of crucial importance in the advancement of other sciences. The development of quantum
theory for example, permitted the chemists to understand the wide variety of facts that had been gathered about chemical structures and chemical reactions. The rules that the physicists formulated concerning the propagation of sound waves in solid materials allowed the geologists to use seismological techniques for the investigation of the interior of the earth. The theory of fluid flow is of great importance to the meteorologist and to the oceanographer. The laws of physics determine all physical processes (Marion, 1971).

A Physics culture is therefore crucial for successful development of technology and advancement of any society’s economy (Zingu, 2005). Certainly, a physicist does not create new buildings or construct new modes of transportation. He does not cure our ills nor provide greater comforts in our homes. Physics deals with the pursuit for knowledge about the universe, its constituents and their behaviour. However, it is true that the architects and engineers who construct buildings and aircrafts make constant use of the laws of mechanics and dynamics as formulated by physicists. Many of the diagnostic and therapeutic techniques used in modern medicine were developed in the physics laboratory. Refrigeration, radio and television are outgrowths of discoveries by physicists. The discovery of a transistor in solid state physics laboratory has led to a new era of technology. Without the ejection of new ideas that have been produced by physicists, our great technological industries would not exist and the level of our society would be stark and primitive. Physics is therefore, intimately connected with technology and it is the impact of this association that is the most apparent effect of physics on society (Marion, 1971).

In ancient Greece, physics was originally known as natural philosophy. The word philosophy itself stems from the Greek “philos” – love or lover, and “sophos” – wise
or wisdom; thus the literal translation of philosophy is “lover of wisdom” (Neufeldt & Sparks, 1995). Physics, therefore, could be something looked at with admiration; it is the love of the wisdom of nature. Unfortunately, there seems to be a trend in the opposite direction. Owen, Dickson, Stanisstreet & Boyes (2008), highlight the concern of over-declining numbers of physics students at both the secondary and post-secondary level. They point out that a decrease in students enrolled in physics at these levels leads to concerns of sustaining an educated base capable of working in science and technology research, education and industry. This could have a major impact on the economic reality of the country and an effect on its general population. Dawson (2000) echoes this sentiment, demonstrating that scientific literacy is also considered a necessity in Australia. He states that it serves the greater good of a working democratic society (i.e., informed people making decisions based on critical understanding), and offers potential human capital for the work force. Similar concerns can be raised in Kenya where in spite of the values and contributions of physics to our society, there is a poor enrolment in the subject throughout the country. Though the number of physics students seems to increase steadily, this does not change the percentage which has stagnated at 14% due to increase in the total enrolment as shown in the table below.

Table 1.1 below shows enrolment data at Form Four levels in the three sciences from the year 2007 – 2010.
Table 1.1: Form Four Science Subjects Enrolment from 2007 – 2010.

<table>
<thead>
<tr>
<th>Year</th>
<th>Physics enrolment</th>
<th>Biology enrolment</th>
<th>Chemistry enrolment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>83,818</td>
<td>247,966</td>
<td>269,478</td>
</tr>
<tr>
<td>2008</td>
<td>93,620</td>
<td>274,088</td>
<td>298,916</td>
</tr>
<tr>
<td>2009</td>
<td>104,841</td>
<td>301,304</td>
<td>331,378</td>
</tr>
<tr>
<td>2010</td>
<td>109,810</td>
<td>316,940</td>
<td>349,533</td>
</tr>
</tbody>
</table>

Source: KNEC (2012)

Table 1.2 also shows how enrolment in Physics is poor in South Imenti constituency where this study was carried out.

Table 1.2: Enrolment in Sciences for National Examination in Secondary Schools in Imenti South Constituency in the Year 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Physics enrolment</th>
<th>Biology enrolment</th>
<th>Chemistry enrolment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>645</td>
<td>2331</td>
<td>2754</td>
</tr>
<tr>
<td>2009</td>
<td>814</td>
<td>2536</td>
<td>2930</td>
</tr>
<tr>
<td>2010</td>
<td>724</td>
<td>2892</td>
<td>3227</td>
</tr>
<tr>
<td>2011</td>
<td>785</td>
<td>2916</td>
<td>3433</td>
</tr>
</tbody>
</table>

Source: DEO’s Office

The trend from the Tables 1.1 and 1.2 above is worrying because more students leaving high school in Kenya are likely to fall short of achieving well rounded education. Zingu (2005) stated that, “the fact is that basic knowledge in physics is a key component of a well rounded education, a student who understands nothing of the forces behind natural phenomena like lightening or gravity goes through life with a handicap. He/she is equally handicapped when it comes to understanding the modern world” (p.36). (Goodstein (1999) also argued that, a solid education in physics is the best conceivable preparation for the life time of rapid technological and social change.
that our young people must expect to face. Poor enrolment as indicated on tables 1.1 and 1.2 above shows that physics related fields are faced with shortage in terms of expertise. These include: architecture, aeronautical engineering, computer science and teaching (physics teachers), among others. Who is going to provide even the most basic foundation of physics knowledge if there are a few physics teachers to staff science classes in physics?

According to the Ministry of Education (as cited by Adipo, 2007) in Kenya, 70% of the professional degree courses offered in public universities require physics as one of the subject clusters for admission. In 40% of these courses, physics is mandatory, while in the rest 30% mathematics or any science subject may replace physics (Ibid). This is a clear indication of the importance and value placed on Physics, yet the enrolment in Physics depicts otherwise.

According to Morrell & Lederman, (1998) research has shown that a person’s attitudes are learned, as opposed to being inherited. Many factors can influence a person’s attitude, including previous experiences and social influences. Attitude toward Physics can be defined as, “favorable or unfavorable feelings about Physics as a school subject. To analyze the attitudes of both teachers and students that could have led to poor enrolment in Physics in Imenti south constituency, this research work focused on a few schools as time was limited, but the schools chosen were representative of all categories of schools in the population.

1.2 Statement of the Problem

Scientific literacy and the need for technological advancement in any society are a major ground for physics, needing to be part of any program of lifelong learning. The foundation of this lifelong learning should therefore be well grounded in our schools.
In secondary schools in Kenya, science curriculum is organized as three distinct subjects: Biology, Chemistry and Physics. At the inception of the 8-4-4 system of education in Kenya in 1986, science was compulsory. This enhanced chances of science becoming part of every learner’s lifelong undertaking. All the learners were given a basis for understanding and coping with their lives and for understanding the applications and effects of science in society (Ministry of Education, 2002).

After revising the 8-4-4 system of education in 1990, 1995 and 1999, the compulsory science subjects were reduced to two (Kenya Institute of Education [KIE], 2002). Most schools made Chemistry compulsory because it could be easily combined with either Biology or Physics in the subject clusters required in post secondary education (Ministry of Education, 2007). Biology and Physics were grouped together such that a student was free to take Biology and/or Physics. Majority of students though opt to take Biology and drop Physics in Form Three.

The major challenge confronting Physics is attraction of more students to study it. Despite the numerous career opportunities related to physics and the crucial role it plays in the development of technology and advancement of the country’s economy, there is a general poor enrolment in Physics in secondary schools in Kenya as compared to other science subjects (see Table 1.1). While students’ achievement in physics is the concern of most educational researchers, there has been little interest in students’ attitudes towards Physics which consequently influences their enrolment into the subject. For this reason, a research on attitudes towards Physics is salient at this time.
1.3 Purpose of the Study

The purpose of this study was to analyse the attitudes towards physics in secondary schools. Given the declining numbers of students opting to choose Physics in the upper secondary school level, it is evident that it is necessary to determine what is causing it. To explore the role that attitudes play the following objectives were formulated.

1.4 Objectives of the Study

The objectives of the study were to:-

i. Find out the Physics teachers’ attitudes towards the physics curriculum.

ii. Find out the students’ attitudes towards the physics curriculum.

iii. Investigate factors that influence the Physics teachers’ attitudes towards the teaching of Physics.

iv. Investigate factors that influence the students’ attitudes towards the learning of Physics.

v. Determine the principals’ attitudes towards offering of physics in their schools.

1.5 Research Questions

The following research questions were generated from the statement of the problem:-

i. What are the Physics teachers’ attitudes towards the physics curriculum?

ii. What are the students’ attitudes towards the physics curriculum?

iii. What factors influence Physics teachers’ attitude towards the teaching of physics?

iv. What factors influence students’ attitudes towards the learning of Physics?
v. How do school principals' attitudes towards physics affect the teaching of Physics?

1.6 Significance of the Study

Potential benefits of this study include, but are not limited to, providing academic communities and policy makers with information on poor participation of students in physics in Kenya. The study is going to reveal to policy makers factors which hinder students from selecting Physics which is crucial in making Kenya achieve vision 2030 of being industrialized.

This study may contribute to knowledge about the relationships of the factors that influence students' decisions in regard to making subject choices. Not much information is available regarding the relationships of factors and how or whether, they influence students' decisions to choose a particular subject. The study will reveal to teachers what they do or fail to do in order to encourage students or discourage them from choosing Physics. It may also help the students to visualize the role their attitudes play in selecting Physics and what influence that has on their career choices. The curriculum developers may find the results of the research useful as they structure the learning content and learning resources to make them more learner friendly.

1.7 Assumptions of the Study

The study was based on the following assumptions:

i. Students are not coerced into choosing any subject but do it on their own free will.

ii. Students are well informed of the importance and the career prospects of each subject they choose.

iii. That the respondents will be sincere and will give accurate information.
1.8 Limitations of the Study
Like all other research undertakings, this research has limitations. Data collection was carried out within a relatively short time frame. The research only covered one constituency and just a few schools. Given the significance of this study and the dismal participation in physics by students, it would have been more appropriate to take samples from across the country. Unfortunately this did not happen.

1.9 Delimitations of the Study
Although parents could give valuable information concerning the study it was difficult to reach them and therefore they were not included in the study.

1.10 Theoretical Framework
This study was guided by component theory of attitudes and self-efficacy theory. The structure of attitudes consists of three types of components: The cognitive component (beliefs), affective component (feelings), and the conative component (behavioural tendencies). Cognitive component is the knowledge about an attitude object, whether accurate or not. The affective component is the feelings towards the object either likes or dislikes. The behavioural component is the action taken towards the object, that is, the overt behaviour attached to our internal attitudes (Zanna and Rempel, 1988).

According to Zanna and Rempel (1988), attitudes are formed through different four ways. The first is direct experience, that is, an encounter with attitude object. The second is vicarious experience that is observing or hearing about an experience with an attitude object, and third way is assimilation of attitude from others that is, accepting what others report about an attitude. Finally, attitudes are formed from the need for cognitive consistency that is the need to avoid conflict between beliefs and feelings.
Zanna and Rempel (1988), further say that, attitudes differ in four ways. First, in the favourableness, that is, the extent to which the attitude object is considered to be good or bad. Secondly, in complexity, that is the number of identifiable dimensions of favourableness to which the components of attitudes relate. Some might perceive the object as good in some respect and bad in others. The salience/ego involvement, that is the extent to which the attitude is important to the holder and regarded as being part of his or her dignity. Lastly the extremity, that is the extent to which the attitude is at one or the other end of a continuum. Attitude therefore signifies what people think of, how they feel about and how they intend to behave towards an attitude object.

The component theory of attitudes is important in this study because attitudes play a central role in human behaviour in a given situation. For example students' attitude toward physics curriculum may consist of positive or negative emotions (the affective component). An intention to drop or proceed with physics curriculum (the behaviour component) and the belief that physics is a curriculum for talented students (the cognitive component). Attitudes can also take different forms, especially in the process of change. For instance, they can be selective, biased, arouse effect when challenged or resist change in the face of new experience for example the teaching experience from teachers coupled with in-service training may lead to positive attitudes. Attitudes are hypothetical constructs, they cannot be directly observed and their existence is inferred from a person’s behaviour. This behaviour can of course take many forms for example students dropping physics and schools developing a low priority towards physics Curriculum.

Self-efficacy theory is defined as “judgement of one’s capability to accomplish a certain level of performance” (Bandura, 1982). The theory relates to our feelings of
confidence that we can achieve a desired outcome. Self-efficacy judgements are specific to certain domains, which we judge ourselves to possess competence. For example we might describe ourselves as good in teaching English but not so well in teaching Mathematics (Bandura, 1982). Self-efficacy influences behaviour through cognitive, motivational, affective, and selection processes. Individuals who feel that they will be successful on a given task are more likely to be so because they adopt challenging goals, try harder to achieve them, persist despite setbacks and develop coping mechanisms for managing their states, (Bandura, 1982). Self-efficacy is a determinant of choice of behaviour because it influences the choice of behaviour setting. When individuals recognize coping as inadequate for addressing threatening situations they avoid the situations. Understanding the mechanisms in Bandura’s theory that determine perceived self-efficacy is important in understanding teachers and students attitudes towards Physics.

1.11 Conceptual Framework

<table>
<thead>
<tr>
<th>Attitudinal Attributes of:</th>
<th>Enrolment and participation in Physics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Gender</td>
<td></td>
</tr>
<tr>
<td>• Type of school</td>
<td></td>
</tr>
<tr>
<td>• Environmental stimuli</td>
<td></td>
</tr>
</tbody>
</table>

Independent variables

Intervening variables

Dependent variable

Source: Researcher (2012)

Figure 1.1: Conceptual Framework on Analysis of Attitudes towards Physics in Secondary Schools
The conceptual framework shows that interrelationships between the independent and dependent variables of the study. The independent variables of the study are learners', teachers' and principals' attitudes towards Physics. These attitudes should either be positive or negative, the negative attitudes may be expressed through avoidance to teach and learn while the positive attitudes may be expressed through positive remarks and desire to teach and learn. Negative or positive attitudes are expected to have an influence on enrolment and participation in Physics, which is the dependent variable of the study. This conforms to the two stated theories, that is, component theory of attitudes (Zanna and Rempel, 1988) and self-efficacy theory (Bandura, 1982). The theory revealed that for an improvement in participation and increase in enrolment among learners in Physics, principals, teachers and students must have a positive attitude towards the subject.
1.12 Operational Definition of Central Terms

**Attitude:** Refers to a way of feeling, thinking and behaviour.

**Attitude change:** Refers to modification of an individual’s general evaluative perception of a stimulus or set of stimuli.

**Believe:** Refers to information, factual and non-factual that a person has about other people, objects or issues.

**Motivation:** Refers to an inner force that leads one towards an action of a fulfilment of a goal.

**Enrolment:** Refers to number of students who choose to pursue physics to K.C.S.E level.

**Subject:** Refers to specialized area of study.

**Cluster:** Refers to a combination of four selected subjects required for one to pursue a given degree Programme.

**Gender:** Refers to socially determined personal and psychological characteristic associated with being a male or a female namely, ‘masculinity and femininity’.
CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter contains a literature review that describes the point reached by other education researchers on attitudes and perceptions towards physics. It describes what has been written about problems in physics participation with a focus on the factors that have been found to have an impact on students' attitudes and their decision to choose physics as a school subject. These factors broadly include students' characteristics, school-related factors and society related factors.

2.1 Attitudes

Attitudes are important since they act as directive factors in every day endeavours of human beings. Haber (1975) states that the primary function of attitudes is to provide some kinds of organization of the world we live in. Lindsey (1978) supports this observation by maintaining the fact that attitude serves as standards that help people to understand their universe. Human beings are cognitive in nature; that is some extent stimulated towards an intellectual mastery of their environment. Attitudes thus provide us with a cognitive structure, a simplified programme of behaviour that tells us how to act in our social world. Attitudes help us to know what to do in certain situations and therefore help us to satisfy our primary needs.

2.1.1 Definitions and Discussion of Attitude

Attitude is a mental predisposition towards people, objects, subjects, events, situations or ideas. An attitude may be considered as a mental state of readiness to respond that is organized through experience and will exert a direct influence on behaviour. An attitude entails organization of concepts, beliefs, habits and motives associated with
particular persons, objects, subjects, events, situations and ideas. They make one to react in consistent way, favourably or unfavourably to a more or less predictable degree to particular situations. Attitudes consist of satisfaction and dissatisfactions and form the basis of ideas and feelings we bring to these situations they are the core of our likes and dislikes for certain people, groups, situations, objects and intangible ideas such as freedom of the press (Diana, 1975).

The concept of attitude links to internal characteristics of people to the external characteristics of situations. Attitudes are thus internal private events whose existent we infer from our own introspection or from some of the behavioural evidence. This happens when they are reflected in word or in deed. Since an individual’s attitudes are inferred, this means that they cannot be measured directly as skills, facts and concepts (Diana, 1975). It can be noted that attitudes are very important to the learning. Attitudes refer to how one thinks, feels about, or act towards objects or ideas (Irumbe 1990). In this connection then, attitudes will definitely affects our ways of learning. Keil (1985) defines altitudes as “positive or negative feelings that an individual holds about objects, persons or ideas”.

2.1.2 Attitude Formation

Contemporary psychologist observes that attitudes are not innate or inborn. They are learned and organized through experiences as children develop. Sprint hall (1987) enumerates two general sources of attitudes: external influences such as exposure, parents, peers and mass media and internal influences due to personal conflicts. Attitudes may also be formed as a result of a number possible ways namely, due to past experiences encountered, identification and due to ones past behaviours and actions.
Kimble (1963) states that a majority of a person's attitudes are learned from his parents and other close associates. Orodho (1990) asserts that, the initial experiences that mould an individual's values, spiritual, emotions, interests and attitudes are those that are offered by parents and other close members of the family. Parental values, attitudes, aspirations and interests are subtly and are unwillingly transferred to their children. The systematic reinforcement of certain opinions by parents and peers corresponding to instances of instrumental conditionings strengthens the cognitive component of attitudes e.g. a parent who is interested in reading literature would without any serious intention encourage his children to read such literature.

Earnest, (1967) asserts that, attitudes, at least those held in common with other group members may be regarded as the internalized equivalent of norms. Thus for example, if I belong to a group whose norms include the strict avoidance of physics subjects my behaviour and my expressed attitudes, will certainly tend to coincide with those of group, I will probably end up believing in the norm and acquiring a genuinely unfavourable attitude towards physics. Some attitudes may be formed as a result of a person's needs, such as in response to a challenge to his ego. In other cases attitudes are created on the basis of how we perceive people, objects and events in the world.

2.2 Teachers' Attitude Towards Physics Curriculum

At school, science teachers play an especially crucial role in the formation and reorganization of students' conceptions and attitudes towards science and scientists (Turkmen, 2008). In particular, teachers' conceptions and attitudes towards science and scientists establish a „hidden curriculum“ and determine to a large extent their teaching practices (Lunn, 2002). Teachers' inadequate understanding of the nature of science may pose difficulties in introducing coherent and compelling teaching.
practices addressing their students' interests and experiences and perpetuate to implement traditional, teacher-centered instruction (Bianchini, Johnston, Oram, & Cavazos, 2003). Hence, the teachers' views and attitudes towards science have an impact on the respective views and attitudes of their students. Previous studies have confirmed that teachers with a positive view towards science tend to inspire analogous positive stances in their students (Koch, 1990). On the other hand, many teachers have been found to adopt stereotypic images of scientists identical to those of students (Finson, 2002; Hatzinikita, 2007; Hatzinikita, Christidou, & Bonoti, 2009; Moseley & Norris, 1999), which often go hand in hand with negative attitudes towards science. These teachers are expected to have a negative impact on the ways their students conceive of science and scientists (Moseley & Norris, 1999; Quita, 2003), as well as on the students' likelihood of selecting and pursuing school science courses and, accordingly, of opting for a future career related to science (Finson, 2002; Quita, 2003).

2.3 Factors Influencing Teachers' Attitude Towards Physics

Several factors have been identified to cause low enrollment of students in physics and science related subjects. Among the problems identified include, inadequate teaching strategies, poor laboratory facilities, lack of fund, poor quantitative ability among others (Adesoji, 2002). Odubunmi and Balogun, (1991) have identified teachers' personality and attitude towards their teaching subjects as factors contributing to poor performance and low enrollment of the students in Physics and other science subjects. Simpsom and Troost (1982) found out that attitude determines achievement and enrolment of students in science subjects. Teachers as basic tool in curriculum implementation remain a very crucial factor that influence students'
attitude, achievement, and continuing educational development. These is no longer achievable since teachers are accorded with little or no respect in the society due to insufficient fund, lack of motivation incentives, delay in salary payment among others all these affects teachers activities, causing psychological and emotional trauma which in turn affect teachers output.

Students are taught science as to enable them communicate well in science with experts, peers and their apprentices. The methods used by teachers to deliver content in physics vary from one teacher to another. However, as much as possible, teachers should always have the learner at the centre of learning whatever methods they choose to use. Therefore, a learner centred approach should be used in the teaching-learning process. The learner should be allowed to carry out hands on activities so that he/she can have an intimate feel of the apparatus used. This will provoke the learners’ curiosity and interest in the learning of a particular subject (Physics). According to Tanabara (as cited by Otiato, 2011) if a teacher’s understanding in a certain topic say mechanics is very poor, he/she avoids experimental work, rejects any form of questioning by students and uses no examples. In such situation the teacher does not use any analogies simply because they do not understand the concepts. Physics like any other science subject should be taught through experiments. Experiments motivate the learners to bring out positive attitude. Students develop interest in the subject when they themselves perform experiments to investigate the natural phenomena. They also become excited when they discover the natural laws which they previously were not aware of, this result in them liking the subject. Experimentation helps the students to analyze, discuss and share participatory experience. Through these experiences students get curious to know more about their new experiences. By so doing they learn more and eventually they develop subject
favourable attitudes towards the subject (Magiri, 1997). Students should be made more aware of the fact that experimentation is not a laboratory issue alone but that experiments can be performed even outside the school or out of classroom. They should relate their learning to their daily life experiences to interact more with nature.

Teachers should realise that the main aim of science instruction should begin with each child where he/she is and create an educational climate to bring out the maximum potential in every learner (Nderitu, 2009). The physics teacher should, therefore, encourage students to think more themselves and investigate physics problems as much as they can. Out of class activities like science congress, field trips and science club activities if guided by the teacher can be an exciting adventure that can cultivate student interest in physics and develop it to their full potential. Physics should be taught in an interesting manner to draw maximum attention of the learners and also to maintain high motivational level at all times (Ibid).

2.4 Students’ Attitudes Towards Physics Curriculum

Perceptions of a subject’s difficulty, is related to students’ subject choices. Measurements of subject difficulty are contentious because of the shortcomings of available statistical treatments. According to Fitz-Gibbon & Vincent (1994) Physics was shown to be one grade more difficult than non-science subjects, and more difficult than chemistry, biology and maths. These findings were confirmed by analyses of national data-sets (Dearing, 1996).

According to Mundalamo (2006) a study done for UK government by ACOST (Advisory Committee on Science and Technology) concluded that many students had negative attitudes towards science because they perceived their science courses as being difficult and dull, impersonal and abstract, irrelevant to their lives and requiring
them to be passive in their learning. However, students welcomed the active learning and the project work that was being encouraged in some of their courses. Mundalamo (2006) further indicated that physics was “perceived as difficult, dull uninteresting subject ...” and that they had very low confidence in their own ability to pass in physics.

Attitude that students come with into class may influence what they learn in the physics course. There is some difference between individual and intrinsic interest and situational and extrinsic interests. Situational and extrinsic interest is stimulated by contextual factors such as good teaching that stimulate interest and engagement. The role of situational interest is highly significant in classroom or courses where students are not interested in the course or are not at all motivated academically (Mundalamo, 2006).

Hynd (2000) indicates that students interests in science affects their motivation, will to learn science and their past history of science learning affects how they perceive their skill. Teachers should make an effort to tie information to students’ interest. Teachers can present information by incorporating real life applications or uses. Students should also be taught to associate information with future goals. Teachers should also reflect on their role as teachers and on the main educational objectives that they would like their students to accomplish.

2.5 Factors Influencing Students’ Attitudes Towards Learning of Physics

According to Smyth and Hannan (2006), students choose the subjects they study based on their interest and ability, and also in the perceived usefulness of the subject, especially to their future career. Some researchers have examined some of these factors as highlighted below.
2.5.1 Gender Issues and Physics

The bourgeoning body of literature regarding the pattern of one’s choice as a function of gender shows a consistent pattern. For example a study by (Ethington, 1988, as cited in Samela, 2009) found out that men’s achievement and attitude toward science to be higher than women while at the same time noting a discernible pattern of difference between the sexes in motivational orientation in particular areas of science. Accordingly females are more inclined to life sciences e.g. Biology while males are oriented towards physical sciences e.g. physics.

According to Reid & Skryabina (2003) towards the end of the second year of secondary school (S2), a significant decline in girls’ attitudes towards science relative to boys’ attitudes was clearly observed. Nonetheless, many pupils still wish to pursue further studies in science subjects, including physics. Twice as many boys as girls are attracted to physics at this stage.

It was shown that this ratio of boys to girls in physics, once established at the end of S2, remains unchanged till the end of the formal schooling. The main factor that attracts boys and girls to physics after the S2 science course rests on the perceived value of such study in terms of possible careers. Students, at this stage, are very much aware that subjects like physics carry a ‘useful career value’ and, despite their unsatisfactory experience in science in S1 and S2, they still opt for physics in significant numbers (Reid and Skryabina 2003).

Eshiwani (2001) in his research on enhancing female participation and performance in mathematics, science, and information technology in university education, found out that there are very few role models and mentors for girls in science oriented areas. Stereotyped attitudes by teachers about what subjects are appropriate and proper for
males and females lead to the channelling of girls and boys into specific and often limited fields of study.

One of the most prominent issues is the large difference in the uptake of physical sciences between boys and girls. This 'gender gap' is particularly significant in the study of physics where in 2005 girls made up less than a quarter of the physics cohort in the VCE (Victorian Curriculum and Assessment Authority, 2005, as cited in Coyle, 2006). The 'gender gap' is a term also used to describe an historical difference in achievement between genders. The literature found the causes of such gender gaps to range from physical, cognitive differences between male and females, exclusive curriculum and social conditioning, which then leads to a diminishing of interest in physics (Coyle, 2006).

The difference in learning styles between boys and girls has also attributed to a gender gap in physics. From her study, Coyle (2006) suggest that boys and girls hold different notions of what it means to study physics. She suggest that boys are happy to find an internal coherence of physics; they look for concrete answers, readily use terminology and the traditional scientific framework, whereas girls tend to look for an external coherence; they do not believe they have grasped a concept until they can put it into a broader, (non-scientific language). The result of this is that traditional methods of teaching physics may favour the male learning styles and undermine female students' confidence.

Coyle (2006) suggests that as stereotypes of male and female develop in children, their attitude to gender-related subjects also develops. By middle secondary, boys are more interested in the physical science and mathematics and girls are more interested in English and languages. In addition she identifies that by the time students are
making their subject choices they are in the midst of teenage years, and the pressures associated with this lead students to find comfort in conventional gender specific areas where they are not making decisions that conflict with their own self-image. Adolescents go through crisis (intensive questioning) and commitment (firm belief) in their struggle for 'ego-identity': it is the very conventionally male aspect of science that attracts boys and repels girls at this stage in their development.

Gender and science are mutually constitutive and girls' participation in physics education, historically and currently, needs to be understood in relation to this. Prior achievement and perceptions of the difficulty of physics are determinants of students' decisions about whether to continue to study physics. These influences may be heightened for girls by gendered associations about who is, and is not, competent in mathematics and physics.

Interest and enjoyment in physics also influence students' course choices, particularly those of girls, and these decline relative to other sciences through schooling, more so for girls than boys. This decline is not disrupted by school organization. Single-sex organization is associated with high teacher expectations in science and a greater sense of 'belonging' for girls, but not for all girls. The contents, contexts and ways of approaching problems and investigations in physics more closely reflect what boys, more than girls, engage with outside school, and those activities associated with what culture defines as masculine rather than feminine attributes. These exert a negative influence on girls' engagement with physics, their sense of self-efficacy in relation to it, and their perception of its personal relevance. Girls, relative to boys, continue not to see a future self engaged in physics and physics-related careers. Context-based courses alter how physics content is organized, and impact positively on overall
performance, and on girls' performance relative to that of boys. They also raise fundamental challenges to physics education and its perceived educational purpose. This can be disrupted by changes in the curriculum and in pedagogy.

2.5.2 Societal Influence on Students Choice of Physics

According to Lipps (1999) interest in science could be influenced by the recognition and value placed on knowledge of science and application scientists and science related profession by society. When science professions are highly rewarded people consider it a worthwhile profession to engage in. Enrolment in physics studies have shown that influence of society is more pronounced in girls decision than boys due to social cultural traditions. Society perceives physics and physics related courses as masculine and difficult.

Researchers like Fraser (1959), Douglas (1964) and Cullen (1970) among others have demonstrated in their studies on home environments influence on choices that differences in home environment factors such as parental level of education, occupation, living condition, encouragement, family size among others determine students' life to greater extent. Fraser (1959) found out that the parents occupation significantly related to the child's schooling. Hung and Marjoribanks (2005), indicated that children's educational aspirations had large associations with their parents' aspirations, together with their family social status.

Topping (1989) says many educators considered peer groups to be an effective and powerful instructional strategy that can be used to develop academic as well as social skills in peer group. Peer group are usually made up of play mates, friends or people within the same age bracket. They serve as confidant to their members. In most cases
they share same values and ideals. It’s important to note that peer members can also influence on each other.

2.5.3 Students’ Interest Towards physics

Interests are considered to be the most important motivational factors in learning and development. In regards to the relevance of science, students view scientific knowledge as an important component of their education, acknowledging its value for explaining everyday experience. However, they primarily stress the instrumental value of science (e.g. for pursuing a career) than its intrinsic interest (Osborne & Collins, 2001). More particularly, students’ interest in science involves three dimensions (Häussler & Hoffmann, 2000): a) interest in a particular context in studying science; b) interest in a particular content connected with that context; and c) interest in a particular activity a student is engaged in, in conjunction with that content. Therefore, the context in which science is studied is a powerful predictor of students’ interest. Contexts that stimulate interest involve science as a: means to promote practical competence; socio-economic enterprise; vehicle to enhance emotional experience; intellectually challenging endeavor; and a vehicle to qualify for professional life.

Students’ interests and attitudes related to science are significantly differentiated according to age and gender, as well as to socio-economic and cultural background (Brickhouse & Potter, 2001). These factors combined with the classroom environment and science teaching practices employed are considered as particularly important in shaping students multiple and fluid identities (Buck, Cook, Quigley, Eastwood, & Lucas, 2009). As they advance from primary to secondary education, students rapidly lose their interest in science (Baird & Penna, 1992) and cease seeing it as a viable option for their future, or associating it with their success aspirations (Bowtell, 1996).
Also, boys tend to be more interested in science than girls (Evans, Schweingruber, & Stevenson, 2002) who value careers with a strong interpersonal and communicative dimension (Zeldin, Britner, & Pajares, 2008).

2.6 Principals’ Attitudes Towards Offering of Physics in Schools

The school principal, deputy principal, head of academic department and the career counselor are expected to play a major role during the subjects selection exercise. The principal is in charge of all that goes on in the school ranging from human resource management, financial management to curriculum implementation (Mbiti, 2007). He or she interprets the policy on behalf of the ministry of Education, executes curriculum programmes, ensures provision of equipment, physical facilities and maintains effective school community relations. According to Nwanne (1996), high school principals play a pivotal role in school decisions, and that the decisions the principals make are based on their perceptions and attitudes. Due to their leadership role, principals’ perceptions and attitudes about a curriculum could either result in increased educational opportunities for students or in limited efforts to enhance curricular change.

In many schools the academic department is mandated to conduct the form three students’ subjects’ selection exercise after ensuring that the curriculum requirements have been understood by all students. However a number of past research studies revealed that this is one of the areas that students are not fully involved but rather hurriedly coerced into subjects choices that may not enable them to join the aspired careers. For example Musyoka (2000), found that some students who had dropped physics, expected to pursue courses such as geology, meteorology, biomedical
engineering, dental surgery, survey engineering and many others which required a good physics grade in KCSE.

A study by Muli (2005) on the effects of head-teachers' management styles on performance in physics in Kitui district, found that performance in physics, indirectly depends on the management styles of the head teachers and is highly affected by their management characteristics such as acquisition of text books, equipments, qualified teachers, proper guidance and counseling to change the attitude towards the subject and poor teachers motivation.
CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents a discussion on design and methodology of the study. It gives a summary of the research design, the population sample, instrumentation and data collection procedures. Data analysis methods will also be described.

3.1 Research Design

The study adopted a descriptive survey research design. This is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals (Orodho, 2003). It can be used when collecting information concerning current status of the subject of the study to determine and report the way things are (Gay, Mills & Airasian, 2009). This research design was preferred because the researcher only gathered data on existing state of affairs in the target population without manipulating any variables.

3.2 The Study Locale

The study was carried out in Imenti south constituency, Kenya. The constituency has a total of 61 secondary schools offering students for K.C.S.E. The constituency is located in the eastern side of Mount Kenya. The constituency was considered for this study because it has schools of all categories, that is, girls, boys and co-educational schools. The constituency was also considered because of the researcher's wide experience on educational matters in the constituency hence, likely to carry out the study with competence.
3.3 The Target Population

Orodho (2009) defines target population as that population from which the researcher wants to generalize the results of the study. The target population for this study was sixty one public secondary schools in Imenti South constituency. The schools in the constituency are categorized as National, Extra county (Provincial), County or District schools. The National and Extra county schools admit those students who performed better in primary leaving examination than the County and the district schools. They are well staffed and have better teaching and learning resources as compared to the district schools. The study targeted 1 National school, 5 Extra County schools, 24 County schools and 31 District schools giving a total of 61 schools in Imenti South Constituency.

3.4 Sample Size and Sampling Procedure

The researcher used the stratified random sampling to select the six schools that participated in the study. The Extra county boys schools were grouped together to form group A1, the Extra county girls schools formed group A2. The county boys schools were grouped as B1 and county girls schools were grouped as B2. Finally District schools were grouped as C. The lottery method of selection was used in which five papers were picked from each group. The researcher used purposeful sampling to pick the sixth school since there is only one National school in the constituency. The sample therefore included: One National school, two Extra county schools one being boys schools and the other being a girls school, two County schools one girls and the other boys school, and finally one district day school which is mixed gender. All form three students and physics teachers in the samples schools participated. Form three students were preferred because they had just chosen the subjects and therefore the reason for their choices was still be very vivid in their
minds. The researcher used the stratified random sampling to select the students in the six schools that participated in the study.

3.5 Research Instruments

The study used questionnaires for data collection. Questionnaires were used to collect data from students, physics teachers and principals. The questionnaire had both open and close ended items. Close ended items were used because they are easy to fill, tabulate and quite objective. Open-ended items were also used because they allowed the students to express themselves freely. Anderson (2004) argues that surveys using questionnaires are perhaps the most widely-used data-gathering technique in research and can be used to measure issues that are crucial to the management and development of human resources, such as behaviour, attitudes, beliefs, opinions, characteristics, expectations and so on. According to Leary (1995), there are distinct advantages in using a questionnaire as opposed to an interview, questionnaires are less expensive and easier to administer than personal interviews; they lend themselves to group administration; and, they allow confidentiality to be assured. The details of each questionnaire are discussed below.

3.5.1 Questionnaire for Students

The researcher prepared a questionnaire for form three students who are included in the sample. The first part included the students background information, that is, their gender, who influenced their subject choice and career aspirations. The second part collected data on factors that influence students’ attitudes towards physics. These included student related factors, teacher related factors, and physics related factors. For this questionnaire, a correlation coefficient alpha of 0.7047 was obtained which was reliable for data analysis.
3.5.2 Questionnaire for Physics Teachers

This questionnaire was in two sections. The first section sought to find out background information of the teacher like age, gender, working experience and level of education. The second section collected data on physics teachers’ attitudes towards physics. For this questionnaire, a correlation co-efficient alpha of 0.6729 was obtained.

3.5.3 Questionnaire for Principals

The researcher constructed a questionnaire for principals that sought to find out the background information about their schools. It also sought to find out principals’ attitudes towards physics. Based on the results of the pilot study, the researcher noted that the tool was not adequately structured to cover the study variables. Therefore, another section was added in the questionnaire to capture principals’ attitude towards Physics (see appendix C).

3.6 Pilot Study

The pilot study was conducted as a pre-test of the questionnaire instrument. It was administered to determine: whether there were ambiguities in any items; whether the instruments elicited the type of data anticipated; and also establish whether the type of data desired could be meaningfully analysed in relation to the stated research questions. After the pilot study the principals’ questionnaire was adjusted to include an attitude test on a 5-point likert scale. It was also found important to emphasize to students not to write their names on the questionnaires, because some students included their name on the instruments. Any communication problems noted by the pre-test sample, such as any ambiguous questions were adjusted in the final questionnaire on the basis of the pre-test result.
3.7 Instrument Reliability

Reliability is a measure of the degree to which a research instrument yields consistent results or data after repeated trial. It is necessary that the research instruments are piloted as a way of finalizing them (Wiersma, 1995). This is vital as it enables the reliability of the instruments to be determined. Reliability is synonymous with repeatability or stability. A measurement that yields consistent results over time is said to be reliable (Wiersma, 1995). When a measurement is prone to random error, it lacks reliability. The study used the split-half (SH) method of reliability testing. The research instruments were piloted in order to assess their reliability. One secondary school within Imenti South Constituency was selected for piloting the instruments. Split-Half technique of reliability testing was employed, whereby the pilot questionnaires were divided into two equivalent halves and then a correlation coefficient for the two halves computed using the formulae below;

\[ r = 1 - \frac{6\sum(D)^2}{N(N^2 - 1)} \]

Where;

- \( r \) = Correlation coefficient
- \( N \) = Sample,
- \( \sum \) = Summation of scores,
- \( D \) = Deviation

\[ \text{SH} = \frac{2r}{1 + r} \]  
(Where Items are doubled)

(Spearman Brown Prophecy)

A reliability coefficient of 0.7 or above was accepted as recommended by Gay (1992).
3.8 Instrument Validity

According to Borg and Gall (1989) validity is the degree to which a test measures what it purports to measure. Validity of an instrument is improved through expert judgment (Borg and Gall, 1989). As such, the researcher sought the assistance of research experts, and experienced supervisors in order to help improve validity of the instrument. For instance, the questionnaire for principals was redesigned to cover the study variables, whereby, a section was added to capture the principals’ attitude towards Physics.

3.9 Data Collection Techniques

The researcher obtained an introduction letter from Kenyatta University. Thereafter, she obtained a research permit from the National Council for Science and Technology. The researcher then proceeded to the District Education Officer (DEO) for Imenti South District to seek his/ her permission before proceeding on with data collection. The researcher then proceeded to selected schools and sought the permission of the principal after which the researcher personally administered the questionnaires to the respondents; after assuring them of confidentiality and enlightening them on their rights. The researcher gave the respondents one week to respond to the questions.

3.10 Data Analysis

After the data was collected, the completed questionnaires were edited to identify errors and then coded. Data analysis procedures employed both quantitative and qualitative procedures. Quantitative data was analysed using descriptive statistics such as frequency counts, percentages, means and standard deviations. On the other hand, qualitative data was analyzed using content analysis and then grouping responses on
open-ended questions thematically in line with the research objectives. The results of the analysis were then presented using tables, bar charts and pie charts.
CHAPTER FOUR
DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.0 Introduction

This chapter deals with analysis, results and discussions. The main purpose of the study was to analyse students', teachers' and principals' attitudes towards Physics in public secondary schools in Imenti constituency. The chapter is arranged into sections as follows:-demographic characteristics of the respondents, teachers' attitudes towards physics curriculum, students' attitudes towards physics curriculum, factors influencing teachers' attitudes towards teaching of Physics, factors influencing students' attitudes towards the learning of Physics and principals' attitudes towards offering physics in their schools.

Data was collected from, six principals, 14 Physics teachers and 220 students (91 Biology and 129 Physics students), giving a total of 240 respondents. All the questionnaires were returned, therefore making a 100% return rate. This response was high enough to provide credible findings on attitude towards physics curriculum in secondary schools in Imenti South constituency.

4.1 Demographic Data of the Study Respondents

This section presents data on both students and teachers as analysed below.

4.1.1 Students' Demographic Data

The bio data of the students included gender, subjects registered for KCSE, physics performance in form two and the person who influenced students to choose the optional subjects (Biology and Physics). Table 4.1 illustrates students' gender
Table 4.1: Students' Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Subject</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Biology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Female</td>
<td>66</td>
<td>72.5%</td>
</tr>
<tr>
<td>Male</td>
<td>25</td>
<td>27.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Physics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Female</td>
<td>59</td>
<td>45.7%</td>
</tr>
<tr>
<td>Male</td>
<td>70</td>
<td>54.3%</td>
</tr>
<tr>
<td></td>
<td>125</td>
<td>56.8%</td>
</tr>
<tr>
<td></td>
<td>95</td>
<td>43.2%</td>
</tr>
<tr>
<td></td>
<td>220</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Results in Table 4.1 show that among the students taking Biology, 66 (72.5%) were females while 25 (27.5%) were males. Of the 129 students taking Physics, 59 (45.7%) were females and 70 (54.3%) were males. This implies that most of the male students were taking Physics compared with their female counterparts who were taking Biology. In agreement with the findings, Coyle (2006) suggests that as stereotypes of male and female develop in children, their attitude to gender-related subjects also develops. By middle secondary, boys as compared to girls are more interested in Physics and Mathematics.

Similarly, numerous studies have shown that boys have a more consistent positive attitude to science than girls; although this effect is stronger in Physics than in Biology and girls' attitudes to science are significantly less positive than boys (Osborne, et al., 2003). Regarding the number of subjects registered for K.C.S.E, all (100%) the students (both Biology and Physics students) reported that they registered eight subjects. The study further sought to determine whether students selected the subjects freely. Table 4.2 shows results obtained.
Table 4.2: Students’ Choice of Subjects

<table>
<thead>
<tr>
<th>Free Subject choice</th>
<th>Biology</th>
<th>Physics</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>Yes</td>
<td>72</td>
<td>79.1</td>
<td>99</td>
</tr>
<tr>
<td>No</td>
<td>19</td>
<td>20.9</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>91</td>
<td>100.0</td>
<td>129</td>
</tr>
</tbody>
</table>

Table 4.2 shows that majority of the students (72 Biology and 99 Physics students) reported that selection of the subjects was free. However, a notable number of respondents stated that they did not make their own choice, meaning they were influenced to select some subjects. Table 4.3 illustrates person’s who influenced students when selecting optional subjects.

Table 4.3: Person’s Who Influenced Students’ Choice of Subjects

<table>
<thead>
<tr>
<th>Person who influenced students’ choice of the subjects</th>
<th>Biology</th>
<th>Physics</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>Not influenced</td>
<td>72</td>
<td>79.1</td>
<td>99</td>
</tr>
<tr>
<td>Guardians</td>
<td>4</td>
<td>4.4</td>
<td>8</td>
</tr>
<tr>
<td>Teachers</td>
<td>14</td>
<td>15.4</td>
<td>17</td>
</tr>
<tr>
<td>Friends</td>
<td>1</td>
<td>1.1</td>
<td>4</td>
</tr>
<tr>
<td>Relatives</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>91</td>
<td>100.0</td>
<td>129</td>
</tr>
</tbody>
</table>

Results of person’s who influenced students’ choice of subjects in Table 4.3 implied that majority of the students were not influenced during subjects selection. However, among those who stated that they were influenced, 15.4% of the Biology students and 13.2% of the Physics students reported that they were influenced by their teachers. In line with the findings, a study by Githaiga (2011) on factors influencing Form Two
boys and girls choice of KCSE subjects in Kieni division, Nyeri North district, Kenya, found out that teachers, family background, peer socialization, guardians' level of education and occupation were the major factors which influenced students' subject choice. Table 4.4 presents students' rating of their performance in Physics in form two.

Table 4.4: Physics Performance in Form Two

<table>
<thead>
<tr>
<th>Rating of Physics Performance in Biology</th>
<th>Subject</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Biology</td>
<td>Physics</td>
</tr>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Very good</td>
<td>6</td>
<td>6.6</td>
</tr>
<tr>
<td>Good</td>
<td>17</td>
<td>18.7</td>
</tr>
<tr>
<td>Fair</td>
<td>53</td>
<td>58.2</td>
</tr>
<tr>
<td>Poor</td>
<td>15</td>
<td>16.5</td>
</tr>
<tr>
<td>Total</td>
<td>91</td>
<td>100.0</td>
</tr>
</tbody>
</table>

As shown in Table 4.4, majority (58.2%) of the Biology students rated their performance in Physics as fair. However, among those taking Physics, 59.7% of them indicated that they were performing well in Physics, 38.0% indicated that their performance was fair while 2.3% felt that it was poor. This implies that students' Physics performance in Form Two was a major factor which influenced their uptake of either physics or Biology in Form Three. Results of the analysis revealed that most of the students with poor performance in Physics opted to pursue Biology and vice versa. In relation to the findings, Eshiwani (1984) and Twoli (1986) indicate that low achievements in past examinations may lead to negative attitude towards science subjects. Students may be less motivated to work harder in case of prevalent poor performance. It is also possible that consistent poor performance in Physics may lead to
students’ discouragements hence loss of interest and negative attitude towards the subjects.

4.1.2 Teachers’ Demographic Data

Out of the 14 teachers who took part in the study, 11 (78.6%) were males while three (21.4%) were females. Figure 4.1 shows teachers’ academic qualifications.

Figure 4.1: Physics Teachers’ Academic Performance

B.Ed (Sc), 11 (78.6%)

Diploma, 2 (14.3%)

S1, 1 (7.1%)

Figure 4.1 shows that majority (78.6%) of the Physics teachers had Bachelor of education qualifications. This implies that most of the teachers were highly qualified to deliver the subject matter to the students. Figure 4.2 illustrates teachers’ responses on duration of time served as physics teacher.
From Figure 4.2, it can be observed that nine (64.3%) teachers had taught Physics for a period of 1-5 years, 2 (14.3%) had taught for 10-15 years while another two (14.3%) had served as physics teachers for more than 15 years. Ademulegun (2001) argued that students taught by more qualified and experienced teachers in terms of knowledge of the subject matter perform better than those taught by less qualified but experienced teachers. As depicted in Figure 4.1, results show that most of the teachers had attained Bachelor of Education, meaning they were qualified to deliver subject contents to the students.

Table 4.5 illustrates number of physics teachers per school

<table>
<thead>
<tr>
<th>Number of Physics Teachers</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three teachers</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>Two teachers</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>One teacher</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

As indicated in Table 4.5, from the six schools, two (33.3%) had three Physics teachers, another 2 (33.3%) had two teachers while the remaining 2 (33.3%) had only
one teacher each. This was a clear indication that most of the schools did not have enough teachers for Physics.

4.2 Physics Teachers' Attitudes towards the Physics Curriculum

The first objective of the study was to find out teachers' attitudes towards Physics curriculum. To address this objective, teachers were presented with 11 statements to establish their attitude towards Physics. They were required to state their agreement levels on a 5-point likert scale. The scale ranged from 1-5, with 1 denoting strongly disagree, 2 representing disagree, 3 denoting undecided, 4 agree and 5 strongly agree. The midpoint of the scale was a score of 3. Any score above 3 therefore denoted that respondents agreed with the statements while scores below 3 signified that respondents disagreed with the statements. Presented in Table 4.6 are the means and standard deviations obtained.
Table 4.6: Physics Teachers' Attitude towards Physics

<table>
<thead>
<tr>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>D</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I really like Physics.</td>
<td>13</td>
<td>92.9%</td>
<td>1</td>
<td>7.1%</td>
<td>4.93</td>
<td>0.267</td>
</tr>
<tr>
<td>I think in-service. training would assist me in improving my skills for teaching Physics.</td>
<td>10</td>
<td>71.4%</td>
<td>3</td>
<td>21.4%</td>
<td>4.64</td>
<td>0.633</td>
</tr>
<tr>
<td>I look forward to giving students experiments in Physics lessons.</td>
<td>9</td>
<td>64.3%</td>
<td>5</td>
<td>35.7%</td>
<td>4.64</td>
<td>0.497</td>
</tr>
<tr>
<td>I am comfortable to teach any topic in Physics.</td>
<td>6</td>
<td>42.9%</td>
<td>7</td>
<td>50.0%</td>
<td>4.29</td>
<td>0.825</td>
</tr>
<tr>
<td>Physics is fascinating.</td>
<td>5</td>
<td>35.7%</td>
<td>8</td>
<td>57.1%</td>
<td>4.14</td>
<td>1.027</td>
</tr>
<tr>
<td>I find some Mathematical concepts very difficult to explain.</td>
<td>1</td>
<td>7.1%</td>
<td>4</td>
<td>28.6%</td>
<td>2.79</td>
<td>1.122</td>
</tr>
<tr>
<td>In my opinion, Physics is for talented students.</td>
<td>0</td>
<td>0.0%</td>
<td>3</td>
<td>21.4%</td>
<td>2.36</td>
<td>0.929</td>
</tr>
<tr>
<td>Physics is a domain for boys.</td>
<td>0</td>
<td>0.0%</td>
<td>3</td>
<td>21.4%</td>
<td>2.14</td>
<td>0.663</td>
</tr>
<tr>
<td>The facilities for teaching Physics are adequate in my school.</td>
<td>1</td>
<td>7.1%</td>
<td>3</td>
<td>21.4%</td>
<td>2.07</td>
<td>1.492</td>
</tr>
<tr>
<td>I am under terrible strain in Physics class.</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>1.79</td>
<td>0.579</td>
</tr>
<tr>
<td>I think Physics is boring.</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>7.1%</td>
<td>1.36</td>
<td>0.842</td>
</tr>
</tbody>
</table>

The mean scores obtained on statements measuring teachers' attitudes towards Physics ranged from 1.36 to 4.93. The highest ranked statements were; I really like Physics (4.93); I think in-service training would assist me in improving my skills for teaching physics (4.64); and I look forward to giving students experiments in Physics lessons (4.64). The lowest ranked statements were; Physics is a boring subject (1.36);
I am under terrible strain in Physics class (1.79); and Physics is a domain for boys (2.14). This was a clear indication that Physics teachers had a positive attitudes towards the subject and also felt that both female and male students were capable of performing well in physics. Figure 4.3 illustrates the overall attitude of teachers towards physics.

Figure 4.3: Physics Teachers' Overall Attitude towards Physics

As shown in Figure 4.3, all Physics teachers had a positive attitude towards Physics curriculum. This is in contradiction with a survey by Tilgner (1990) which showed that over half of all elementary school teachers found teaching science subjects very threatening and ranked sciences at or near the bottom of subjects they preferred to teach (cited in Kelble & Howard, 1994). Interview responses analyzed by Tosun Tarik (2000) during his research on teacher attitude found that the descriptors used by his study participants to describe their feelings about teaching Physics were overwhelmingly negative.
4.3 Students' Attitudes towards the Physics Curriculum

The second objective of the study was to find out students' attitudes towards the physics curriculum. To respond to this objective, physics and biology students were presented with 10 statements on a 5-point likert scale. The scale ranged from 1-5, with 1 denoting strongly disagree, 2 representing disagree, 3 denoting undecided, 4 agree and 5 strongly agree. The midpoint of the scale was a score of 3. Any score above 3 therefore denoted that respondents agreed with the statements while scores below 3 signified that respondents disagreed with the statements. Table 4.7 shows the means and standard deviations obtained.

Table 4.7: Form Three Students' Attitude towards Physics

<table>
<thead>
<tr>
<th>Attitude towards physics</th>
<th>Physics students</th>
<th>Biology students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Deviation</td>
</tr>
<tr>
<td>Physics teacher's role is important for success in physics.</td>
<td>4.36</td>
<td>0.975</td>
</tr>
<tr>
<td>I believe I can get good grades in physics.</td>
<td>4.32</td>
<td>1.090</td>
</tr>
<tr>
<td>I think studying physics will be useful to my career/job.</td>
<td>4.17</td>
<td>1.335</td>
</tr>
<tr>
<td>Physics is an interesting subject.</td>
<td>4.10</td>
<td>1.211</td>
</tr>
<tr>
<td>I enjoyed physics experiments.</td>
<td>3.53</td>
<td>1.576</td>
</tr>
<tr>
<td>Physics teacher is well versed with physics curriculum.</td>
<td>3.38</td>
<td>1.552</td>
</tr>
<tr>
<td>Physics experiments are too complex.</td>
<td>3.16</td>
<td>1.535</td>
</tr>
<tr>
<td>I think physics is for students with special talents.</td>
<td>3.00</td>
<td>1.696</td>
</tr>
<tr>
<td>I like physics more than the other subject.</td>
<td>2.64</td>
<td>1.424</td>
</tr>
<tr>
<td>Physics is difficult subject.</td>
<td>2.57</td>
<td>1.545</td>
</tr>
</tbody>
</table>
As shown in Table 4.7, the mean score obtained by physics and Biology students on aspects measuring their attitude ranged from 2.57 to 4.36 and 1.63 to 3.71 respectively. Majority of the Physics students obtained scores above 3.0 in most statements, meaning they had a positive attitude towards Physics. The highest ranked aspects included: Physics teacher's role is important for success in Physics (4.36); I believe I can get good grades in Physics (4.32) and I think studying Physics will be useful to my career/job (4.17). The lowest ranked aspects were; Physics is a difficult subject (2.57) and I like physics more than the other subjects (2.64). On the other hand, results in Table 4.7 revealed that majority of the Biology students had a negative attitude towards Physics.

From the findings presented in Table 4.7, it emerged that students (Physics and Biology) considered Physics to be a difficult subject. In line with the findings, Mundalamo (2006) indicated that physics was “perceived as difficult, dull, uninteresting subject ...” and that students had very low confidence in their own ability to pass in Physics. This attitude could negatively influence students hence leading to low enrolment of students in Physics. In addition to this, majority of the students considered the teacher’s role as being an important factor in teaching and studying Physics. This was a clear indication that students considered teachers’ roles such as motivating students, goal settings and supporting learning during subject selection.

The negative attitude among Biology and few Physics students could be influenced by various factors among them, one being teachers’ role in teaching physics. This fact must be rendered valuable at its maximum by the teacher, who has to teach content centred around life, use efficient teaching and studying methods, motivate students towards studying sciences and monitor and evaluate the students’ progress, thus
meeting the students' trust. According to Nderitu (2009), teachers should realise that the main aim of science instruction should begin with each child. The teacher should create an educational climate to bring out the maximum potential in every learner. Table 4.8 illustrates overall students' attitude towards Physics.

Table 4.8: Overall Attitude of Students towards Physics

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Subject</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Biology Students</td>
<td>Physics students</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>Very negative attitude</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>Negative attitude</td>
<td>49</td>
<td>53.8</td>
</tr>
<tr>
<td>Neutral</td>
<td>35</td>
<td>38.5</td>
</tr>
<tr>
<td>Positive</td>
<td>3</td>
<td>3.3</td>
</tr>
<tr>
<td>Very positive attitude</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>91</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4.8 show that out of the 91 Biology students, 49 (53.8%) students had negative attitude towards Physics, 35 (38.5%) were neutral whereas three (3.3%) had positive attitude. Among the 129 Physics students, 15 (11.6%) students had negative attitude towards the subject, 87 (67.4%) had positive attitude while four (3.1%) had very positive attitude. Looking at the findings, it emerges that majority of the Physics students had positive attitude towards the subject while majority of the Biology students had negative attitude towards Physics.

Three Biology students showed a positive attitude while 16 Physics students showed a negative attitude towards the subject. This difference in attitude among students revealed that there were some factors which influenced students during subject selection. These factors included peer influence, personal career interest, teachers' competency, parental influence, availability of learning materials, past performances.
4.4 Factors Influencing Physics Teachers’ Attitudes towards Teaching of Physics

The third objective of the study was to find out factors influencing Physics teachers’ attitudes towards the teaching of Physics. To answer this research objective, the study first sought to establish whether Physics teachers had attended in-service training in the last five years. In response, 85.7% of the teachers stated that they had attended training while 14.3% of them reported that they had not attended any training. Table 4.9 shows benefits acquired by Physics teachers from in-service training.

**Table 4.9: Importance of In-service Training among Physics Teachers’**

<table>
<thead>
<tr>
<th>Importance of in-service training</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved teaching method</td>
<td>6</td>
<td>42.9</td>
</tr>
<tr>
<td>Improved lesson planning</td>
<td>3</td>
<td>21.4</td>
</tr>
<tr>
<td>Improvisation of apparatus</td>
<td>2</td>
<td>14.3</td>
</tr>
<tr>
<td>In-corporate ICT in learning</td>
<td>1</td>
<td>7.1</td>
</tr>
<tr>
<td>Not attended training</td>
<td>2</td>
<td>14.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

From Table 4.9, it can be observed that 42.9% of the teachers reported that in-service training helped them to improve their teaching methods, 21.4% improved lesson planning skills while 14.3% were able to improvise on apparatus in the laboratory during the practical lessons. This implies that in-service training had a positive impact towards Physics teachers. The training aimed at equipping teachers with knowledge and practical skills necessary for Physics curriculum implementation. The training therefore helped these teachers to overcome learning obstacles experienced by Physics students (Mestre, 2001). Presented in Table 4.10 are factors influencing teachers’ attitudes towards Physics.
Table 4.10: Factors Influencing Physics Teachers’ Attitude towards Physics

<table>
<thead>
<tr>
<th>Factors influencing teachers’ attitude</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lessons allocated for Physics</td>
<td>13</td>
<td>92.9</td>
</tr>
<tr>
<td>Students’ interest towards the subject</td>
<td>12</td>
<td>85.7</td>
</tr>
<tr>
<td>Availability of teaching and learning materials</td>
<td>11</td>
<td>78.6</td>
</tr>
<tr>
<td>Students attitude towards the subject</td>
<td>10</td>
<td>71.4</td>
</tr>
<tr>
<td>Physics syllabus</td>
<td>9</td>
<td>64.3</td>
</tr>
<tr>
<td>Time allocated in the timetable</td>
<td>7</td>
<td>50.0</td>
</tr>
</tbody>
</table>

As shown in Table 4.10, over 70.0% of the teachers felt that the major factors which influenced their attitude towards the subject were; lessons allocated for Physics, students interest towards the subject, availability of teaching and learning materials and also students attitude towards the subject. Other factors that were mentioned included Physics syllabus, where some of the teachers complained that it’s too wide and also time allocated in the timetable for teaching Physics. These factors had a great impact towards teachers’ attitude on Physics which may also exert some influence on students’ selection of Physics subject and academic achievement.

4.5 Factors Influencing Students’ Attitudes towards Learning of Physics

The fourth objective of the study was to investigate factors that influence students’ attitudes towards learning of Physics. To answer this research objective, students were requested to indicate factors that influence their attitude towards Physics. Table 4.11 presents results that were obtained.
Table 4.11: Factors Influencing Students’ Attitude towards Physics

<table>
<thead>
<tr>
<th>Factors Influencing Student’s Attitudes</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer group influence</td>
<td>213</td>
<td>98.8</td>
</tr>
<tr>
<td>Career interest</td>
<td>190</td>
<td>86.4</td>
</tr>
<tr>
<td>Teachers’ delivery of the subject contents</td>
<td>186</td>
<td>84.5</td>
</tr>
<tr>
<td>Availability of teaching and learning resources</td>
<td>178</td>
<td>80.9</td>
</tr>
<tr>
<td>Physics performance in the previous exams</td>
<td>167</td>
<td>75.9</td>
</tr>
<tr>
<td>Time allocated for the subject</td>
<td>132</td>
<td>60.0</td>
</tr>
<tr>
<td>Students belief that Physics is a difficult subject</td>
<td>129</td>
<td>58.6</td>
</tr>
<tr>
<td>Lack of motivation to work hard in Physics classes</td>
<td>111</td>
<td>50.5</td>
</tr>
<tr>
<td>Teachers’ and parental influence towards subject choice</td>
<td>93</td>
<td>42.3</td>
</tr>
</tbody>
</table>

From the Table 4.11, it is evident that over 70.0% of the students indicated that the major factors which influenced students’ attitude towards Physics were: peer group influence, career interest, teachers’ delivery of the subject content, and availability of teaching and learning resources. Other mentioned factors were teachers’ and parental influence towards subject choice, lack of motivation and students’ beliefs that Physics is a difficult subject. In agreement with the findings, previous studies conducted by Adesoji, (2008); Cokadar & Kulce, (2008), Gardner (1975), Taber, (1992) cited by Lin, (1998) on factors that relate to the students’ attitude towards science subjects found out that: students’ school results in sciences, classmates’ influence, interest in a certain type of career, social view on science and scientists, students’ cognitive style, self-image, social self-perception, teaching methods, the parents’ attitude towards sciences and family’s socio-economic status (parents’ education, jobs and monthly income) were the major factors which influenced students’ attitudes towards science subject.
4.6 Principals’ Attitudes towards Offering of Physics in Schools

The fifth objective of the study was to determine the principals’ attitudes towards offering of Physics in their schools. To respond this objective, school principals were provided with statements measuring their attitude towards offering of Physics in schools. They were required to indicate their agreement levels on a five point likert scale ranging from strongly agree to strongly disagree. Table 4.12 shows results that were obtained.

Table 4.12: Principals’ Attitude towards Physics

<table>
<thead>
<tr>
<th>Attitude towards Physics</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I involve Physics teachers during purchasing of teaching and learning materials.</td>
<td>2</td>
<td>33.3</td>
<td>3</td>
<td>50.0</td>
<td>0</td>
</tr>
<tr>
<td>I ensure there is a Physics laboratory in the school where students can carry out experiments.</td>
<td>2</td>
<td>33.3</td>
<td>2</td>
<td>33.3</td>
<td>0</td>
</tr>
<tr>
<td>I ensure Physics laboratory is well equipped with the apparatus.</td>
<td>1</td>
<td>16.7</td>
<td>3</td>
<td>50.0</td>
<td>0</td>
</tr>
<tr>
<td>I reward best performing students in Physics.</td>
<td>1</td>
<td>16.7</td>
<td>2</td>
<td>33.3</td>
<td>0</td>
</tr>
<tr>
<td>I ensure Physics teachers attend in service training.</td>
<td>1</td>
<td>16.7</td>
<td>3</td>
<td>50.0</td>
<td>0</td>
</tr>
<tr>
<td>I organize academic trips for physics students with Physics teachers.</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>50.0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4.12 shows that over 60.0% of the principals agreed (combined strongly agree and agree) with the following statements: I involved physics teachers during purchasing of teaching and learning materials (83.3%); I ensure there is a Physics laboratory in the school where students can carry out experiments (66.6%) and I
ensure Physics laboratory is well equipped with the apparatus (66.7). This shows that principals had positive attitude towards Physics curriculum in schools.
CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction
This chapter presents a summary of the study findings, conclusion and recommendations of the study. It also suggests areas for further research.

5.1 Summary of the Study Findings
The main objective of the study was to find out students’, Physics teachers’ and principals’ attitudes towards Physics in public secondary schools in Imenti south constituency. Data for the study was collected from six principals, 14 physics teachers and 220 students (91 Biology and 129 Physics students), giving a total of 240 respondents. The following are the main study findings of the study:

5.1.1 Physics Teachers’ Attitudes towards Physics Curriculum
The study established that majority of the Physics teachers had a positive attitude towards Physics curriculum and also felt that both female and male students were capable of performing well in Physics. In addition, results revealed that most of the teachers felt that in-service training assisted them in improving knowledge and skills necessary for teaching Physics.

5.1.2 Students’ Attitudes towards the Physics Curriculum
In relation to this objective, the study found out that majority (67.4%) of the Physics students had a positive attitude towards the subject while majority of the Biology students (53.8%) had a negative attitude towards Physics. However, three (3.3%) Biology students showed a positive attitude while 16 (12.4%) Physics students showed a negative attitude towards the subject. This difference in attitude among students revealed that there were some factors which influenced students during
subject selection. These include such factors as peer influence, personal career interest, teachers’ competency, parental influence, availability of learning materials, past performances.

5.1.3 Factors Influencing Physics Teachers’ Attitudes towards Teaching of Physics

The study established that the major factors which influenced Physics teachers’ attitude were; lessons allocated for Physics, students interest towards the subject, availability of teaching and learning materials and also students attitude towards the subject. These factors had a great impact towards Physics teachers’ attitude on Physics which also exert some influence on students’ selection of Physics subject and academic achievement.

5.1.4 Factors Influencing Students’ Attitudes towards Learning of Physics

From the findings, it emerged that the major factors which influenced students’ attitude towards Physics were: peer group influence, career interest, teachers’ delivery of the subject content and availability of teaching and learning resources.

5.1.5 Principals’ Attitudes towards Offering of Physics in Schools

Regarding this objective, the study findings revealed that school principals had positive attitude towards Physics curriculum. Over 60.0% of the respondents reported that they: involved Physics teachers during purchasing of teaching and learning materials and also ensured schools had Physics laboratories that were well equipped with the teaching and learning materials. This shows that most of the principals in Imenti South constituency supported Physics curriculum implementation in their schools.
5.2 Conclusion

From the findings of the study, it can be concluded that principals and Physics teachers had positive attitude towards Physics curriculum. Majority of the Physics teachers felt that both female and male students were capable of performing well in Physics and therefore, Physics should not be dominated by male students. Pertaining to students' attitude towards Physics, the study established that majority of the Physics students had positive attitude towards the subject while most of the Biology students had negative attitude towards Physics. However, the two groups perceived Physics as being a difficult subject and therefore stated that the teacher's role had a great impact towards their attitude in the subject.

5.3 Recommendations of the Study

In the light of the research findings, the following recommendations were made:

i. Owing to the fact that majority of the Biology students had negative attitude towards Physics and both groups (physics and Biology students) perceived physics as difficult subject, then effort should be made to improve the students' attitude towards Physics. The school environment should be conducive for students to express themselves without fear so that their concerns are understood and attended to promptly and adequately.

ii. The study established that Physics teachers' played a great role in influencing students' attitude towards Physics. The government through Ministry of Education should ensure that Physics teachers are provided with constant workshops and seminars. This would help them to be conversant with the changing Physics curriculum and also improve their teaching methodologies.
iii. The school administrators should ensure that Physics laboratories are adequately equipped. This would help to improve students' hands-on ability and experience besides triggering an inquisitive and analytical mind.

5.4 Suggestions for Further Research

i. A study should be conducted to find out students' gender preference of the science subjects especially Biology and Physics.

ii. A similar study should be carried out in other districts to find out whether the same findings would be obtained.
REFERENCES


APPENDIX A

QUESTIONNAIRE FOR STUDENTS

You have been selected to participate in this research. It is strictly meant for academic purposes only. Thus, any information that you give will be treated with confidentiality. Answer the questions by filling in the blank spaces or by ticking (✓) where necessary.

PART ONE

1. Your gender [ ] Male [ ] Female

2. How many subjects will you register for Kenya Certificate of Secondary Education (K.C.S.E)?
   [ ] Seven [ ] Eight

3. Did you freely choose the subjects you are doing?
   [ ] Yes [ ] No

4. If No, in (3) above, who influenced you most on your choices of optional subjects?
   [ ] My guardian
   [ ] My teachers
   [ ] My friends
   Others (specify)...

5. How would you rate your performance in physics in Form Two?
   [ ] Very good
   [ ] Good
   [ ] Fair
   [ ] Poor

6. If you are taking Physics:
a) How did you arrive to that choice

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.................................................................................................................................
.................................................................................................................................

b) Is the subject difficult?

[ ] Yes  [ ] No

c) If yes, what makes difficult?

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7. If you are given another chance to make your subject choices, would you take Physics?

[ ] Yes  [ ] No

Explain ..............................................................................................................................

7. In what ways do you think Physics will be useful to you in future?

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.................................................................................................................................
.................................................................................................................................

8. Tick (✓) the area of study in physics that you consider easiest

[ ] Waves  [ ] Optics
[ ] Mechanics  [ ] Thermodynamics
[ ] Atomic and Nuclear Physics  [ ] Electricity and magnetism

9. From the areas in 8. Above indicate the most difficult area of study

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PART TWO

Questions 10, 11, and 12 are meant for students who are not taking Physics.

10. Why did you drop the physics? .................................................................

11. Give three careers (jobs) that you would like to join most after completing your education. List the jobs in order of preference

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.............................................................................................................................
.............................................................................................................................

12. What should be done to make Physics more popular?

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13. You are kindly requested to state your level of agreement in relation to each of the given items on a Five-point likert scale. Insert a tick (✓) in the most appropriate column. Use the key below when responding

Key: SA=Strongly agree, A=Agree, D=Disagree, SD=Strongly disagree

<table>
<thead>
<tr>
<th>Statements</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Think, physics is an interesting subject.</td>
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<tr>
<td>I like physics more than other subjects.</td>
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<tr>
<td>Physics is less descriptive and more mathematical.</td>
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<tr>
<td>Physics is a difficult subject for me.</td>
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<tr>
<td>Many topics in physics are too abstract.</td>
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<tr>
<td>I enjoy physics experiments.</td>
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<tr>
<td>Physics experiment are too complex for me.</td>
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<tr>
<td>I believe I can get good grades in physics.</td>
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<tr>
<td>I think physics is for students with special talents.</td>
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</tbody>
</table>
My past performance in physics before selection influenced my choice.

I think studying physics will be useful to my career/job.

I believe that physics is a domain for boys.

The physics teacher role is important for my success in physics.

The physics teacher knows a lot about physics.

The physics teacher positively remarks influenced me in to taking physics.

THANK YOU FOR YOUR COOPERATION
APPENDIX B

QUESTIONNAIRE FOR PHYSICS TEACHERS

This research is meant for academic purpose. It is geared towards carrying out an analysis of attitudes towards physics and how students uptake of the subjects is affected kindly you are requested to respond to all questions. Responses to these questions will be treated as confidential.

PART ONE

1. Your gender [ ] Male [ ] Female

2. Is physics optional in your school [ ] Yes [ ] No

(b) If yes, what reasons do student give for dropping the physics in Form Two

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3. What are the your academic qualifications

[ ] S1

[ ] Approved teachers

[ ] Dip

[ ] B.E.D (SC) BSC

Others (Specify) .................................................................

4. For how long have you taught physics?

[ ] 1-5 yrs [ ] 5-10 yrs

[ ] 10-15yrs [ ] Above 15 yrs

5. Have you attended any in-service training in the last five years

[ ] Yes [ ] No

b) If yes, how has it helped you in delivering content in class?

..........................................................................................................................
6. Which instructional method do you prefer using often?

[ ] Lecture method
[ ] Question and answer
[ ] Demonstration
[ ] Group work
[ ] Class experiment

7. Do you consider physics syllabus to be too wide?

[ ] Yes          [ ] No

b) If yes, what should be done?

[ ] Increase number of physics lessons
[ ] Reduce the syllabus content

Any other, please explain………………………………………………………………………………………………

PART TWO

8) You are kindly requested to state your level of agreement in relation to each of the given items on a Five-point likert scale. Insert a tick (✓) in the most appropriate column. Use the key below when responding

Key: SA=Strongly agree, A=Agree, D=Disagree, SD=Strongly disagree

<table>
<thead>
<tr>
<th>Statements</th>
<th>SD</th>
<th>A</th>
<th>UD</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I really like physics.</td>
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<tr>
<td>Physics is fascinating.</td>
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<tr>
<td>I think physics is boring</td>
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<tr>
<td>I am under terrible strain in physics class.</td>
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<tr>
<td>Physics is too abstract.</td>
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<tr>
<td>I find some mathematical concepts very difficult to explain</td>
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</tbody>
</table>
The facilities for teaching physics are adequate in my school.

In my opinion, physics is for talented students.

Physics is a domain for boys.

I think in-service training would assist me in improving my skills of teaching physics.

I look forward to giving students experiments in physics lessons.

THANK YOU FOR YOUR COOPERATION
APPENDIX C

QUESTIONNAIRE FOR PRINCIPALS

This research is meant for academic purposes. It is meant to analyze attitudes towards physics in secondary schools. Kindly you are requested to provide answers to these questions as honestly and precisely as possible. Responses to these questions will be treated confidentially. Answer the questions by filling in the blanks or by ticking (✓) where necessary.

PART ONE

1. Category of school
   [ ] Mixed    [ ] Girls only    [ ] Boys only

2. How many streams are there in your school.............................................

3. Indicate the number of students taking Physics, Chemistry and Biology subjects in Form Three in your school

<table>
<thead>
<tr>
<th>Subject</th>
<th>No of students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
</tr>
<tr>
<td>Physics</td>
<td></td>
</tr>
<tr>
<td>Chemistry</td>
<td></td>
</tr>
<tr>
<td>Biology</td>
<td></td>
</tr>
</tbody>
</table>

4. How many physics teachers are there in your school?
   a) Female ......................... Male.................................
   b) Are they enough?  [ ] Yes   [ ] No
   c) If not how many more are required?..........................................

5. Which subjects are you trained to teach

..................................................................................................................
6. What factors (s) if any limits the number of students who should take physics in your school?

[ ] Number of teachers

[ ] Learning facilities

[ ] Students performance in physics

Any others, specify .................................................................

7. How can the number of students taking physics in form 3 be increased?

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8. In your own opinion do you think physics should be made an optional subject

[ ] Yes  [ ] No

a) Explain your answer

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........................................................................................................

9. You are kindly requested to state your level of agreement in relation to each of the given items on a Five-point likert scale. Insert a tick (✓) in the most appropriate column. Use the key below when responding

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<table>
<thead>
<tr>
<th></th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I involve physics teachers during purchasing of teaching and learning materials</td>
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<tr>
<td>I ensure there is a physics laboratory in the school where students can carry out experiments</td>
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<tr>
<td>I ensure physics laboratory is well equipped with the apparatus</td>
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<tr>
<td>I reward best performing students in physics</td>
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<td></td>
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<tr>
<td>I ensure physics teachers attend in service training</td>
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<tr>
<td>I organize academic trips for physics students with physics teachers</td>
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</tbody>
</table>

**THANK YOU FOR YOUR COOPERATION**
THIS IS TO CERTIFY THAT:
Prof./Dr./Mr./Mrs./Miss/Institution
Edith Mugito Kiruki
of (Address) Kenyatta University
P.O.Box 43844-00100, Nairobi
has been permitted to conduct research in
Location
District
County

on the topic: Analysis of attitudes towards Physics in secondary schools in Imet South Constituency of Meru County, Kenya.


Applicant's Signature

Secretary

National Council for Science & Technology.