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## **Influence Of Students And Teachers Attitudes On Students Enrollment In Physics In Secondary Schools In Imenti South Constituency , Meru County, Kenya**

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**Abstract:** The study examined the influence of students and teachers attitudes on students' enrolment in Physics in secondary schools in Imenti South constituency of Meru County. This study was premised on the component theory of attitudes and self-efficacy theory. The study adopted a descriptive survey design. The target population was composed of 138 physics teachers 1,864 students and 61 principals from 61 public secondary schools in Imenti South Constituency. Purposive sampling was used to select six principals 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 and Physics teachers as well as interview guidelines for principals in the selected schools. The main finding was that both female and male students had a positive attitude towards Physics and were capable of performing well in the subject. The major challenge thwarting students' enrolment in Physics was the inadequacy of teaching and learning resources that limited the range of instructional techniques used by teachers to teach the subject effectively. The study recommended that the Government of Kenya, through the Ministry of Education, should ensure that Physics teachers are provided with adequate instructional resources to facilitate adoption of more learner-friendly teaching methods that attract more students to enrol in the subject. [217 words]

**Keywords:** Students and Teachers Attitudes, Learning, Physics, Secondary Schools, Imenti South Constituency, Meru County, Kenya.

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### **I. Introduction**

#### **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 and 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. 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. It was against this background that this study was prompted to examine the influence of the attitudes of both teachers and students on students’ enrolment in Physics in Imenti South Constituency, Meru County.

### **State of the Art Review**

Despite the importance of physics in the technological development of our nation, students’ low enrollment has been singled out as a challenge to the teaching and learning of the subject. 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. Simpson 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 are 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.

It is not also clear whether low enrolment could also be linked to instructional methods used to teach the subject. 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.

The other problem could also be linked to the attitudes of physics teachers who probably do not 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). 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).

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 those 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.

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 & Skryabina 2003). 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 this 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

The second factor is related to the interest of the learner and teacher. 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 (Haussler & 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 (Bowell, 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).

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. 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.

### **Purpose and Objectives 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. The objectives of the study were to:-

- i. Examine the enrolment and performance profile of students in Physics
- ii. Find out the Physics teachers' attitudes towards the physics.
- iii. Find out the students' attitudes towards the physics.
- iv. Investigate factors that influence the Physics teachers' attitudes towards the teaching of Physics.
- v. Investigate factors that influence the students' attitudes towards the learning of Physics

### **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 cognitive 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 & 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- which 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.

## **II. Research Design And Methodology**

### **Design and Locale of the Study**

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, 2009a, 2009b). It can be suitable in a study that involves the collection of information concerning current status of the subject of the study to determine and report the way things are (Gay, Mills & Airasian, 2009; Orodho, 2012).

The study was carried out in Imenti south constituency, Kenya. The constituency has a total of 61 secondary schools offering students for Kenya Certificate of Secondary Education (KCSE) Examinations. The constituency was considered for this study because it has schools of all categories, that is, girls, boys and co-educational schools.

### **The Target Population and Sampling Techniques**

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, 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. 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.

### **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.

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; Orodho, 2009b). This is vital as it enables the reliability of the instruments to be determined. 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 formula:

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

Where;

r = Correlation coefficient

N = Sample,

∑ = Summation of scores,

D = Deviation

$$\frac{2r}{1+r} \quad \text{(Where Items are doubled)}$$

$$SH = \frac{2r}{1+r} \quad \text{(Spearman Brown)}$$

A reliability coefficient of 0.7 or above was accepted as recommended by Gay (Orodho, 2012; Brooks, 2013).

The validity of the research instruments, which according to Borg and Gall (1989) validity is the degree to which a test measures what it purports to measure, was also determined. Validity of an instrument is improved through expert judgment (Orodho, 2012). As such, the researcher sought the assistance of research experts, and experienced supervisors in order to help improve validity of the instrument.

### Data Collection and Analytical Techniques

Before data collection exercise commenced, an introduction letter from Kenyatta University was used to obtain a letter of authorization and permit to collect data from the National Commission for Science, Technology and Innovation (NACOSTI). The authorization letter from NACOSTI enabled the remainder of the research protocol to be followed during data collection. 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 as suggested by Orodho (2009b).

## III. Findings And Discussions

### Student Enrolment in Science Subjects

The first task of this study was to profile the students' enrolment trend in Physics. The enrolment trend in the three core science subjects between 2007 and 2010 academic years is shown in Table 1. From the results illustrated in Table 1, it is evident that 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.

**Table 1.: Form Four Science Subjects Enrolment from 2007 – 2010.**

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

Source: KNEC (2012)

Table 2 also shows the enrolment trend in Physics in South Imenti constituency where this study was carried out. An examination of the data presented in the table indicates that the enrolment trend in the subject has been fluctuating but generally very low compared to the other science subjects such as Biology and Chemistry.

**Table 2: Enrolment in Sciences for National Examination in Secondary Schools in Imenti South Constituency in the Year 2012**

Year	Physics enrolment	Biology enrolment	Chemistry enrolment
2008	645	2331	2754
2009	814	2536	2930
2010	724	2892	3227
2011	785	2916	3433

Source; DEO's Office

The trend from the Tables 1 and Table 2 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 and 2 indicate 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, nearly three quarters 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

### Physics Teachers' Attitudes towards the Physics

The second 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 3 are the means and standard deviations obtained.

**Table 3 : Physics Teachers' Attitude towards Physics**

Statement	SA		A		UD		D		SD		Mean	Std. Dev.
	f	%	f	%	f	%	f	%	f	%		
I really like Physics.	13	92.9	1	7.1	0	0.0	0	0.0	0	0.0	4.93	0.267
I think in-service. training would assist me in improving my skills for teaching Physics.	10	71.4	3	21.4	1	7.1	0	0.0	0	0.0	4.64	0.633
I look forward to giving students experiments in Physics lessons.	9	64.3	5	35.7	0	0.0	0	0.0	0	0.0	4.64	0.497
I am comfortable to teach any topic in Physics.	6	42.9	7	50.0	0	0.0	1	7.1	0	0.0	4.29	0.825
Physics is fascinating.	5	35.7	8	57.1	0	0.0	0	0.0	1	7.1	4.14	1.027
I find some Mathematical concepts very difficult to explain.	1	7.1	4	28.6	0	0.0	9	64.3	0	0.0	2.79	1.122
In my opinion, Physics is for talented students.	0	0.0	3	21.4	0	0.0	10	71.4	1	7.1	2.36	0.929
Physics is a domain for boys.	0	0.0	3	21.4	0	0.0	10	71.4	1	7.1	2.14	0.663
The facilities for teaching Physics are adequate in my school.	1	7.1	3	21.4	0	0.0	2	14.3	8	57.1	2.07	1.492
I am under terrible strain in Physics class.	0	0.0	0	0.0	1	7.1	9	64.3	4	28.6	1.79	0.579
I think Physics is boring.	0	0.0	1	7.1	0	0.0	2	14.3	11	78.6	1.36	0.842

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 attitude towards the subject and also felt that both female and male students were capable of performing well in physics.

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 (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.

### **Students' Attitudes towards the Physics Curriculum**

The third objective of the study was to find out students' attitudes towards physics. 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 shows the means and standard deviations obtained.

**Table 4 : Form Three Students' Attitude towards Physics**

Attitude towards physics	Physics students		Biology students	
	Mean	Std. Deviation	Mean	Std. Deviation
Physics teacher's role is important for success in physics.	4.36	0.975	3.71	1.186
I believe I can get good grades in physics.	4.32	1.090	2.22	1.209
I think studying physics will be useful to my career/job.	4.17	1.335	1.69	1.380
Physics is an interesting subject.	4.10	1.211	2.60	1.316
I enjoyed physics experiments.	3.53	1.576	2.53	1.232
Physics teacher is well versed with physics curriculum.	3.38	1.552	2.71	1.515
Physics experiments are too complex.	3.16	1.535	2.09	1.235
I think physics is for students with special talents.	3.00	1.696	2.44	2.486
I like physics more than the other subject.	2.64	1.424	1.63	0.798
Physics is difficult subject.	2.57	1.545	1.86	1.101

As shown in Table 4, 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, 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.

### Factors Influencing Physics Teachers' Attitudes towards Teaching of Physics

The fourth 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 5 shows benefits acquired by Physics teachers from in-service training.

**Table 5: Importance of In- Service Training among Physics Teachers'**

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

From Table 5 , 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 6 are factors influencing teachers' attitudes towards Physics.

**Table 6: Factors Influencing Physics Teachers' Attitude towards Physics**

Factors influencing teachers' attitude	Frequency	Percentage
Lessons allocated for Physics	13	92.9
Students' interest towards the subject	12	85.7
Availability of teaching and learning materials	11	78.6
Students attitude towards the subject	10	71.4
Physics syllabus	9	64.3
Time allocated in the timetable	7	50.0

As shown in Table 6 , approximately three quarters 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 an 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.

### Factors Influencing Students' Attitudes towards Learning of Physics

The final 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 7 presents results that were obtained.

**Table 7 : Factors Influencing Students' Attitude towards Physics**

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

From the Table 7 , 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 teacher' 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.

#### **IV. Conclusions And Recommendations**

The study thrust of this study was to examine the influence of students and teachers attitudes on students' enrolment in Physics in secondary schools in Imenti South constituency of Meru County. 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.

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. 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.

The overall conclusion was 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.

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.

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