INFLUENCE OF GENDER AND PERCEPTIONS OF MOTIVATING FACTORS ON STUDENT' ACHIEVEMENT IN SECONDARY SCHOOL PHYSICS IN TINDERET SUB-COUNTY, KENYA

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DECLARATION AND RECOMMENDATION

Declaration

I declare that this is my original work and has not been previously published or presented for the conferment of any degree or award of any diploma in this or any other university.

Signature …….. Date ……..…….

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Recommendation

This thesis has been submitted for examination with our approval as the University Supervisors.

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DEDICATION

To my late Dad, Wycliffe, mother, Cyrilla, wife, Maria, daughters, Cynthia and Eva and son Bennett. God bless you.

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My utmost gratitude is to God the Almighty, the source of all knowledge and wisdom for enabling me to successfully write this thesis. I am grateful to Egerton University for giving me a chance to learn in the institution. I am indebted to my supervisors, Prof. Mark Okere and Prof. Johnson Changeiywo for their constructive criticism, suggestions, guidance and encouragement together with their patience throughout all the stages of developing and writing of this thesis. I also wish to thank all those who participated in examining and attended the defenses of this thesis right from proposal stage. Special thanks go to members of Curriculum, Instruction and Education Management department for their support and encouragement, Ministry of Higher education for providing me with the research permit without which this research would not have taken place. The D.C, D.E.O, Heads of schools, Teachers and Students who assisted in data collection and test administration also deserve a special mention. Thanks too to my colleagues, Eric Wekesa and William Andahi who assisted in coding during analysis in proofreading and editing the final manuscript. Last but not least may I thank my family for their prayers, patience, moral and economic support, I cannot thank them enough.

ABSTRACT

In Kenya, the performance of secondary school students in physics is a matter of great concern to the Ministry of Education because physics is among the key subjects expected to make Kenya realize vision 2030. The performance at secondary school level has been poor for a long time. It is possible that gender influences performance of physics as a subject since there is a long standing belief that physics is a domain of male students**.** This study focused on the Influence of Gender and Perceptions of Motivating Factors on Students' Achievement in secondary school physics in Tinderet Sub-county, Kenya. The theoretical framework adopted for this was Self-worth theory which suggests that people whether male or female are largely motivated to do what it takes to enhance their reputation in various areas. The research design used for the study was cross sectional survey. The study population was the physics students in the public secondary schools within the study area. It was based on a sample of 300 physics students in form four. Multi-stage sampling was applied in the study to ensure that all types of students were well represented in the study. Data was collected using closed-ended questionnaires and a physics achievement test administered to the students. The validity of the questionnaires and the achievement test were established by three lecturers involved in research because of their vast experience in supervision of post graduate studies. The reliability of the questionnaires were established through a piloting process undertaken on the basis of a sample of 15 students in Nandi East Sub-county and was estimated using Cronbach's co-efficient test. The questionnaires were dully modified to the required standards before they were used to collect data. The data was coded, edited and analyzed using Statistical Package for Social Sciences on basis of descriptive and inferential statistics. All the findings were subjected to significance testing at an alpha level of 0.05.The study added some knowledge to the empirical research by revealing that boys performed better than girls in the Physics achievement test. Factors that were significant in influencing students' achievement in Physics were: school type, career expectations, love for Physics and student gender. The study also established that access to text books and lab facilities were very significant in motivating students towards achievement in Physics. Other factors that motivated students were other students' co-operation, students' obedience/ discipline and love for Physics. The study recommends that there is need for schools to encourage girls towards performing better in Physics through active guiding and counseling departments. Motivation factors such as access to text books and lab facilities should be enhanced so as to improve the performance of secondary schools in Tinderet Sub-County. The findings may provide a solution to the unbalanced performance in physics at KCSE level. It would also be of benefit to secondary school teachers and students in planning, setting and implementing performance targets in physics.

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ABBREVIATIONS AND ACRONYMS

ANOVA	**:**	Analysis of Variance
DEO	**:**	Sub-County Education Officer.
EFA	**:**	Education for All
KCSE	**:**	Kenya Certificate of Secondary Education
KNEC	**:**	Kenya National Examinations Council
MDG	**:**	Millennium Development Goals
MOEST	:	Ministry of Education Science, and Technology
NCST	**:**	National Council for Science and Technology
SMASSE	**:**	Strengthening of Mathematics and Sciences in Secondary School Education
SPSS	**:**	Statistical Package for Social Sciences
PE	**:**	Physical Education
PAT	**:**	Physics Achievement Test.
UNESCO	**:**	United Nations Educational, Scientific and Cultural Organization.
USA	**:**	United States of America.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

The World Conference on "Education for All" (EFA) held in Jomtien, Thailand in 1990 declared education a basic human right (United Nations Educational, Scientific and Cultural Organization) (UNESCO, 1990). This was deemed achievable if access to basic education was fair to all gender. Achievement in Education, according to human capital theory is a fundamental indicator of quality human resource required for increased productivity (Republic of Kenya (RoK), 2005). It is a very critical factor for an individuals' upward mobility regardless of gender (Featherman & Hauser, 1978). In America, the notion of equal educational achievement has historically been supported by the researchers. However in spite of this fact, some groups have achieved more than others (Kluguel & Smiths, 1986). The researchers further observed that 83% of American people believed that boys from upper socio-economic background had a better chance to achieve higher grades than girls.

In Latin America, the increased investment and target interventions to the children's educational achievement especially girls from low-income families and vulnerable schools have succeeded in improving the overall students' educational achievement, (Psacharopoulos & Woodhall, 1985). However, children particularly boys from well-off families who attend private schools achieve higher scores (Aedo, 1998; McEwan & Carnoy, 2000; McEwan, 2001).In a study by Court and Kinyanjui (1980) on gender and academic achievement in secondary schools it was concluded that by the early 1960s, girls from the newly independent African countries were seriously disadvantaged. In Kenya and Tanzania for example, boys' academic achievement in sciences like physics was far above that of the girls.

All over the world, performance of secondary school students in physical sciences particularly physics has challenged scholars for a long time (Okere, 1996). Performance in its simplest sense refers to the achievement of set objectives or targets (Sagimo, 2002). However, in terms of secondary school education, it is more complex because it concerns the ability of students to achieve a particular grade in a specific examination subject apart from the ability of the teacher in question to facilitate students in achieving the grade (MOEST, 1987).

Students' achievement in sciences is critical because scientific knowledge particularly of Physics is fundamental for socio-economic development (Changeiywo, 2000). Physics as a science is central to the promotion of public's scientific knowledge about the physical world, sharpening of logical thinking amongst the youth, technological advancement, and promotion of positive attitude towards science education and provision of solutions to critical societal problems (Kluguel & Smiths, 1986). Physics is one of the science subjects in secondary school education that offers the greatest opportunity for discoveries that have fundamental and philosophical importance to humanity (Sagimo, 2002).This is because it provides understanding of the essential primal forces for example the interaction of celestial bodies at billions of meters of separation and of nuclear constituents at about 10^{-15} meters separation (Dainton, 1972).

Science and Technology is a means through which many world nations have attained economic development (Okere, 1996). Technological advancement is attained through science based courses at the university and other technical institutes. However, the performance of students in science subjects like Physics, Chemistry and Biology in secondary school is fundamental to the success of these more advanced Science and Technology programmes (Imbeywa, 2007).

It is against this background that the Kenya government realized the importance of science subjects and facilitated several reforms in curriculum and education policy aimed at improving students' achievement in these subjects. The reforms targeted both students and teachers (Ministry of Education, Science and Technology) (MOEST, 1987). The most recent intervention for science teachers is a programme entitled Strengthening of Mathematics and Sciences in Secondary School Education (SMASSE) and education reform programme in which 540 billion Kenya shillings are being spent on improvement of education with special emphasis on performance in technical subjects and sciences like physics (Aduda, 2005).

In Kenya, the performance of secondary school students in physics is a matter of great concern to the Ministry of Education Science and Technology because physics is among the key subjects expected to turn Kenya into an industrialized country by the year 2030 (Njoroge, 2004; Githua, 2002). The performance has been poor for along time and is getting worse

especially among the female students. This points at the possible influence of gender issues in the performance of physics as a subject (Ramani, 2004) while in 1981 Kelly established that students' achievement in science subjects is assuming gender dimensions. According to Wertheim (1995), there is a long standing belief that mathematical sciences are meant for male students and male teachers**.** Aduda (2004) further established that Performance of girls in science subjects in Kenya has not shown significant improvement for many years .

Tsuma (1998) noted that there is a school of thought in the field of sociology which holds the view that science has in-built features which inhibits girls from studying it. He further notes that boys bring with them to the science class, the conception of masculinity while girls bring with them feminist conception. This has led to more boys than girls studying science subjects especially physics in secondary schools. According to Mbilinyi (2000), the gender division of labour outside school environments acts as an obstacle for girls and women's physics education in terms of space and time to engage in studies. He further documented a higher performance of girls in single sex girl's boarding schools as compared to girl's day schools

According to Fetcher (1972), girls should not be taught physics except at the most elementary level, because the expenditure of enormous energy involved in the mastery of the analytical concepts in physics would be injurious to their health. Though such an argument may seem ridiculous today, the critical question is how far we have really progressed because up to now, far fewer girls than boys study physics and always achieve lower grades as exemplified in Table 1.

Table 1.1:

Students' Performance in KCSE Physics by Gender and Year (2004 -2009 KCSE)

YEAR	TOTAL NUMBER OF CANDIDATES	FEMALE		MALE	
		Entry Phy	Mean %	Entry Phy	Mean %
2004	222,676	16,966	31.41	43,116	35.25
2005	260,665	19,288	32.85	50.136	35.99
2006	243,453	21,376	39.07	51,123	40.82
2007	276,239	23,767	39.04	59,506	42.23
2008	305,015	26,322	36.10	66,326	36.95
2009	337,404	29,233	29.93	74,955	31.88

Source; KNEC KCSE Examination Report, 2003 P63, 2005 P68, 2007 P66 and 2010 P65

This is proven by the continued poorer girls' performance in national examinations. According to Mbilinyi (2000), many science teachers assume that males have superior performance than females while in terms of positions at work, most women with physics education are relegated to the lowest levels of seniority. This tends to demoralize the school-going girls from laying emphasis on physics.

According to Aduda (2003), many female students encounter a chilly climate in physics classes and given an option in science subjects, fewer girls opt for physics. Fennema and Sherman (1978) found out that girls experience a drop in their self confidence in physics before they experience an overall academic decline. This is attributed to the differential treatment boys and girls receive from teachers in schools. In fact most classroom activities applied by the teachers in the teaching of physics appeal more to boys than girls. This has seriously contributed to the faulty perception that physical sciences especially physics and chemistry are a domain of male students (Shaffer, 1972).

The persistent under representation of girls in secondary school physics classes in many countries constitute a big challenge for physics education reform movements which aim to recruit and retain students in physics (Rowe, 1978). The Kenya National Examinations Council report of 2007, further attests to this. According to the report, in that year only 19.2% of the girls sat for physics at KCSE and ended up with a lower performance relative to that of boys. According to Tsuma, (1998), the poor performance of students in science subjects especially Physics at KCSE has led to few students taking science based courses at the university. The under performance in physics is more among female students than male students. These factors have contributed to gender dominance of male in science related careers in Kenya (Gicheru, 2002). Mbilinyi (2000) found that gender planning is essential in physics education.

Okere (1996) points out that the quest for better performance strategies in physics as a subject has been on for a long time while according to George (2006), creativity and interest energizes motivation which is critical in effective teaching and learning processes. He further found that motivation on its own can influence a student in such a way that the pattern of motivation becomes a pointer to his future career. Secondary schools in Tinderet Sub-County in the Nandi County are victims of poor performance in KCSE physics. The situation is worsened by the manifestation of gender imbalance in the performance and frequent complaints in the general public about inadequate student motivation. It is against this background that this study was designed to investigate the influence of gender on secondary school students' achievement and motivation in physics.

1.2 Statement of the Problem

There is a concern among all stakeholders about the continuous poor performance of secondary school students in physics (KNEC, 2007). This is exercabated by the imbalance in the performance of girls and boys whereby the girls perform poorer than the boys. This point at the possibility of gender influencing the students' achievement. This poor and unbalanced performance in physics may be attributed to learners' inadequate motivation. However, up to now, the exact influence of gender and motivation factors on students' achievement in physics particularly in Tinderet Sub-County which is characterized by gender imbalances and widespread public outcry about inadequacy in student motivation has not been established and documented. It is against this background that this study was designed to establish the

influence of gender and perceptions of motivating factors on students' achievement in secondary school physics in Tinderet Sub-county, Kenya.

1.3 Purpose of the Study

This study sought to investigate the influence of students' gender and perceptions their motivating factors on their achievement in secondary school physics examinations among secondary schools in Tinderet Sub-County of Kenya.

1.4 Objectives of the Study

This study was guided by the following objectives;

i) To determine the influence of students 'gender on secondary school students' achievement in physics in Tinderet Sub-County.

ii) To determine the influence of motivation on achievement of secondary school students in Physics in Tinderet Sub-County.

1.5 Hypotheses of the Study

On the basis of the objectives of the study, the research was further guided by the following null hypotheses;

H_O1: There is no statistically significant influence of gender on students' achievement in physics in secondary schools in Tinderet Sub-County.

H_O2: There is no statistically significant influence of motivation on secondary school students' achievement in Physics in Tinderet Sub-County.

1.6 Significance of the Study

It is hoped that the results of this study would contribute to the expansion of knowledge in the field of physics education towards improvement of students' achievement. The findings would provide a solution to the otherwise continuous poor and unbalanced performance in physics at KCSE level. It would be of benefit to secondary school teachers and students in planning, setting and implementing performance targets in physics. Physics teachers would also benefit from the findings by using them to scale up the approaches to teaching and classroom management. The findings would provide an opportunity for critical understanding of the importance of students' motivation in physics education. Education administrators and policy makers, curriculum developers, teachers and other stake holders would use these findings in setting strategies to improve physics education. The findings of this study,

especially those that would be published may be essential instruments in the training of future physics teachers. A part from these, the recommendations of this study would facilitate identification of new unexploited areas for further research and hence stimulate generation of more knowledge for development.

1.7 Scope of the Study

The study was carried out in Tinderet Sub-County within the Nandi County in the republic of Kenya. It focused on the influence of gender and perceptions of motivating factors on students' achievement in physics in public secondary schools. Only Form Four students from public secondary schools under the Sub-County Education Officer's jurisdiction were included in the study because they were assumed to have maximum exposure to gender factors and motivation. They were also assumed to have covered more physics content as compared to lower classes in secondary school.

1.8 Limitations of the Study

The study specifically and only covered Tinderet Sub-County; therefore the findings were only generalized to public secondary schools within the Sub-County and not any other. For more conclusive result all the schools could have been studied. However; the researcher took into consideration the fact that motivation of learners in private schools could differ and thus the study was restricted to public secondary schools. The researcher also appreciated the unique demands of each school i.e. co-educational and non-co-educational schools. Apart from this, some respondents did not exhaustively give the information sought by the questionnaires; hence the findings from the study were only based on the information that was provided and hence the study findings need to be generalized with caution.

1.9 Assumptions of the Study

The study was based on the following assumptions;

i) There was no disruption of the schools' programmes due to strikes or other disasters during the period of the study.

ii) The researcher also presupposed that the students would co-operate and answer the questions of the test items and questionnaires as requested.

iii) All teachers under the study area had been trained and have at least been exposed to motivation of learners and gender differences.

1.10 Definitions of Terms

For the purpose of this study the following terms were operationalised as follows:

Achievement: This refers to the action of accomplishing something typically by effort, courage or skill (Githua, B.N, 2003). In this study achievement is considered as the performance as measured by scores in a test or examination.

Equity: This refers to treatment of different views or opinions equally and fairly. Fairness, social justice (Herman, S. 1999). In this study it shall refer to the fair distribution of students in terms of examination grades in relation to boys and girls.

Gender: It refers to the differential differences of males and females on the account of their different sexes based on socio-cultural grounds (Bandura, 1997). In this study gender shall refer to the social position assigned to boys and girls.

Influence: The effect of one thing (or person) on another. It is the effect of gender on achievement in Physics.

Measurement: The act or process of assigning numbers to phenomena according to a rule (Kathuri, N.J. 1993). In this study it will be considered as the assigning of value or score to determine the achievement for boys and girls.

Motivation: The psychological feature that arouses an organism to action towards a desired goal; the reason for the action; that which gives purpose and direction to behavior (Steers, R.M. 1999). In this study will refer to the desire to achieve a goal combined with the energy to work towards that goal.

Motivation factor: The study of the motivation and how it affects achievement of secondary school students in their physics examinations (Steers, R.M. 1991).

Secondary School: A school for students intermediate between elementary school and college. It is the school between primary school and college.

Secondary School Physics: Syllabus of Physics covered within secondary schools.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature related to the study. It focuses on importance of physics education, factors affecting students' academic achievement, gender and science education, gender issues and access to science education, motivation and achievement in education. Finally the chapter concludes with Theoretical and Conceptual frameworks which guided the study.

2.2 Importance of Physics Education

The majority of physicists agree with the fact that man studies physics in order to satisfy his curiosity about the world he lives in since this is the aim of all sciences. For example the study of Physics enables us to understand the physical world because it is through physics that we seek solutions to phenomena like composition of matter, forces that hold particles of matter together and what makes the sky to be blue (Okere, 1996).

It is generally believed that a study of the techniques and results of physics experiments and investigations expands and disciplines the mind to think more logically, clearly and creatively in all areas of invention (Mwangi, Chiuri & Mungai, 2001). According to Shaffer (1972), the study of physics allows objective thinking and the association of cause with effect to replace superstition and belief in magic. The teaching of science and physics in particular is meant to promote positive scientific attitude in our society. For example, Feldman (1986), commented that, "the most important means for achieving a build-in scientific attitude is through the curriculum as it relates to the formal education of the young and the informal education of the a child".

The concept of creativity is used in various fields of the study and the meaning attached to it varies from one field to another. For example Glasersfield (1989) who is recognized as the founder of psychological and mathematical studies defined creativity as a natural mental ability that is inherited. According to him creativity is a composite of intelligence, motivation and power.

The knowledge about importance of physics education is needed by students and educators in Kenya and in Tinderet in particular to satisfy the curiosity of learners about the world they

live in and help them seek solution to phenomena. It also expanded and disciplined their minds to think more logically, clearly and creatively in all areas of invention.

2.3Students' Academic Achievement and Influencing Factors

Academic achievement is a measure of the degree of success in performing specific tasks in a subject or area of study by students after a teaching –learning experience (Changeiywo, 2000), Learners' academic achievement is hampered by the absence of enough and qualified teachers and adequate classrooms with the required number of desks and chairs to accommodate the required number of learners (UNESCO, 1990).

The deficiency of teachers, textbooks, instructional materials, classrooms, desks and chairs may lead to poor pupils' academic achievement. This is because pupils' academic achievement depends on these important educational inputs (Herman, 1989). Porter (1991),asserts that, quality results in education have to do with the way the inputs are transformed into output, This essentially focuses on the quality of human and material resources or inputs available for teaching and learning which determine the quality of the results output, which is in this case pupils' academic achievement.According to Glasser (1990) some people feel that performing well in school leads to taking a prestigious course at the university, which is seen as a stepping stone to a successful future. Besides that, this kind of thought leads to working hard so as to get good grades and always outshine others. Conventionally in Kenya a mean grade of C+ and above in sciences in KCSE is considered to be the bridge to a prestigious science based course at the university and other middle level colleges (Muya 2000).

The need for achievement is clear characteristic of a case in which satisfaction is obtained by striving to attain a high level of excellence. People with high achievement targets need to compete against set standards and prove that they can be successful at the end of the task. Similarly, they avoid unchallenging situations especially those in which success is unlikely to be attained (Bandura, 1997).In contrast, the need for achievement tends to close tasks that are very easy in order to avoid embarrassment of failure. They are mainly motivated extrinsically by a desire to avoid failure (Bempechat, 1999). Students with positive self–concept and self confidence are enthusiastic and able to take initiative, work independently, feel proud of their accomplishment and are quick to recover from experience of failure (Walter, 2000).

Self-confidence triggers enthusiasm and optimism. It motivates people to pursue their goal and to preserve in the face of obstacle (Melhi, 2001). For students, self-confidence enhances the ability to attain academic success. People with low self-confidence generally under-estimate their capabilities and sub-sequentially establish less challenging or mediocre goals for themselves (Walter, 2000).What fails most students at higher classes in secondary school is the fact they do not follow instructions and they lack self- confidence. Students should be taught how to come out of ambiguous and conflicting situation that erodes their self-confidence. Problem solving and decision making skills when taught help students build up self- confidence. In all science class situations, enhancing self-confidence would encourage high achievement; however, care should be taken to avoid causing overconfidence which can be counterproductive (Melhi, 2001).

Students who have an interest in science tend to like the subject and hence work hard to do well. This may however not be true always, sometimes students may like a subject taught but still perform poorly. This gives a difference between 'like' and 'interest'. 'Like' is more of affection while 'interest' is more of cognition (Feldman, 1996).Students who have interest in science subjects develop unique view of the subject (National Science Board, 2006). They exhibit an observable characteristic like spending more time on science projects, learning about wildlife and studying scientific models.

It is advisable for a person to have a certain threshold level of anxiety. This is because anxiety affects an individual's achievement depending on its level. There are so many agents that cause anxiety but the most common among students includes stress, shyness and fear. According to Sigmond Freud, anxiety is an intense, emotional experience that acts as signal to ego and may arise from fears or irrational impulses (Feldman, 1996). People develop a range of defense mechanisms to deal with anxiety when faced with a challenging situation. Defense mechanisms are unconscious strategies people use to reduce anxiety by concealing the source from themselves and others. According to Freudian theory, when using defense mechanisms people engage a large amount of psychic energy there by lowering their performance in whatever activity they are undertaking (Kimble, Garmezy and Zigler, 1990).

A student with high anxiety level will be expected not to do well in academic and more so in science subjects. Apart from physical signs, depressed persons show more signs of great sadness, pessimism, guilt, self-dislike, self-accusation and suicidal ideas (Bempechat, 1999). A depressed student seems vulnerable to loss of source of reward. Depressed students tend to

remember their incorrect answers to questions better than they remember the correct answers. The depression leads to helplessness where a person blames failures on personal fault considered to be pervasive and persistent. A depressed person has almost zero intrinsic motivation (Weiner, 1999).

Individuals with specific phobia or fear feel anxious in a given situation or when anticipating it. Persons with generalized phobia may have chronic anxiety symptoms. They generally develop fear that the situation or activity they are facing will lead to public scrutiny (Watkins, 2000).Excessive anxiety impairs performance in such a way that individuals with social phobia are shy; they perceive social rejection and have greater academic impairment (Schneir, Johnson, Homing, Liebowitz & Weiner, 1992).

The knowledge about student's achievement and the influencing factors made it easier for schools in Kenya and Tinderet in particular to understand the measure of the degree of success in performing specific tasks in a subject or area of study by the students after a teaching-learning experience. This is because the students' academic achievement depends on education inputs like teachers, textbooks, instructional materials, classrooms, desks and chairs. It also helped understand that self-confidence triggers enthusiasm and optimism. It motivates people to pursue their goals and preserve in the face of obstacles. It also helped understand that self-confidence enhances the ability to attain academic success.

2.4 National Enrolment and Performance in Physics; 1999 – 2009.

The enrolment for physics has also been lower than for the other science subjects. Furthermore, more boys than girls opt for physics. Table 2 gives the comparison of the number of candidates enrolling for the subject and their performance between the year 1999 and 2009.

Table 2.1:

Performance in Physics in the Period 1999 – 2009.

Year	Paper	Enrolment	Maximum mark	Mean score	Standard deviation
1999	1A		70	26.43	17.46
	1B		80		
	2		40	16.63	7.27
	Overall	35,061	190	43.07	22.88
2000	1A		70	26.24	15.44
	1B		80		
	2		40	17.94	8.19
	Overall	40,061	190	43.81	21.94
2001	1A		70	20.94	15.50
	1B		80		
	2		40	14.56	7.17
	Overall	54,645	190	35.24	20.00
2002	1A		70	24.61	18.05
	1B		80		
	2		40	17.06	8.23
	Overall	54,180	190	41.55	24.80
2003	1		70	27.34	18.70
	2		80		
	3		40	16.15	6.82
	Overall	55,877	190	44.06	23.90
2004	1		70	25.31	16.47
	2		80		
	3		40	22.54	8.10
	Overall		190	47.84	22.00
		60,082			
2005	1		70	27.92	16.71
	2		80		
	3		40	21.27	7.84
	Overall	69,424	190	49.18	23.00
2006	1		80	24.00	15.62
	2		80	35.75	17.05
	3		40	20.88	7.22
	Overall	72,299	200	80.63	37.00
2007	1		80	23.46	13.43
	2		80	33.33	17.93
	3		40	25.85	7.14
	Overall	83,162	200	82.63	35.00
2008	1		80	25.32	14.66
	2		80	24.17	16.34
	3		40	23.92	7.31
	Overall	93,692	200	73.42	35.43
2009	1		80	26.72	16.17
	2		80	20.77	14.23
	3		40	15.22	6.29
	Overall	104,883	200	62.62	34.02

Source; KNEC 2004 P63, KNEC 2006 P68, and KNEC 2008 P66,and KNEC 2010 P65.

At KCSE, all the core science subjects have been expanded into three papers each of which is marked independently. This is advantageous to students because it allows them to have humble time for revision of some subject within the examination period. Beside that they have an advantage in that if the score in one subject is low it can be compensated by high

scores in the next one (Aduda, 2005). However, there is an increasing student's apathy to science. Students see science and particularly physics as uninteresting and uninspiring (Siringi & Waihenya, 2002). This has resulted in continued poor performance in physics (Ramani, 2004; Njoroge, 2004). This is disregarding the fact that it is the bright students who opt to take physics as their optional subject (Siringi & Waihenya, 2002). Table 1 gives the physics performance in Physics in KCSE between 1999 and 2001. The knowledge about national enrolment and performance in physics made it possible for schools and educators in Kenya and Tinderet in particular to know that there is increasing students' apathy to science. This helped them understand how students see science and particularly physics.

2.5 Gender Issues and Access to Science Education

There are several factors that influence educational opportunities in Kenya. The first of it is the historical background of formal education, whereby the colonial administration had little inclination to interest in education facilities for the natives in general. The few opportunities that were available then went to the boys rather than to the girls. The second is the cultural and attitudinal factors. Traditionally, girls were meant to remain at home to assist in house work and later as house wives (UNESCO, 1998).

The third factor is the government educational policies regarding that cost of education. For example by making primary schooling cheaper, it has made it equally accessible to boys and girls. Consequently, there are very slight variations in the numbers of girls as compared to the boys at Primary level. Secondary education on the other hand is more expensive and boys tend to be preferred when it comes to competing for the scarce financial resources. Hence, variations in the number of girls" enrolment as compared to that of boys are therefore greater at this level. For university education, the costs involved are even higher leading to quite significant disparities between the number of boys' and girls' enrolment (Mondoh, 2003).

Since independence, education reviews in Kenya have addressed the issues of gender inequality in the educational system. For instance, the Gachathi report (1976) noted that the girl-child education is less developed than that of boys. This was attributed to the traditional beliefs and prejudices held by people regarding the roles and occupations of women in the society. To many parents, the education of boys was considered as a far much better investment than that of girls for whom secondary education is often considered a sufficient education level to accompany their biological maturity for marriage. In close relation to the

expectation for marriage, girls are often given many more chores in the house than boys thus reducing the time they spend on studies compared to boys (Mondoh, 2003). This of course gives the boys a higher chance of performing better than girls in Kenya's institutions of learning (Odalo, 2000).

In the past, women were advised to venture into careers such as teaching, home economics, nursing and other fields that do not require high passes in mathematics and sciences. Also, mathematics and science are areas that the society and teachers have always tended to regard as being beyond the competence of women (Tsuma, 1998).Therefore to pursue mathematics and science, a woman must unfortunately buck the low expectations of teachers, family and social gender roles in which mathematics and sciences are seen as in feminine and anticipate spending her entire professional life in a male dominated world (Claude, 1997). The knowledge about gender issues and access to science education made it easier for schools in Kenya and Tinderet in particular to understand the factors that influence educational opportunities in Kenya namely; historical, cultural, attitudinal and government educational policies regulating the cost of education which mainly favour the boys as compared to girls.

2.6 Gender Perceptions in Physics Education

Boys and girls differ significantly in physics institutions. Boys achieve higher grades in tests and are more interested in learning physics than girls. With regard to social and linguistic behavior, we claim that boys and girls hold different motions of what it means to understand physics. Briefly, girls seem to think that they understand a concept only if they can put it into a broader world view. Boys appear to view physics as valuable in itself and are pleased if there is internal coherence within the physics concepts learned (Mondoh, 2003).

A good supply of well qualified and enthusiastic physics teachers is vital, because girls, who often lack familiarity with the situations and activities that are common in physics, require more support to negotiate shamed meanings and are therefore more sensitive to poor teaching than boys (Changeiywo, 2001). The physics curriculum must develop students' understanding of how the physics they are learning relates to them, impacts on the modern world and opens up a range of professional and technical career. The whole assessment process must not introduce barriers to the participation of girls in physics. It is easier to shape

girls' interest, behaviour, attitude and curiosity towards science at an early age and sustain the same to adult hood (Mwangi, Chiuri & Mungai, 2001).

Women and girls, who account for over 51 percent of Kenya's population, are significantly underrepresented in the scientific and technological fields, and are unable to contribute to economic development of an extent proportional to their number (Fennema & Sherman, 1978). In the last decade, the Kenyan government has taken steps towards providing the girls with greater access to higher education through various means including admitting female students to public universities with cut-off points that are one point lower than their male counterparts (Changeiywo, 2001).

The knowledge about gender perceptions in physics education made it easier for schools and educators in Kenya and Tinderet in particular to understand why boys and girls differ significantly in physics institutions. It also helped them understand why boys achieve higher grades in tests and are interested in learning physics than girls. This would help them develop the physics curriculum that must develop students' understanding of how the physics they are learning relates to them, impacts on the modern world and opens up a range of professional and technical career.

2.7 Gender and achievement in Science education

Gender continues to play a major role in determining who goes to school, how well they do, and how far they progress. Being negatively associated with enrolment, attainment and performance in the educational system. There is also a belief that boys have a more right to education and/or need it more than girls. (Mondoh, 2003). Many people especially in Africa still hold the belief that women should grow up, marry and have babies and that boys need to be educated so that they can get good jobs (Changeiywo, 2001).

According to Watkins (2000), for most Greek particularly Aristotle and his followers, Science was perceived as a masculine profession calling for masculine gender. Therefore it was men alone and not women who could aspire to pursue science education while women with their defective souls and feminist orientation should pursue weaker and easier subjects. An observation of the performance trends in national examination particularly at secondary school level indicates higher failure rates in mathematics and science subjects and much

higher failure among female students (Mbilinyi, 2000). He further established that the marriage/career matrix also influences students` performance in physics and that the gender division of labour outside schooling acts as an obstacle for girls and by extension women's physics education in terms of space and time to engage in the studies. He also documented a higher performance for girls in single sex girl's boarding schools as compared to girl's day schools. According to (Kimble, Garmezy & Zigker, 1990), many science teachers assume that boys have superior performance than girls. In terms of position at work, most women with physics education are relegated to the lowest levels of seniority.

The significant role of science and technology in the socio-economic development of a country is recognized worldwide (Ogunniyi, 1998). Kenya is no exemption in that she needs to develop through science and technology, a human resource capacity for rapid industrialization, which will ensure economic growth and sustainable development. Strengthening the access of girls and women to science and technology through higher education is one way of addressing this issue (Sjoberg, 1998).

Women remain under-represented in scientific and technological fields despite the fact that they constitute the majority of workers in Africa and account for fifty one percent of the population in Kenya (Mwangi et al, 2001).Women play a major role in family responsibilities, infact; they have been described as the lead managers within the household (World Bank, 1989).

Gender bias refers to the differential treatment of males and females on account of their different sexes based on socio-cultural grounds (Bandura, 1997).Many of the gender differences that are observed between males and females are not usually biological in nature but socio-cultural. Also, it has been found that there is no inherent or biological reason why boys should be better than girls in learning mathematics, science and technology (Changeiywo, 2001).Education is the basis for the full promotion and improvement of the status of women. It is the basic tool that should be given to women in order for their role as full members of society (Republic of Kenya, 1964, P. 28). Despite the unprecedented expansion of the formal education systems and exponential growth in enrolment throughout the third world, the educational participation of girls has notable traits than of boys(World Bank,1989).

The knowledge about gender and achievement in science education made it easier for schools and educators in Kenya and Tinderet in particular to understand the perception and beliefs that science is a masculine profession calling for masculine gender. This helped them understand the significant role of science and technology in the socio-economic development of a country and worldwide.

2.8 Motivation and Achievement in Education

Motivation is a highly complex phenomenon (Glasersfield, 1989). It influences and is influenced by a large number of factors in one's environment (Porter, 1991). The study of motivation is concerned with why individuals think and behave as they do (Mullin, 1999, Weiner, 1992 Wagner, 1999). Motivation is a process that triggers individuals to act as they do (Walter, 2000). Motivation is a drive within the individual necessary to direct that person's actions and behaviour towards the achievements of some goals, and forces, on the fulfillment of certain needs and expectations (Kimble et al, 1990).

In terms of the organizational aspect, motivation focuses on an individual's willingness to put efforts into higher work, and on the amount of efforts, which are made in order to obtain incentives or a special form of incentives (Molander, 1996). According to Porter (1991), the arousal or emerging source of the individual behaviour that directs or channels such behaviour is a force within the individual and environmental forces that provide the individual with feedback. This feedback either reinforces the individual or intensifies his/ her drive and the direction of his/ her energy or discourages the individual to pursue his/ her course of action and redirects his/ her efforts.

The motivational process represents a very general model of human behaviour. This model assumes that individuals hold a number of needs, desires and expectations in varying strengths. Based on these needs and expectations, people act or behave in a certain way that they believe will lead to the desired goal (Mullins, 1999 & Steers 1991). When people engage in behaviors without coercion, it is usually because they were motivated by one of the preceding individual or interpersonal factors (Spaulding, 1992). Motivation occurs when either intrinsic or extrinsic incentives are used. Incentives that motivate performance in one learner may inhibit similar performance in another learner (Mondoh, 2001).

Such cases are common when extrinsic incentives are used. Sometimes extrinsic incentives are perceived as a bribe by the recipient and incase the recipient is the student then this reduces the feeling of self-confidence and may lead to negative feelings that are likely to hinder motivation (Walter, 2000). Weiner (1999) argued that intrinsic incentives enhance learning more than extrinsic incentives, however, both of them are necessary for learning to occur (Mondoh, 2001).

Walter (2000) argued that the issue of external reward is mistaken and it has set schools off on a wrong track. The researcher supported this concept with the fact that when a desire to learn is attached to extrinsic incentives only, it causes lose of interest and creates anxiety which affect performance of a given behavior. Upon combining all these findings, it can be concluded that achievers base more on intrinsic incentives than extrinsic incentives. According to Maslow's theory, human behaviour is stimulated by the urge to satisfy a need. Melhi (2001), Lower needs are first temporarily satisfied before one embarks on satisfying higher needs. Higher needs lead to social oriented motives whose goal is to satisfy a social behaviour. Reinforcement at this point comes from the feeling that the behaviour has enhanced an individual's social acceptance. Such needs are not basic and therefore they are referred to as secondary or learned needs (Walter, 2000). He suggests the classification of social motives into affiliate and prestige/achievement motives.

He further suggests that the satisfaction of this motive comes from within an individual and therefore can be explained in terms of intrinsic drives. Unlike lower needs which are inborn, higher needs are social needs whose satisfaction involves approval by the society. Higher needs cannot be completely satisfied, however whenever such needs are partially fulfilled, the need to fulfill them fully is even greater. The satisfaction of these needs is greatly related to development of interest, creativity and self-confidence within an individual (Spaulding, 1992).

When Maslow`s theory is applied to education, the implication is that learning can help satisfy the need to have safer life. Such conditioned responses are then generalized beyond safety to other essential motivators (Shechman, Reiter & Scannin, 1993). In effort to please and maintain support of peers, secondary school students tend to struggle to attain high level of excellence in class activities. This enhances self-confidence hence creating a positive self-concept and prestige. Prestige motivates the urge for interest, creativity and general

competitive desire to achieve academically. The effort made by a student to score high grades is an expression of created interest that leads to the need to excel.

An individual performs a task in order to achieve certain types of internal states, which he perceives as rewarding (Deci, 1975). Intrinsic motivation relates to psychological rewards such as the recognition of a task completed (Mullins, 1999). Intrinsic motives can be satisfied by the work itself. The task itself is the main source of motivation, since it provides interest, stimulation, challenges, and opportunities for personal growth and achievement to the individual (Molander, 1996). (Deci, 1975) refer to intrinsic motivation need for feeling competent and self-determining. On the one hand, a person will seek out challenges that allow him to behave in ways that provide him with a sense of competence and self-determination while on the other hand; an individual is engaged in a process of conquering challenges.

Extrinsic motivation, on the other hand, refers to tangible rewards such as pay, fringe benefits, work environment, work conditions, and job security (Mullins, 1999). Extrinsic motives cannot only be satisfied by the work itself. That means pleasure comes from something the task leads to, such as money. Porter (1991), for instance, described the fact that increased performance leads to satisfaction with the help of third variable-rewards. They assumed that performance leads to rewards either in the form of extrinsic or intrinsic rewards, which in turn will cause satisfaction. Furthermore, job satisfaction and life satisfaction are related positively and reciprocally to each other. Motivators satisfy a person's need for self-actualization in his/her job and therefore leads to positive feelings towards the work. The motivators are related to the job content, in other words, they are intrinsic. Job related factors that promote job satisfaction are achievement, recognition, work itself, responsibility and advancement (Hackman & Oldham, 1980).

Creativity and interest energizes social needs which are secondary needs and leads satisfaction of social activities. Interest on its own can influence an individual in such a way that the pattern of interest becomes a pointer to the individual's future career (George, 2006).Lack of interest is a recipe for frustration which in turn causes anxiety. Anxiety may rise from such things like unrealistic fear, phobia, depression, irrational impulse among others (Walkins, 2000).

According to Sigmund Freud, stress, depression, phobia and fear which are anti-motivating factors cause extreme anxiety which make people spend a lot of psychic energy in developing defense mechanism in order to counter it. If such a situation happens to a student, it may divert the attention to learning and may cause decline in performance (Kimble, Garmezy & Zigker, 1990).Motivational attributes of the learners that are important predictors of academic achievement in general are also related to educational achievement (Steers, 1991).Highly motivated persons tend to work harder and perform more effectively in their jobs than less motivated individuals. (Steers, 1999).Further argues that highly committed persons expand considerable efforts towards the achievement of a company's goals and values. The knowledge about what motivates and satisfies people at work may be essential to generate such commitment. In other words, a school has to be aware of what motivates and satisfies the learners at school and work place in order to stimulate them to perform better (Sinning and Waihenya 2002). In this study, the researcher aimed to determine the influence of gender and motivation to students' achievement in physics. The knowledge about similarities and differences in the motivation of learners made it easier for schools in Kenya and Tinderet in particular to motivate them and to generate better achievement in KCSE examination. The consideration of individual characteristics such as gender, gender differences and motivation was in the school and provided useful information for the study as intended.

2.9Theoretical Framework of the Study

This study was based on self-worth theory developed by Covington (1984). This theory focused on the notion that people whether male or female are largely motivated to do what it takes to enhance their reputation in various areas. He further propounded this theory by arguing that underachievers engage in objectively counterproductive activities such as setting goals that are far too low, reducing effort, and procrastinating. By doing these they hope that they will feel better about themselves especially if they refrain from putting forth their best effort and risk failure. This theory was supported by Walter (2000) who established that when learners fail, it may be because they lack the skills to succeed, lack sense of efficiency to use these skills well or were not motivated enough. On this basis, physics students will learn and achieve better if they believe that they are good at managing their thinking strategies in a productive manner. This is because self-efficacy helps students employ strategies that support their intrinsic drive, hence, directing their learning and achievement.

2.10 Conceptual Framework

On the basis of the self-worth theory which emphasizes self –confidence, this study was guided by the assumption that the way students perceive themselves in relation to their gender and motivation is likely to have a direct influence on their achievement in physics. The conceptual framework which is based on study objectives, literature review and theoretical framework formed the basis of the study. According to the conceptual framework, students' self-consideration or valuation in terms of gender and level of motivation was expected to influence their achievement in physics. The basic concepts that guided this study were as outlined in the conceptual framework shown in Figure 1.

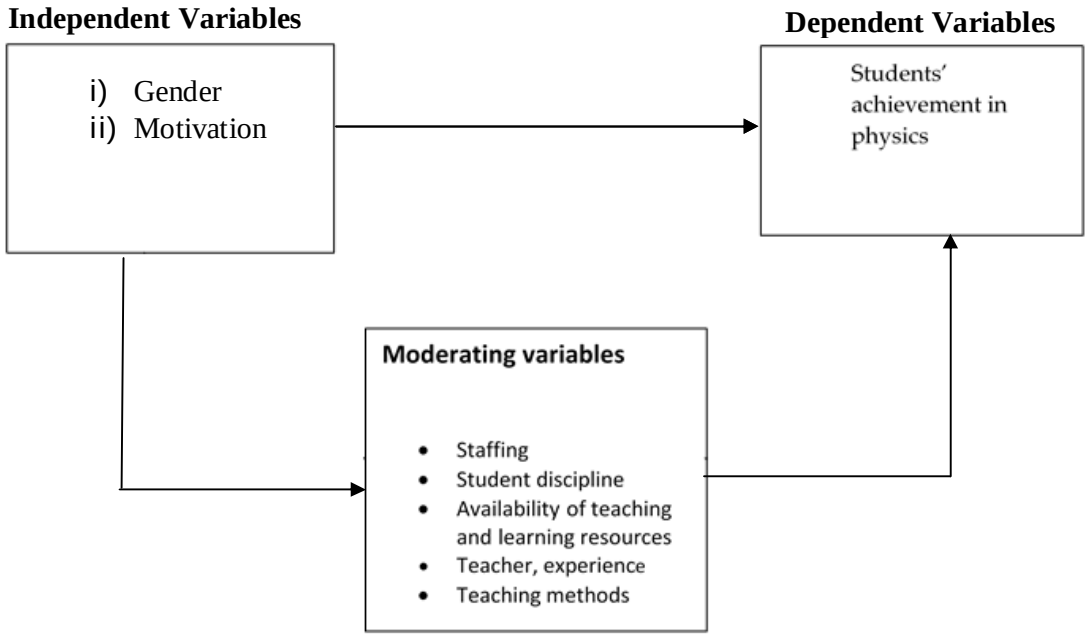

Figure 1.1: Relationship of students' gender, motivation and achievement

In the conceptual framework gender, and motivation form the independent variable and students' achievement in physics is the dependent variable. According to the conceptual framework motivation was expected to be closely related to performance in such way that variations in motivation levels would correlate with that of variations in students' achievement in physics. According to the conceptual framework, it was further expected that the students' achievement in physics examinations would be according to the students' gender in the study area. This conceptual framework of the research proposal was based on interaction of the independent and moderating variables to directly and indirectly influence gender and motivation.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research design, study location, study population, sample and sampling techniques, data collection instruments, validity and reliability of research instruments, data collection procedures, instrumentation and data analysis.

3.2 Research Design

The study utilized cross-section survey research methodology. This is because it facilitates collection of data from a predetermined population at one point in time after the events under investigation have already occurred (Fraenkel & Wallen, 2003). This is further supported by the fact that according to Kothari (2003) the design is appropriate for studies of this nature where the data sought does not have to be captured over several data collection rounds. Kasomo (2007) established that cross-sectional survey is applicable where and when the researcher uses different categories of personnel from a wide geographical area at the same time. This is applicable in this study because the study focused on students of physics from different public secondary schools in the different administrative divisions within the study area.

3.3 Location of the Study

This study was undertaken among the secondary schools in Tinderet Sub-County in the Nandi County of the Republic Kenya. The Sub-County has four administrative divisions and twenty three secondary schools.

3.4 Target population

The target population upon whom the findings of the study were generalized to was all students of physics in the public secondary schools in the study area. The accessible population from whom, a sample of respondents was selected were the form four students studying physics. The form four students were purposively selected for the study because among the public secondary school students, they had maximum exposure to gender issues, motivation factors and physics education. They were perceived to have been in the school longer than the rest. They were therefore able to provide the most reliable information in the study.

3.5 Sampling Procedures and Sample Size

According to Borg and Gall (2003), in cross-sectional, survey studies, involving sub-groups of respondents, the minimum recommended size for each sub-group is 15 respondents. This means that engagement of bigger numbers of respondents is expected to yield superior findings. On this basis, a bigger group of students was used. They were purposively divided into equal sub-groups of male and female in order to ensure gender balance in the study. A sample of 74 students from each administrative division were selected comprising of 52 boys and 22 girls according to the recommendations of Borg and Gall (2003). On the basis of these 4 Divisions in the study area, i.e. Tinderet, Meteitei, Songhor and Kabirer, a sample size of 300 students were used in the study.

This study targeted all the secondary schools in the study area. Each administrative division in the Sub-County was treated as a sub-group or strata therefore stratified sampling was applied in order to ensure coverage of all divisions. The schools selected were: Meteitei Boys, St. Marys' Girls Tach-Asis, St. John Tach-Asis and A.I.C Setek from Meteitei Division, Tinderet Boys, Septon Sec, Sarwot Sec and Got-Ne-Lel Girls from Tinderet Division, Cheptonon Boys, Kamelilo Sec, Senetwo Sec and Songhor Girls from Songhor Division and Kapcheno Girls, Henry Kosgei-Kibukwo Boys, Kabirer Girls and Kibukwo Girls from Kabirer Division. Stratified random sampling was appropriate because according to Fraenkel and Wallen (2003) it enhances representativeness in studies that involve sub-groups of respondents from different geographical areas.

The suitability of stratified sampling for this study was further qualified by the fact that this study would cover students of physics from different categories of secondary schools. The categories were boys and girls schools, day and boarding schools besides single sex and coeducational secondary schools. Among these students purposive sampling was applied to ensure gender balance among the respondents.

The final stage of sampling involved selection of individual respondents from each school. At this point, simple random sampling was applied. This is because according to Kathuri & Pals (1990), simple random sampling gives equal opportunities to all respondents to be selected in the study.

3.6 Instrumentation

Closed- ended questionnaires developed by the researcher were used to collect data. The closed- ended questionnaires are considered suitable because according to Mugenda and Mugenda (2002) they are easier to administer because each question item is followed by alternative answers or choices. They are also economical in terms of time and money and are in a form that is easy to analyze. The first closed- ended questionnaire sought to establish gender differences and motivation status among the students. The second one sought to collect information from the closed-ended Questionnaire. The students were subjected to a common physics test to test their achievement level. The application of the two instruments facilitated correlation of gender differences and motivation levels and students` levels of achievement in physics.

3.6.1 Validity

Post graduate students and lecturers experienced in supervision of postgraduate students from Egerton University were used to validate the questionnaires and the Physics achievement test. They were requested to assess and standardize each question item relative to each objective to ensure relevancy and accuracy. This is because Validity of an instrument is a measure of the extent to which the instrument measures what it is meant or expected to measure (Mugenda and Mugenda, 2002). Validity was also checked during piloting to ensure all the items to be used in the main study were to the required standard.

3.6.2 Reliability

According to Mugenda and Mugenda (2002), reliability of an instrument is a measure of the extent to which a research instrument yields consistent results or data after repeated trials in the study. The consistency of the Questionnaires was established through a pilot process in Kenya Tea Growers Association Taito Secondary School located in the neighboring Nandi East Sub-County. In line with the recommendations of Mugenda & Mugenda (2002) a random sample of 15 students was used during the piloting process. After piloting, the internal consistence procedure was used to determine the reliability of the instruments. This was determined from scores obtained from a single test administered to a sample of subjects. A score obtained in one item was correlated with scores obtained from other items in the instrument. Finally, Cronbach Alpha Reliability Coefficient value was computed to determine how items were correlated. The threshold value accepted in this study was 0.7 and higher

according to (Fraenkel & Wallen, 2000 and Mugenda & Mugenda, 2003). On the basis of the results of piloting process, the instruments were then retained or duly modified to meet performance standards before being used for data collection.

3.7 Data Collection Procedures

An introduction letter was acquired from the Graduate School of Egerton University to facilitate acquisition of a research permit from National Council for Science and Technology. This was followed by formal appointment with the Sub-County administration and principals of secondary schools for permission to collect data. The data were then collected by requesting each of the randomly selected students to fill the structured questionnaire. Students were also subjected to a common knowledge test to determine their levels of achievement.

3.8 Data analysis

After data collection, the items in the questionnaires were coded and the primary data entered into the computer for analysis according to the specific objectives of the study. Statistical Package for Social Sciences (SPSS), a computer programme was used to process and analyze the data mainly using descriptive and inferential statistics as indicated in Table 3. The results were then used to develop this thesis for examination purpose.

Table 3:

Summary of Data Analyses

Hypotheses	**Independent Variable**	**Dependent Variable**	**Statistical tests for quantitative data**
H_o1: There is no statistically significant influence of gender on students' achievement in physics in secondary schools in Tinderet Sub-County.	Gender	students' achievement	- ANOVA - Chi-square
H_O2: There is no statistically significant influence of motivation on secondary schools students' achievement in physics in Tinderet Sub-County.	Motivation	students' achievement	Chi-square

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

The chapter presents results and discussions by giving the demographic characteristics of respondents, determines the influence of gender on secondary school students' achievement in physics in Tinderet Sub-County and determines the influence of gender on motivation of secondary school students in Physics in Tinderet Sub-County.

4.2 Socio – Demographic Characteristics of Respondents

The study sought to find out the background information of the respondents, especially their gender, which was the main independent variable for the study.

4.2.1 Gender

The respondents were asked to indicate their gender and the results were recorded in Table 4.1.

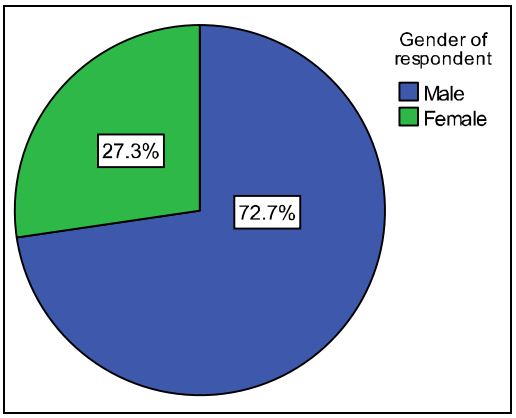

Figure 4.1: Gender of Respondents

A Chi Square test conducted on the students' distribution of gender at 5% level of statistical significance indicated that there was a statistically significant variation ($\chi^2_{1,0.05} = 61.65$; $p<0.05$) in the distribution of gender among students. From the results, 72.7% of respondents were boys while 27.3% were females. This was due to the fact that most of the students who proceeded with physics up to fourth form were boys.

4.3 Influence of Gender on Secondary School Students' Achievement in Physics

The study sought to establish the influence of gender on students' achievement in physics, which was the first objective of this study. To establish this, a physics achievement test (Appendix A) was administered to the sampled form four physics students and the sampled students asked to respond to the questions (Appendix B).

4.3.1 Performance in Students' Achievement Test

A one way ANOVA was conducted on the scores in the physics achievement test to establish if there were any significant variations in the scores for the different gender. The results are given in Table 4.1.

Table 4.1:

ANOVA Results on The Students Scores in PAT

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	685.149	1	685.149	56.854	0.000
Within Groups	3567.136	296	12.051		
Total	**4252.285**	**297**			

F=56.854; df = 1; Critical value for F = 4.00

The results indicate that there was a highly significant difference in the distribution of scores between male and female students.

To afirm this, the mean scores for male and f emale students was determined giving the results in Table 4.2.

Table 4.2:

Mean Scores for Students in PAT by Gender

Gender of respondent	Mean	N	Std. Deviation
Male	12.41	216	3.938
Female	9.01	82	1.696
Total	**11.47**	**298**	**3.784**

From the results, male students had a higher mean score (12.41) than girls (9.01). This implies that in the physics achievement test, boys performed better than girls.

Regression analysis was carried to establish whether statistically significant influence of gender on students' achievement in physics. The results are given in Table 4.3 :

Table 4.3:

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	107.793			
Final	88.391	19.402	1	.000

Link function: Logit.

The results indicate that there was a statistically significant ($p<0.05$) influence of gender on students' achievement in physics. According to Tsuma (1998), mathematics and science are areas that the society and teachers have always tended to regard as being beyond the competence of women. Therefore to pursue mathematics and science, a woman must unfortunately buck the low expectations of teachers, family and social gender roles in which mathematics and sciences are seen as in feminine and anticipate spending her entire professional life in a male dominated world (Claude, 1997).

4.3.2 Influence of Students' Gender on Students' Achievement in Physics

Respondents were asked to indicate the extent to which students' gender influenced their achievement in physics. The responses are given in Figure 4.2.

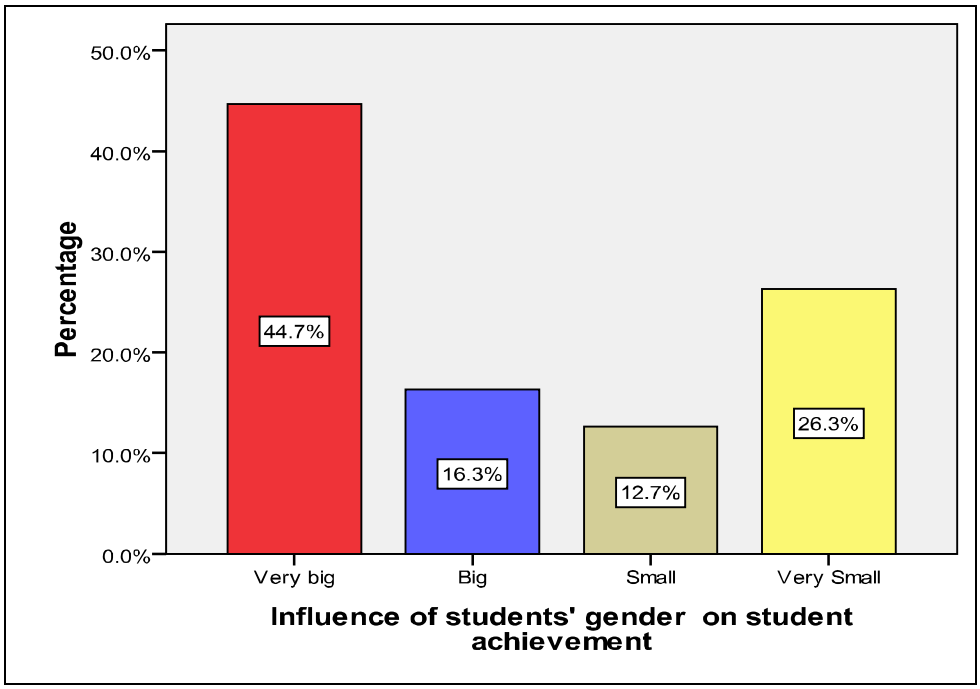

Figure 4.2: Influence of Student Gender on Students' Achievement in Physics in Tinderet Sub-County

A Chi Square test conducted on the distribution of responses indicated that there was a highly significant ($\chi^2_{3,0.05} = 73.89$; $p<0.05$).variation in the distribution of gender among students. From the results, very big influence was represented by 44.7%, big influence 16.3%, small influence 12.7% while very small influence was represented by 26.3%. This implies that most students (61.0%) perceived that students' gender had an influence on their achievement in physics. Mbilinyi (2000), in an observation of the performance trends in national examination particularly at secondary school level indicates higher failure rates in mathematics and science subjects and much higher failure among female students.

Cross tabulation was then carried out to establish the distribution of responses across gender. The results are given in Table 4.3.

Table 4.3:

Cross Tabulation for Students' Gender vs. Influence of Students' Gender on Achievement in Physics

Gender		Influence of students' gender on student achievement			
		Very big	Big	Small	Very Small
Male	Frequency	88	49	20	61
	% within Gender of respondent	40.4%	22.5%	9.2%	28.0%
Female	Frequency	46	0	18	18
	% within Gender of respondent	56.1%	0.0%	22.0%	22.0%

$\chi^2 = 30.24$; df=3, Critical (table) value=7.81

A Chi Square test of independence conducted on the results indicated that there was a highly significant ($\chi^2_{3,0.05} = 30.24$; $p<0.05$) variation in the distribution of responses across the different gender. For male respondents, 40.4% indicated that students' gender had a very big influence, 22.5% for big influence, 9.2% for small influence and 28.0% for very small influence. For female respondents, 56.1% indicated that students' gender had a very big influence, 22.0% for small influence and 22.0% for very small influence.

4.3.3 Influence of Teachers' Gender on Students' Achievement in Physics

The study sought to establish the influence of teachers' gender on students' achievement in physics. Respondents were asked to indicate the extend to which teachers' gender influenced students' achievement in physics. The results were as given in Figure 4.3.

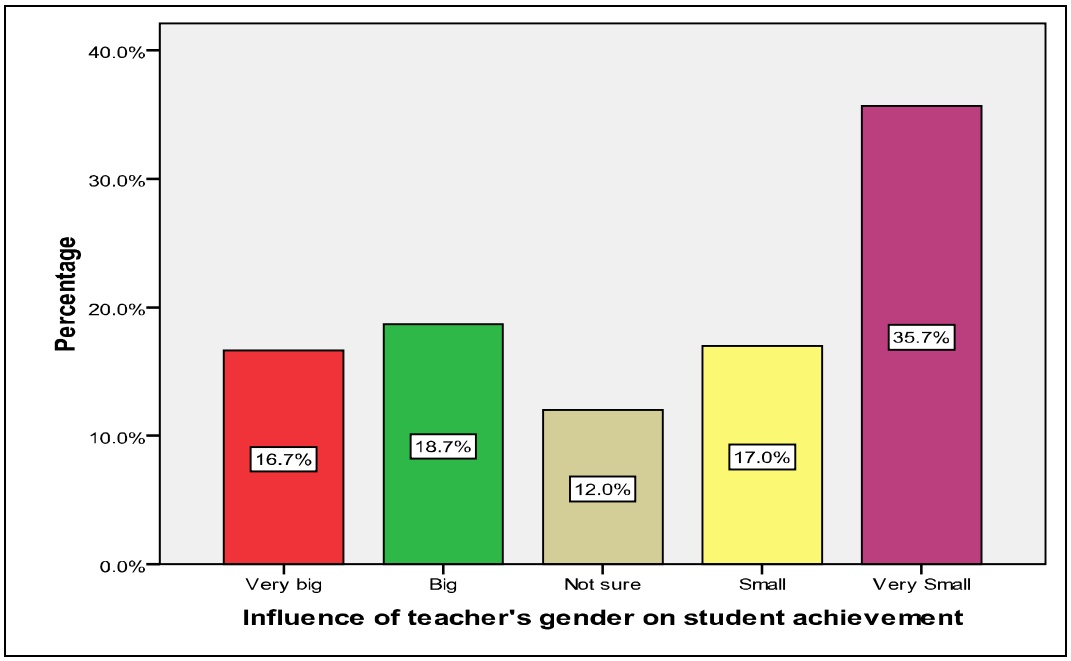

Figure 4.3: Influence of Teachers' Gender on Students' Achievement in Physics

From the responses, 16.7% indicated that teachers' gender had a very big influence, 18.7% for big influence, 12.0% were not sure, and 17.0% for small influence while 35.7% for very small influence. From the results, majority of the respondents were of the opinion that teachers' gender did not have much influence of students' achievement in physics. A good supply of well qualified and enthusiastic physics teachers is vital, because girls, who often lack familiarity with the situations and activities that are common in physics, require more support to negotiate shamed meanings and are therefore more sensitive to poor teaching than boys (Changeiywo, 2001). Thus the gender of the teacher may not be important in influencing academic achievement.

Cross tabulation was carried out to establish the distribution of responses across gender on the extent to which teachers' gender influenced learners' achievement in physics. The results are given in Table 4.4.

Table 4.4:

Cross Tabulation for Gender vs. Influence of Teacher' Gender on Students' Achievement in Physics

Gender		Influence of teacher's gender on student achievement					
		Very big	Big	Not sure	Small	Very Small	Total
Male	Frequency	38	44	30	33	73	218
	% within Gender of respondent	17.4%	20.2%	13.8%	15.1%	33.5%	100.0%
Female	Frequency	12	12	6	18	34	82
	% within Gender of respondent	14.6%	14.6%	7.3%	22.0%	41.5%	100.0%

$\chi^2 = 6.02$; df=4, Critical (table) value=9.49

A Chi Square test of independence conducted on the results indicated that there was no significant variation in the distribution of responses across the different gender ($\chi^2_{4,0.05} = 6.02$; $p<0.05$). For male respondents, 17.4% indicated that teachers' gender had a very big influence on students' achievement, 20.2% for big influence, 13.8% were not sure, 15.1% for small influence and 33.5% for very small influence. For female respondents, 14.6% indicated that teachers' gender had a very big influence on students' achievement, 14.6% for big influence, 7.3% were not sure, 22.0% for small influence and 41.5% for very small influence.

4.3.4 Influence of Initiation Ceremonies on Students' Achievement in Physics

The study further sought to establish the influence of initiation ceremonies on students' achievement in physics. The results are given in Figure 4.3.

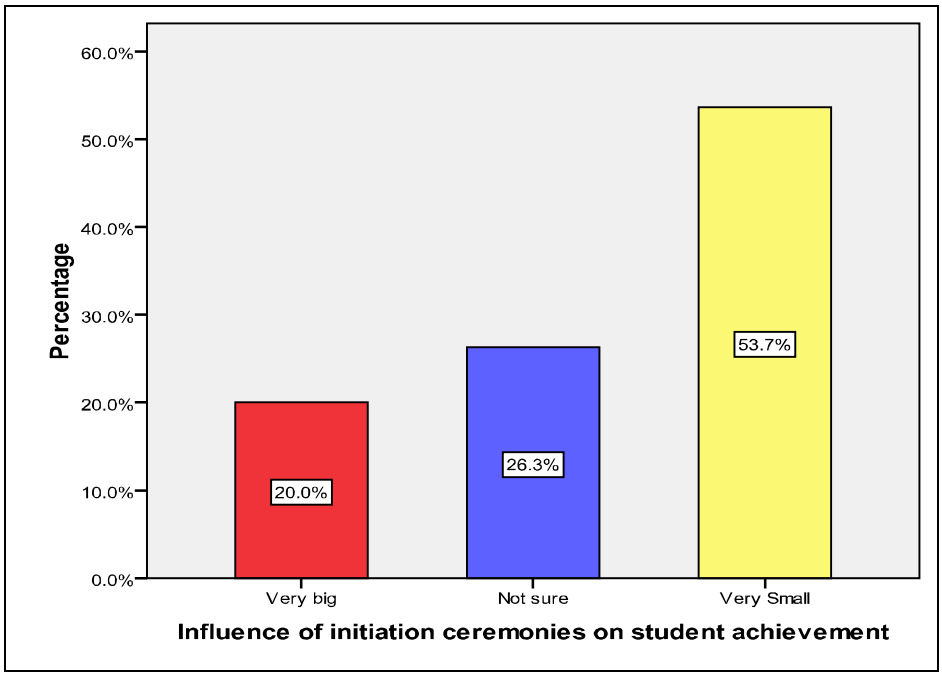

Figure 4.4: Influence of Initiation Ceremonies on Students' Achievement in Physics

Cross tabulation for the influence of initiation ceremonies on students' achievement in physics across male and female students gave the results in Table 4.5. From the results, 20.0% indicated that initiation ceremonies had a very big influence on students' achievement, 26.3% were not sure while 53.7% indicated that it had a very small influence on students' achievement in physics. This shows that initiation ceremonies did not greatly influence students' achievement in physics. Many of the gender differences that are observed between males and females are not usually biological in nature but socio-cultural. Also it has been found that there is no inherent or biological reasons why boys should do better than girls in learning mathematics, sciences and technology (Changeiywo, 2001).

Table 4.5:

Cross Tabulation for Students' Gender vs. Influence of Initiation Ceremonies on Students' Achievement in Physics

Gender		Influence of initiation ceremonies on student achievement		
		Very big	**Not sure**	**Very Small**
Male	Frequency	26	73	119
	% within Gender of respondent	11.9%	33.5%	54.6%
Female	Frequency	34	6	42
	% within Gender of respondent	41.5%	7.3%	51.2%

$\chi^2 = 41.61$; df=2, Critical (table) value=5.99

A Chi Square test of independence conducted on the results indicated that there was a significant variation in the distribution of responses across the different gender ($\chi^2_{2,0.05} = 41.61$; $p<0.05$). For male respondents, 11.9% indicated that initiation ceremonies had a very big influence on students' achievement, 33.5% were not sure while 54.6% indicated that it had a very small influence. For female respondents, 41.5% indicated that initiation ceremonies had a very big influence on students' achievement, 7.3% were not sure while 51.2% indicated that it had a very small influence on students' achievement in physics. From the results, it can be noted that more females were of the view that initiation ceremonies had a very big influence on performance as compared to their male counterparts. Thus there is a likelihood that girls are more affected by initiation ceremonies as compared to male students.

4.3.5 Influence of Domestic Duties on Students' Achievement in Physics

The study aimed at establishing the influence of domestic duties on students' achievement in physics. The results are given in Figure 4.5.

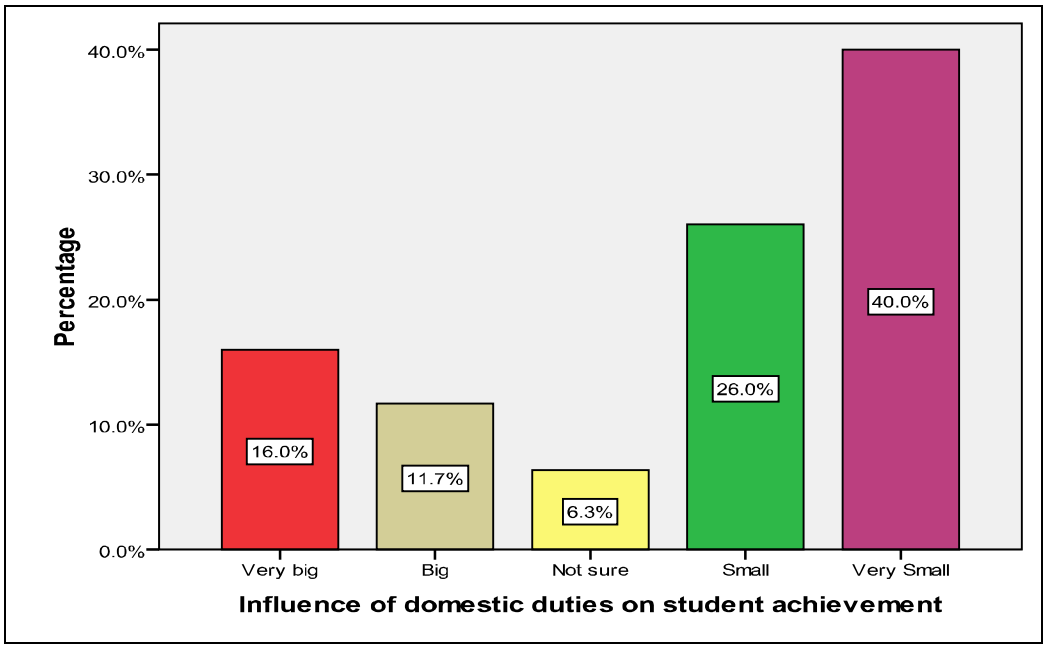

Figure 4.5: Influence of Domestic Duties on Students' Achievement in Physics

From the results, 16.0% indicated that domestic duties had a very big influence, 11.7% for big influence, 6.3% were not sure, 26.0% for small influence and 40.0% for very small influence. The results point out that most of the respondents were of the view that domestic duties did not have much influence of students' achievement in physics. Gender bias refers to the differential treatment of males and females on account of their different sexes based on socio-cultural grounds (Bandura, 1997).

Cross tabulation for students' gender vs influence of domestic duties on achievement in physics gave the results in Table 4.6.

Table 4.6:

Cross Tabulation for Students' Gender vs Influence of Domestic Duties on Achievement in Physics

Gender		Influence of domestic duties on student achievement				
		Very big	**Big**	**Not sure**	**Small**	**Very Small**
Male	Frequency	36	35	19	56	72
	% within Gender of respondent	16.5%	16.1%	8.7%	25.7%	33.0%
Female	Frequency	12	0	0	22	48
	% within Gender of respondent	14.6%	0.0%	0.0%	26.8%	58.5%

$\chi^2 = 30.17$; df=4, Critical (table) value=9.49

A Chi Square test of independence conducted on the results indicated that there was a significant variation in the distribution of responses across the different gender ($\chi^2_{4,0.05} = 30.17$; $p<0.05$). For male respondents, 16.5% indicated that domestic duties had a very big influence on students' achievement, 16.1% for big influence, 8.7% were not sure, 25.7% for small influence while 33.0% indicated that it had a very small influence. For female respondents, 14.6% indicated that domestic duties had a very big influence on students' achievement, 0.0% for big influence, 0.0% were not sure, 26.8% for small influence while 58.5% indicated that it had a very small influence. The results support those of Mondoh (2003) who established that in close relation to the expectation for marriage, girls are often given many more chores in the house than boys thus reducing the time they spend on studies compared to boys. This of course gives the boys a higher chance of performing better than girls in Kenya's institutions of learning (Odalo, 2000).

4.3.6 Influence of School Type on Students' Achievement in Physics

The study also sought to establish the influence of domestic duties on students' achievement in physics. The results are given in Figure 4.6.

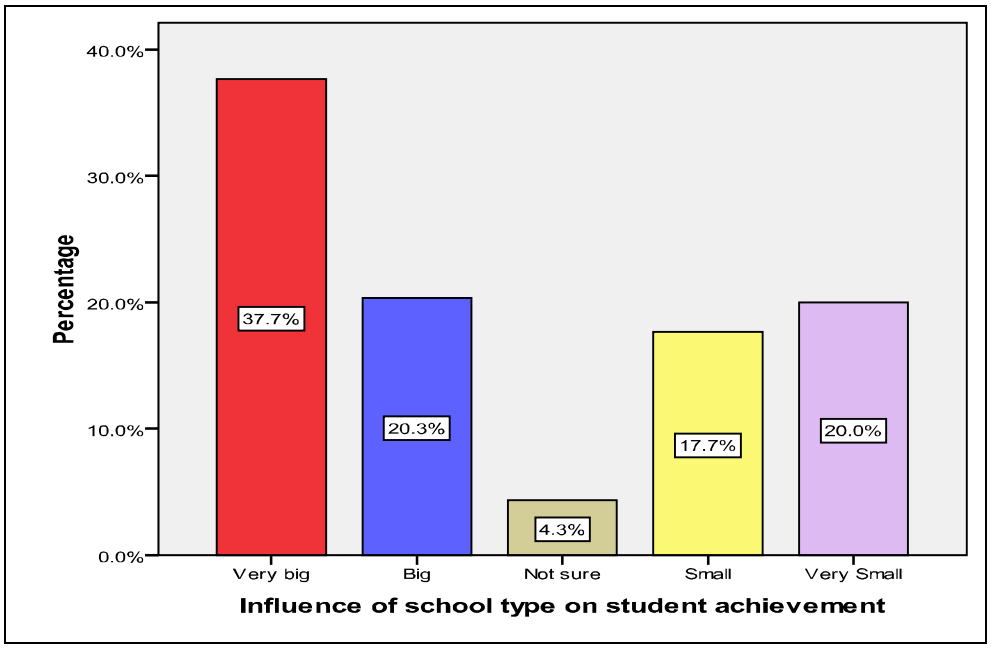

Figure 4.6: Influence of School Type on Students' Achievement in Physics

From the results, 37.7% indicated that school type had a very big influence, 20.3% for big influence, 4.3% were not sure, 17.7% for small influence and 20.0% for very small influence. The results show that most of the respondents (58.0%) were of the view that school type had significant influence of students' achievement in physics. The results are in agreement with those of Mbilinyi (2000) who documented a higher performance for girls in single sex girl's boarding schools as compared to girl's day schools

Table 4.7:

Cross Tabulation for Students' Gender vs Influence of School Type on Achievement in Physics

		Influence of school type on student achievement				
Gender		**Very big**	**Big**	**Not sure**	**Small**	**Very Small**
Male	Frequency	67	43	13	47	48
	% within Gender of respondent	30.7%	19.7%	6.0%	21.6%	22.0%
Female	Frequency	46	18	0	6	12
	% within Gender of respondent	56.1%	22.0%	0.0%	7.3%	14.6%

$\chi^2 = 23.68$; df=4, Critical (table) value=9.49

A Chi Square test of independence conducted on the results indicated that there was a significant variation in the distribution of responses across the different gender ($\chi^2_{4,0.05} = 23.68$; $p<0.05$). For male respondents, 30.7% indicated that school type had a very big influence on students' achievement, 19.7% for big influence, 6.0% were not sure, 21.6% for small influence while 22.0% indicated that it had a very small influence. For female respondents, 56.1% indicated that school type had a very big influence on students' achievement, 22.0% for big influence, 0.0% were not sure, 7.3% for small influence while 14.6% indicated that it had a very small influence. From the results, more females were of the view that school type had a very big influence on performance as compared to the males.

4.3.7 Influence of Adolescent Expenses on Students' Achievement in Physics

The study further sought to establish the influence of domestic duties on students' achievement in physics. The results are given in Figure 4.7.

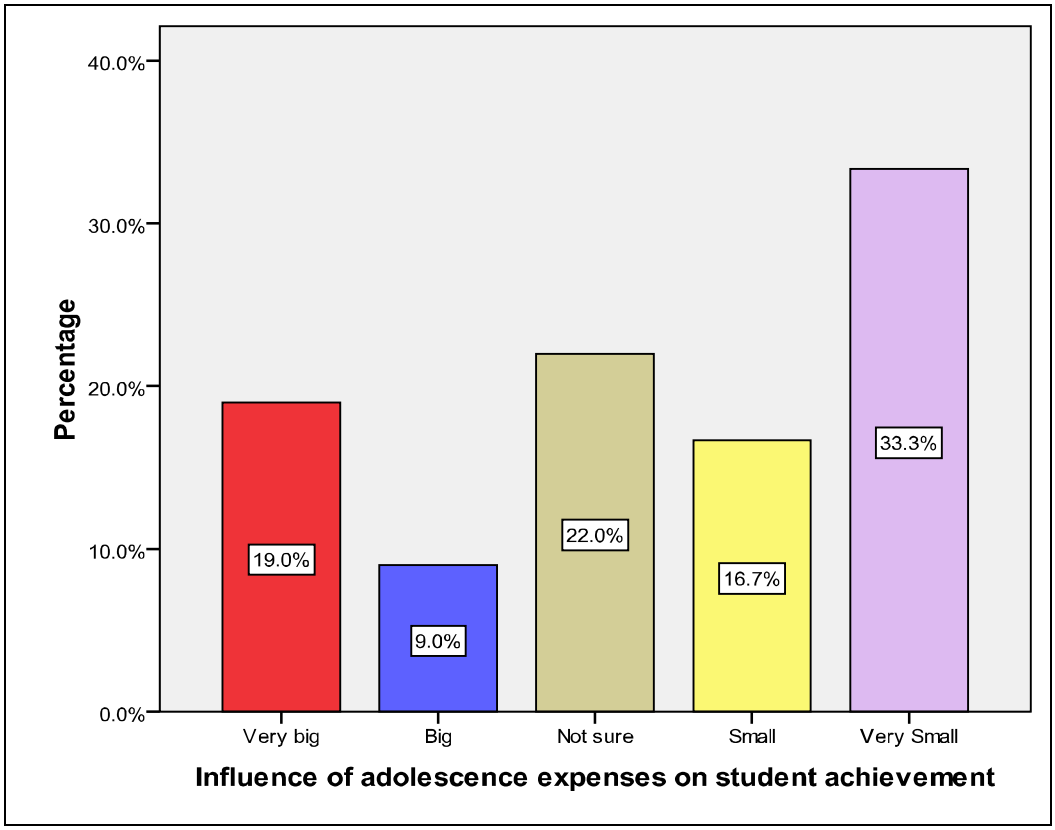

Figure 4.7: Influence of Adolescent Expenses on Students' Achievement in Physics

From the results in Figure 4.7, 19.0% indicated that adolescent expenses had a very big influence, 9.0% for big influence, 22.0% were not sure, 16.7% for small influence and 33.3%

for very small influence. This implies that adolescent expenses did not have a significant influence on students' achievement in physics, as pointed out by the proportion of 'very big' and 'big' responses (28.0%).

Cross tabulation was also carried out to establish the distribution of responses for the different gender. The results are given in Table 4.8.

Table 4.8:
Cross Tabulation for Students' Gender vs Influence of Adolescent Expenses on Students' Achievement in Physics

Gender		Influence of adolescence expenses on student achievement				
		Very big	Big	Not sure	Small	Very Small
Male	Frequency	44	9	45	44	76
	% within Gender of respondent	20.2%	4.1%	20.6%	20.2%	34.9%
Female	Frequency	13	18	21	6	24
	% within Gender of respondent	15.9%	22.0%	25.6%	7.3%	29.3%

$\chi^2 - 28.77;$ df=4, Critical (table) value=9.49

A Chi Square test of independence conducted on the results indicated that there was a significant variation in the distribution of responses across the different gender ($\chi^2_{4,0.05} = 28.77;$ $p<0.05$). For male respondents, 20.2% indicated that adolescent expenses had a very big influence on students' achievement, 4.1% for big influence, 20.6% were not sure, 20.2% for small influence while 34.9% indicated that it had a very small influence. For female respondents, 15.9% indicated that adolescent expenses had a very big influence on students' achievement, 22.0% for big influence, 25.6% were not sure, 7.3% for small influence while 29.3% indicated that it had a very small influence. From the results, a larger proportion of females (37.9%) were of the view that school type had a significant (very big or big) influence on performance as compared to the males (24.3%). Hence girls were more affected in terms of achievement in physics due to adolescent expenses as compared to boys.

4.3.8 Influence of Career Expectations on Students' Achievement in Physics

The study further sought to establish the influence of career expectations on students' achievement in physics. To help achieve this, respondents were asked to indicate the extent to which students' career expectations influenced their achievement in physics. The results are given in Figure 4.8.

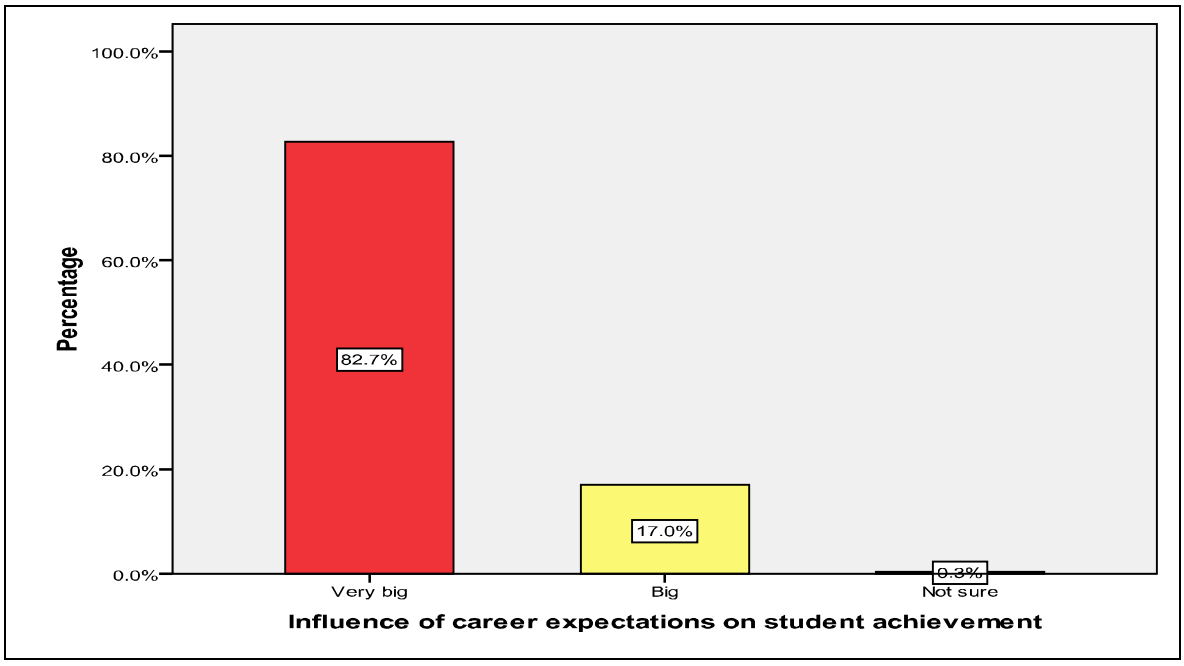

Figure 4.8: Influence of Career Expectation on Students' Achievement in Physics

From the responses, 82.7% of respondents were of the opinion that career expectations had a very big influence on students' achievement in physics, 17.0% indicated that it had a big influence while 0.3% were not sure. The results clearly point out that students' career expectations was very significant in influencing students' achievement in physics. According to Glasser (1990) some people feel that performing well in school leads to taking a prestigious course at the university, which is seen as a stepping stone to a successful future. Conventionally in Kenya a mean grade of C+ and above in sciences is considered to be the bridge to a prestigious science based course at the university and other middle level colleges (Muya 2000).

Table 4.9:

Cross Tabulation for Students' Gender vs Influence of Career Expectations on Students' Achievement in Physics

Gender		Influence of career expectations on student achievement		
		Very big	**Big**	**Not sure**
Male	Frequency	169	49	0
	% within Gender of respondent	77.5%	22.5%	0.0%
Female	Frequency	79	2	1
	% within Gender of respondent	96.3%	2.4%	1.2%

$\chi^2 = 19.29$; df=2, Critical (table) value=5.99

A Chi Square test of independence conducted on the results indicated that there was a significant variation in the distribution of responses across the different gender ($\chi^2_{2,0.05} = 19.29$; $p<0.05$). For male respondents, 77.5% indicated that career expectations had a very big influence on students' achievement, 22.5% for big influence while 0.0% were not sure. For female respondents, 96.3% indicated that career expectations had a very big influence on students' achievement, 2.4% indicated that it had a big influence while 1.2% indicated that it had a very small influence. These results point out how important students' career expectations are in influencing their achievement in physics with girls having a higher expectation.

4.3.9 Influence of Students' Physical Ability on Students' Achievement in Physics

The study further sought to establish the influence of physical ability on students' achievement in physics. To help achieve this, respondents were asked to indicate the extent to which physical ability influenced their achievement in physics. The results are given in Figure 4.9.

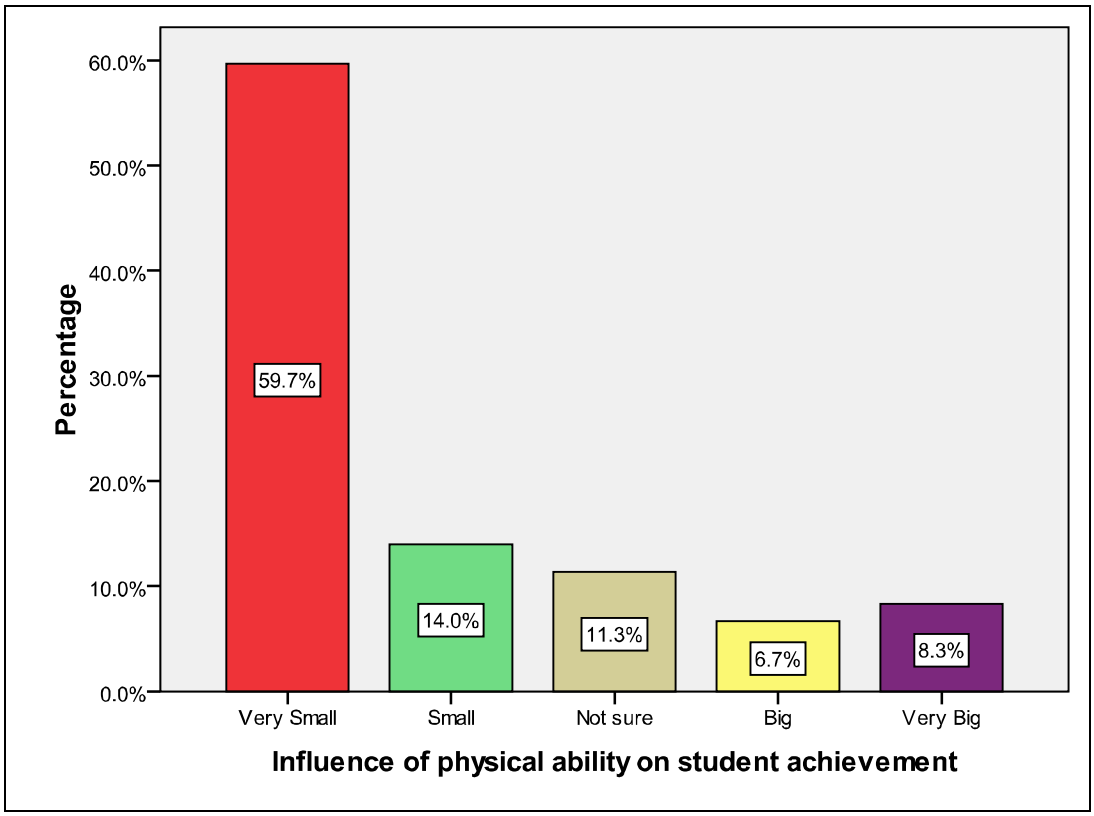

Figure 4.9: Influence of Physical Ability on Students' Achievement in Physics

From the results, 59.7% indicated that students' physical ability had a very small influence, 14.0% indicated that it had a small influence, 11.3% were not sure, 6.7% indicated that it had a big influence and 8.3% for very big influence. This implies that students' physical ability did not have a significant influence on students' achievement in physics, as pointed out by the proportion of 'very small' and 'small' responses (73.7%).

4.4 Influence of Motivational Factors on Secondary School students' Achievement in Physics

The study sought to establish the influence of motivational factors on students' achievement in physics, which was the second objective of the study.

4.4.1 Access to Textbooks

The study sought to establish the extent to which access to textbooks motivated students' towards achievement in physics. The results are summarized in Table 4.10.

Table 4.10: Influence of Access to Textbooks on Students' Motivation Towards Achievement in Physics

Response	Frequency	Percentage
Very big	165	55.0
Big	135	45.0
Total	300	100.0

From the results, 55.0% of respondents pointed out that access to textbooks had a very big influence while 45.0% indicated that it had a big influence in motivating learners towards achievement in physics. This implies that access to textbooks plays a very significant role in enhancing students' achievement in physics. Through textbooks, students are able to read and understand concepts, as well as getting exposed to different exam questions, which help them to perform well in physics. The results support those of Herman (1989) who noted that deficiency of teachers, textbooks, instructional materials, classrooms, desks and chairs may lead to poor pupils' academic achievement. This is because pupils' academic achievement depends on these important education inputs (Herman, 1989).

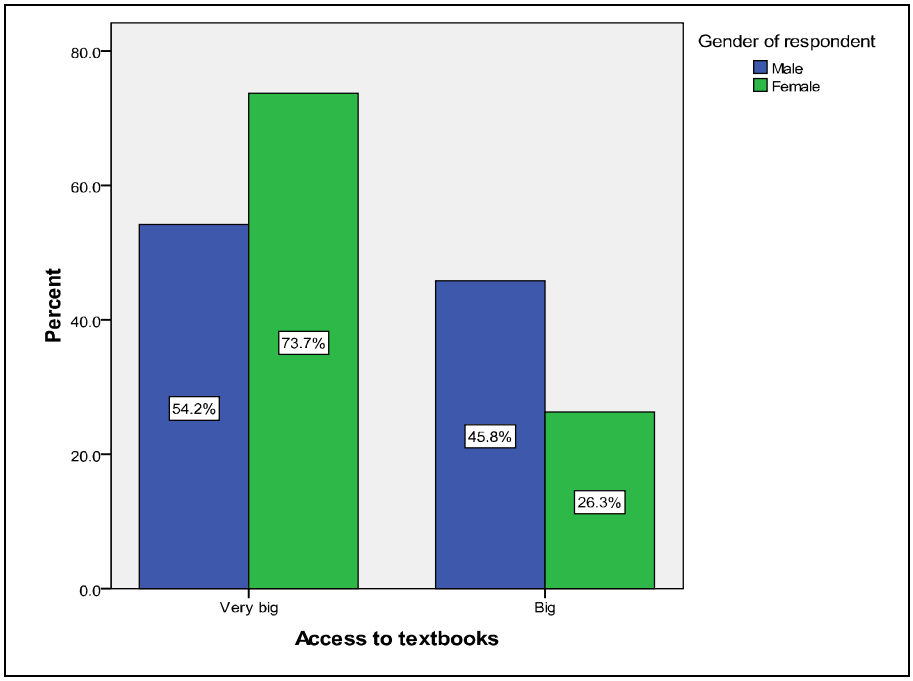

Figure 4.10: Influence of Access to Textbooks on Students' Motivation Towards Achievement in Physics vs Pender of Respondents

The results show that more girls (73.7%) than boys (54.2%) indicated that access to textbooks had a very big influence in motivating learners towards achievement in physics.

4.4.2 Access to Lab Facilities

The study sought to establish the extent to which access to lab facilities motivated students' towards achievement in physics. The results are summarized in Figure 4.11.

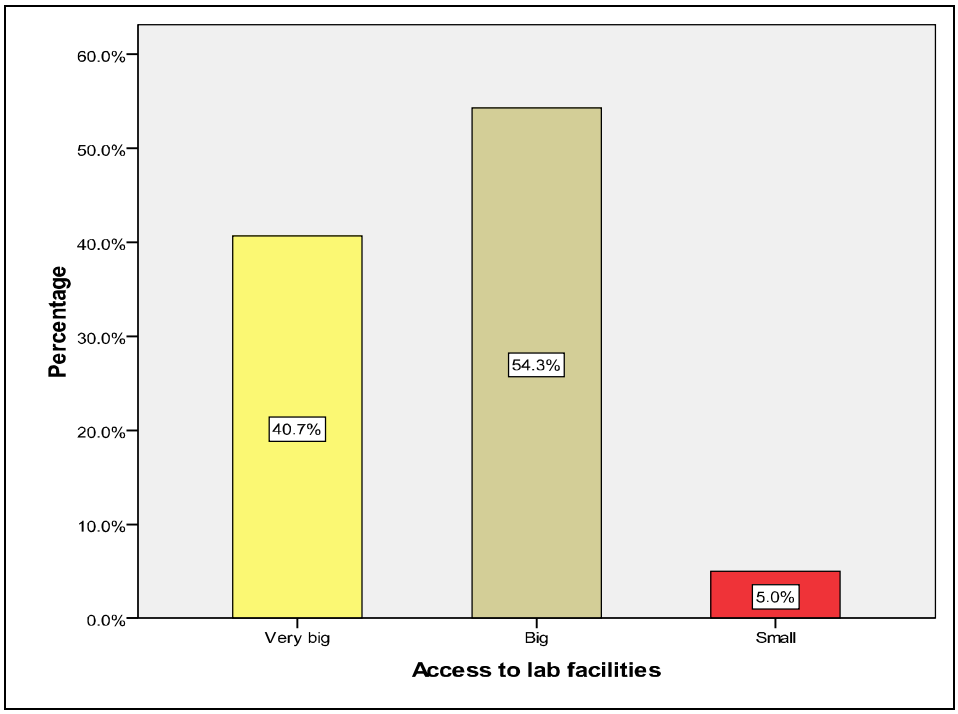

Figure 4.11: Influence of Access to Lab Facilities on Students' Achievement in Physics

The results show that majority of respondents (95.0%) were of the opinion that access to lab facilities played a significant role in motivating students towards achievement in physics. This is supported by a great proportion of the 'very big' (40.7%) and 'big' responses (54.3%). Only a few of the respondents (5.0%) were of the view that access to lab facilities had a small influence in motivating students towards high academic achievement in physics. Constant access to lab facilities helps learners to get used to practicals which are very essential for excellence in physics.

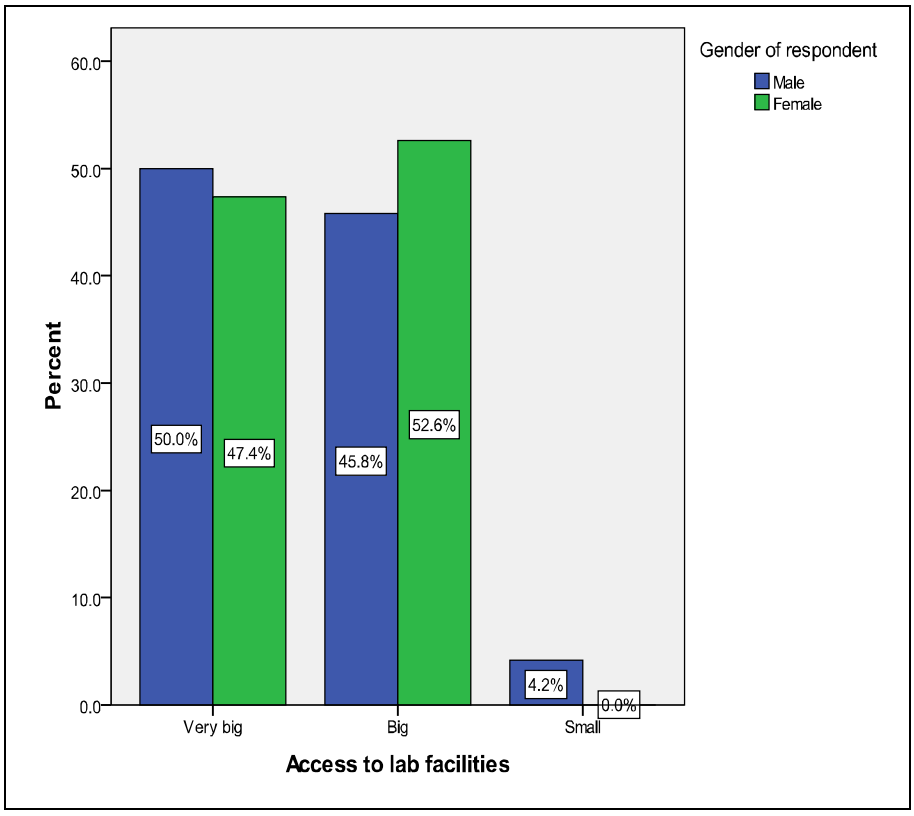

Figure 4.12: Influence of Access to Lab Facilities on Students' Achievement in Physics Versus Gender of Respondents

The results show that a higher proportion of males (50.0%) than females (47.4%) indicated that access to lab facilities had a very big influence in motivating learners towards achievement in physics.

4.4.3 Encouragement by School Administration

The study also aimed at establishing the extent to which encouragement by the school administration motivated students' towards achievement in physics. The results are given in Figure 4.13.

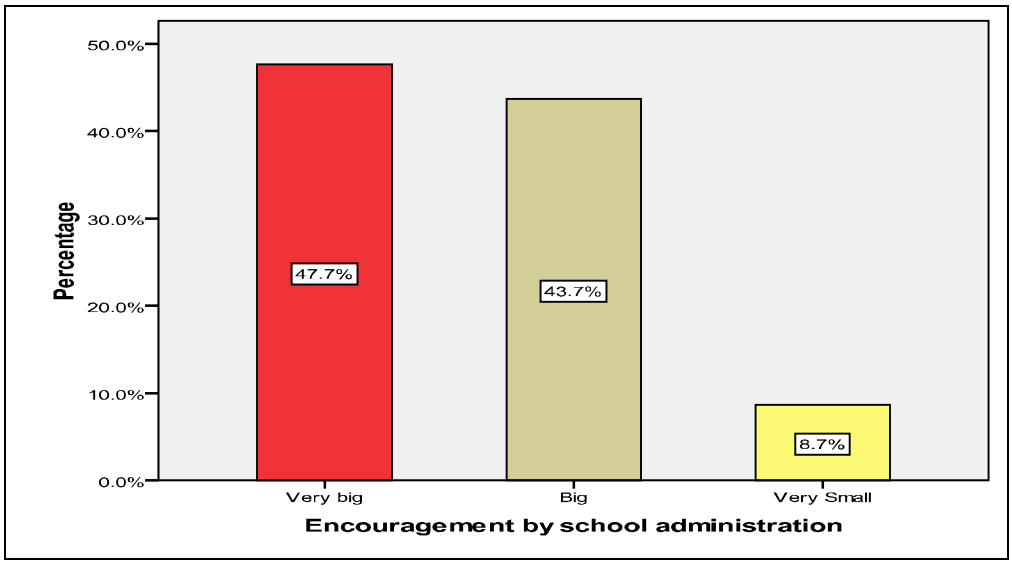

Figure 4.13: Influence of Encouragement by School Administration on Students' Motivation Towards Achievement in Physics

From the results, majority of respondents (91.3%) were of the view that encouragement by school administration played a significant role in motivating students towards achievement in physics. Results point out that 'very big' and 'big' responses were represented by 40.7% and 54.3% respectively. Only a few of the respondents (8.7%) were of the opinion that encouragement by the school administration had a small influence in motivating students towards high academic achievement in physics.

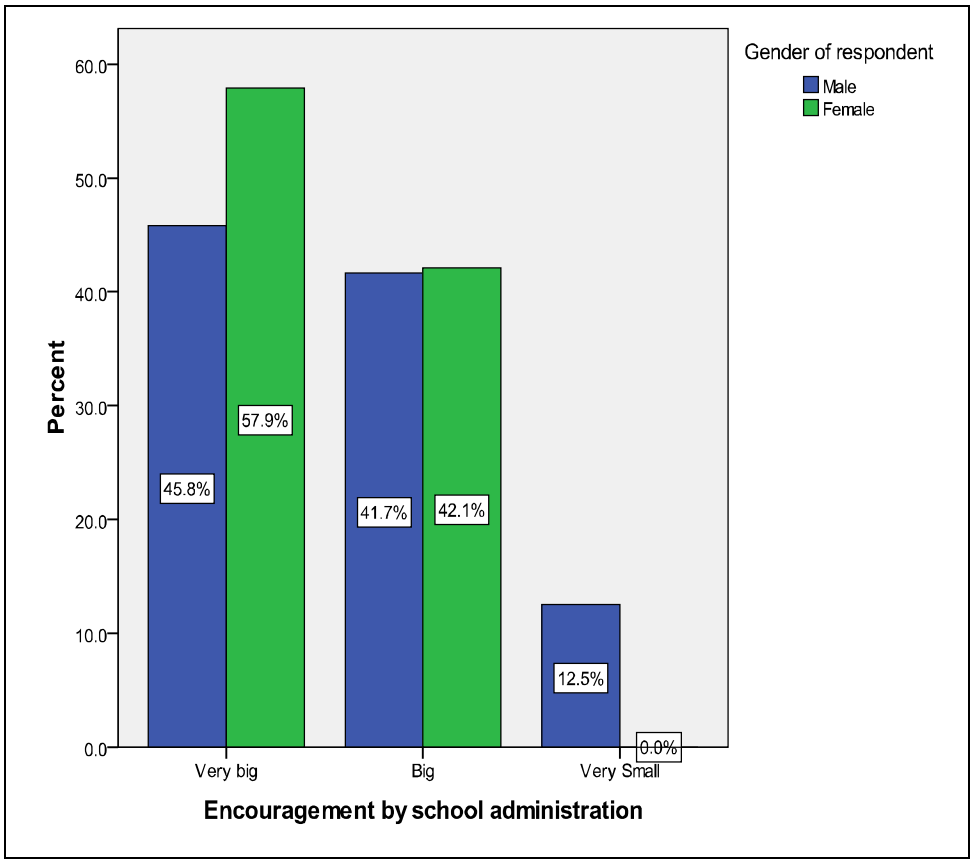

Figure 4.14: Influence of Encouragement by School Administration on Students' Motivation towards Achievement in Physics Versus Gender

The results show that a higher proportion of females (57.9%) than males (45.8%) indicated that encouragement by school administration had a very big influence in motivating learners towards achievement in physics. Physics curriculum must develop students' understanding of how the physics there are learning, impact on the modern world and opens up arrange of professional and technical career. The whole assessment process must not introduce barriers to the participation of girls in physics. It is easier to shape girls interests, behaviour, attitude and curiosity towards sciences at an earlier age and sustain the same to adulthood (Mwangi, Chiuri and Mungai, 2001).

4.4.4 Other Students' Cooperation

Respondents were also asked to indicate the extent to which other students' cooperation motivated learners towards achievement in physics. The results are given in Table 4.1.

Table 4.11: Influence of Other Students' Cooperation on Motivation towards Achievement in Physics

Response	Frequency	Percentage
Very big	177	59.0
Big	97	32.3
Not sure	9	3.0
Small	8	2.7
Very Small	9	3.0
Total	300	100.0

From the results, 59.0% of respondents indicated that other students' co-operation had a very big influence, 32.3% indicated that it had a big influence, 3.0% were not sure, 2.7% indicated that it had a small influence while 3.0% indicated that it had a very big influence. The results point out that other students' co-operation played a very significant role in motivating learners towards achievement in physics. Such co-operation would include group discussions as well as students who are good in physics helping weak ones in understanding certain concepts in physics.

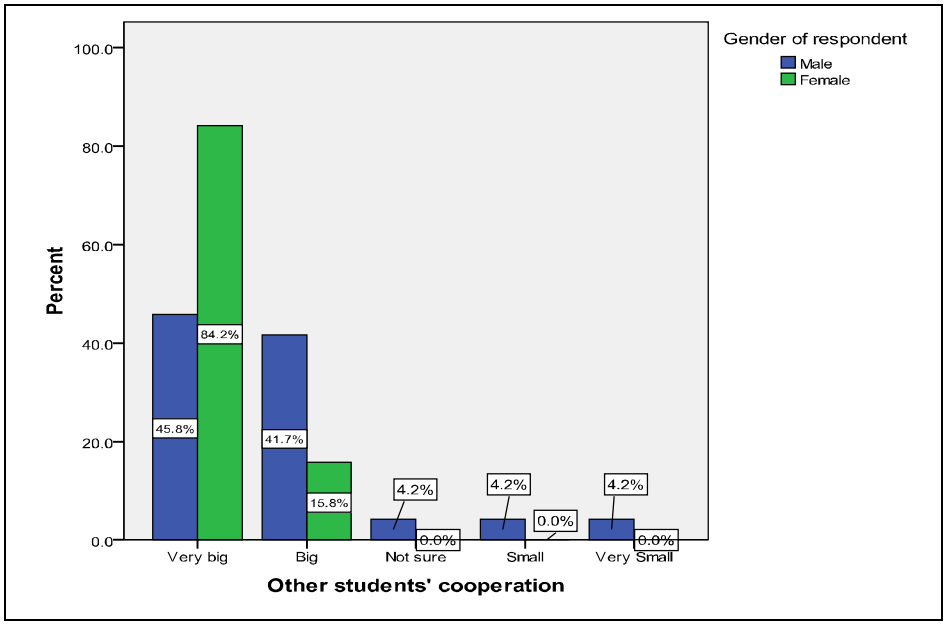

Figure 4.15: Influence of Other Students' Cooperation on Motivation towards Achievement in Physics versus Gender

The results show that a higher proportion of females (84.2%) than males (45.8%) indicated that other students' co-operation had a very big influence in motivating learners towards achievement in physics.

4.4.5 School Reward System

The study sought to establish the extent to which schools' reward system motivated students' towards achievement in physics. The results are summarized in Figure 4.16.

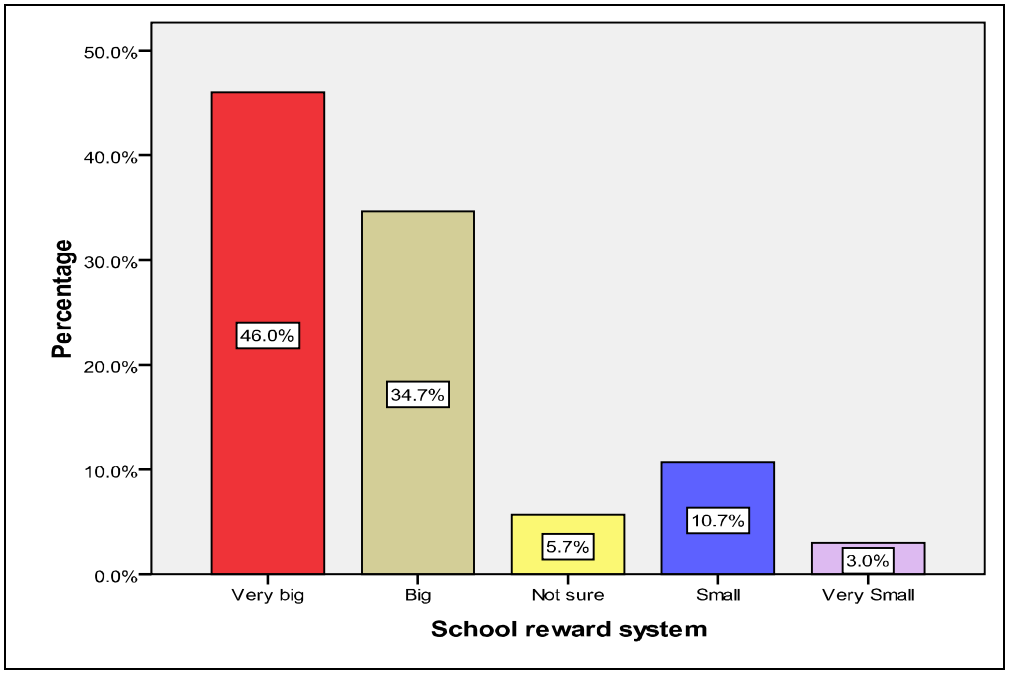

Figure 4.16: Influence of School Reward System on Students' Achievement in Physics

From the results, 46.0% indicated that school reward system had a very big influence, 34.7% indicated that it had a big influence, 5.7% were not sure, 10.7% indicated that it had a small influence while 3.0% indicated that it had a very small influence. The majority (80.7%) respondent with 'big' and 'very big' influence, implying that schools' reward system had a significant influence on students' achievement in physics. Weiner (1999) argued that intrinsic incentives enhance learning more than extrinsic incentives, however, both of them are necessary for learning to occur (Mondoh, 2001).

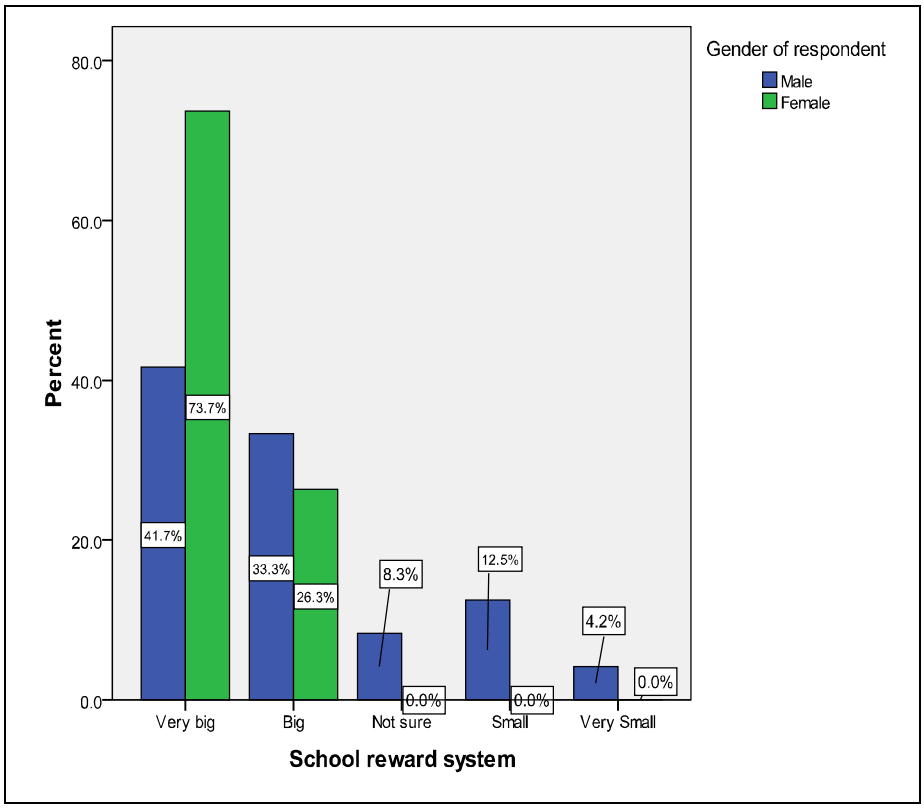

Figure 4.17: Influence of School Reward System on Students' Achievement in Physics versus Gender

The results show that a higher proportion of females (73.7%) than males (41.7%) indicated that the school reward system had a very big influence in motivating learners towards achievement in physics. The results vary greatly across the two gender meaning that gender significantly influenced the responses. This is because it is easier to shape girls' interest, behaviour, attitude and curiosity towards sciences at an earlier age (Mwangi, Chiuri and Mungai, 2001).

4.4.6 Achievement of Previous Years' Students

The study further sought to establish the extent to which schools' achievement of previous years motivated students' towards achievement in physics. The results are summarized in Figure 4.18.

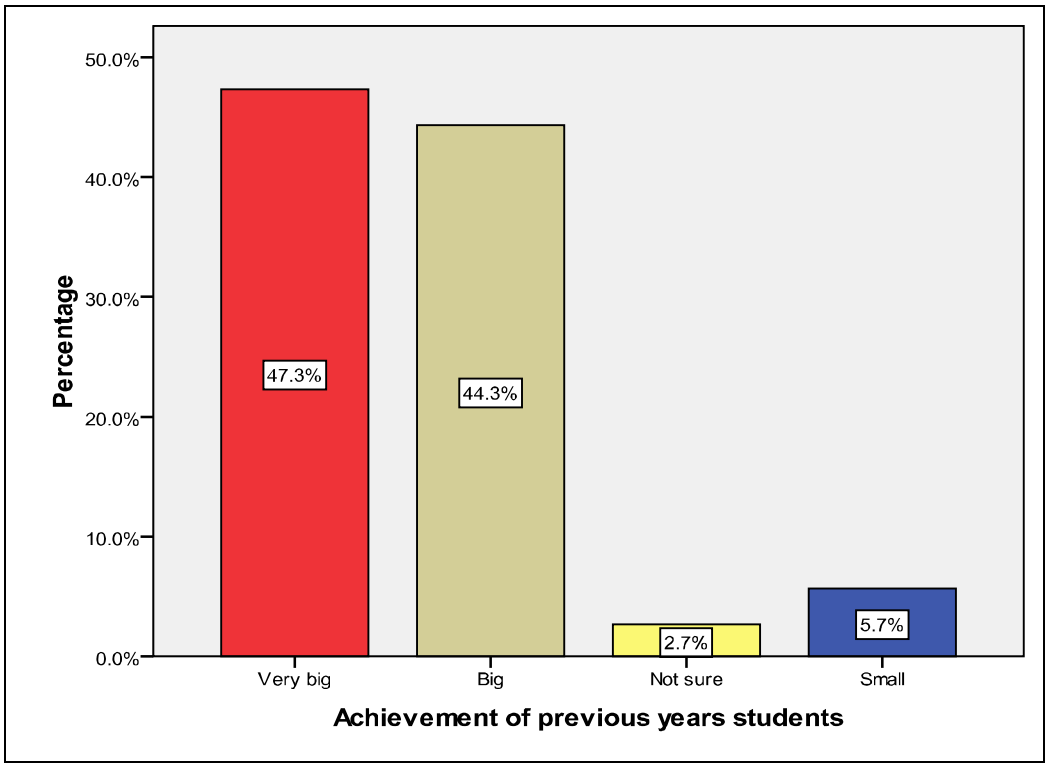

Figure 4.18: Influence of Achievement of Previous Years' Students' on Achievement in Physics

From the results, 47.3% indicated that achievement of previous years' students had a very big influence, 44.3% indicated that it had a big influence, 2.7% were not sure, while 5.7% indicated that it had a small influence. This implies that achievement of previous years' students had a very significant influence on students' achievement in physics.

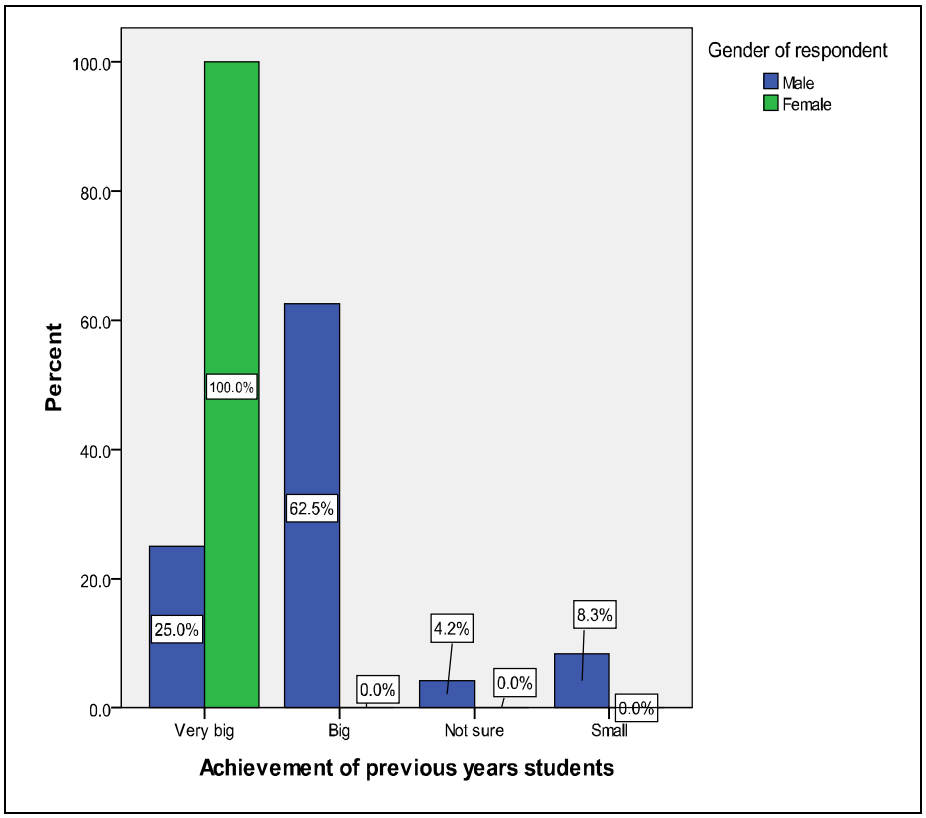

Figure 4.19: Influence of Achievement of Previous Years' Students' on Achievement in Physics versus Gender

The results show that all females (100.0%) indicated that performance of the previous year's students had a very big influence in motivating learners towards achievement in physics. Only 25.0% of boys indicated that it had a big influence. Most girls pointed out that achievement of previous students, especially girls may have a big motivation for them. The results support those of Mondoh (2001). Motivation occurs when either intrinsic or extrinsic incentives are used. Incentives that motivates performance in one learner may inhibit similar performance in another learner. Based on these needs and expectations, people act or behave in a certain way that they may believe will lead to the desired goal (Mullins, 1999 and Steers, 1991).

4.4.7 Peer Influence

The study aimed at establishing the extent to which peer influence motivated students' towards achievement in physics. The results are given in Figure 4.20.

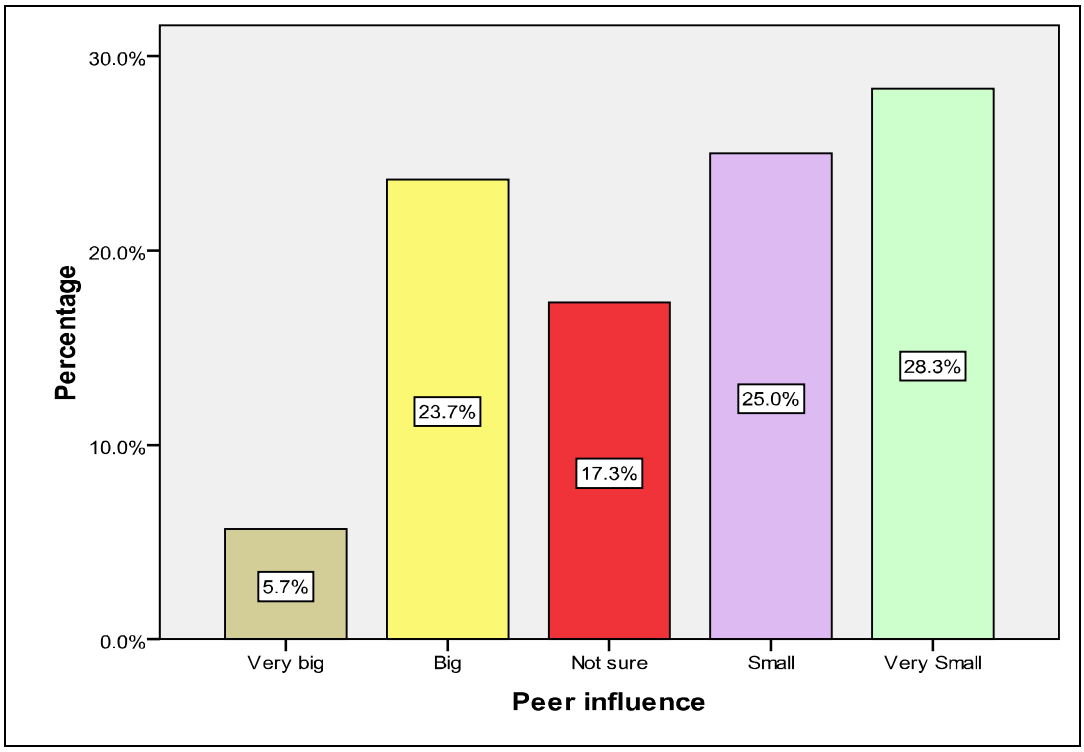

Figure 4.20: Influence of Peer Influence on Students' Achievement in Physics

From the results, 5.7% of respondents indicated that peer influence had a very big influence, 23.7% indicated that it had a big influence, 17.3% were not sure, 25.0% said that it had a small influence while 28.3% indicated that it had a very small influence. It can be noted from the above results that peer influence did not have much influence in motivation of students towards achievement in physics. The results contradict those of Shechman and Scannin (1993) who notes that in an effort to please and maintain support of peers, secondary school students tend to struggle to attain high level of excellence in class activities. This enhances self-confidence hence creating a positive self-concept and prestige. Prestige motivates the urge for interest, creativity and general competitive desire to achieve academically.

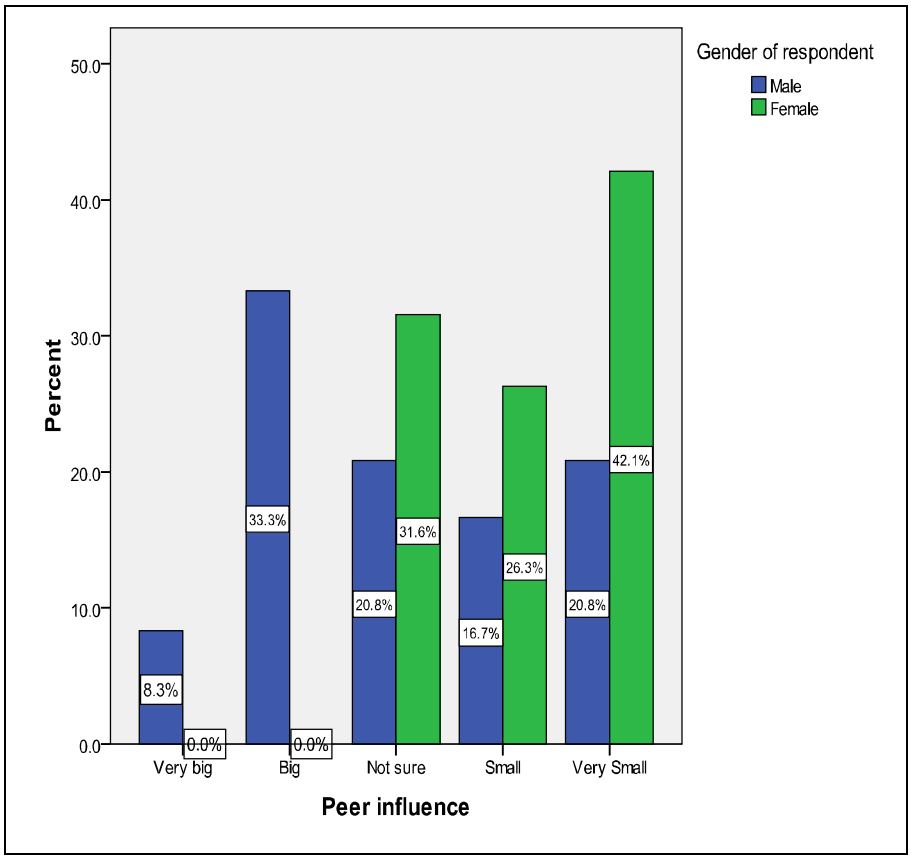

Figure 4.21: Peer Influence on Students' Achievement in Physics versus Gender

From the results, only boys indicated that peer influence had a very big (8.3%) and big (33.3%) influence in motivating learners towards achievement in physics. This supports the findings of Mondoh (2003). There is a believe that boys have a more right to education and/or need it more than girls. Many people especially in Africa still believe women should grow up, marry and have babies and boys need to be educated so that they can get good jobs (Changeiywo, 2001).

4.4.8 Parents' Cooperation

The study further sought to establish the extent to which parents' co-operation motivated students' towards achievement in physics. The results are summarized in Table 4.12.

Table 4.12: Influence of Parents' Co-operation on Students' Motivation towards Achievement in Physics

Response	Frequency	Percentage
Very big	119	39.7
Big	154	51.3
Not sure	18	6.0
Very Small	9	3.0
Total	**300**	**100.0**

From the results, 39.5% of respondents indicated that parents' co-operation had a very big influence, 51.3% indicated that it had a big influence, 6.0% were not sure while 3.0% indicated that it had a very small influence on students' motivation hence achievement in physics. This indicates that parents' co-operation was very vital in motivating students towards achievement in physics.

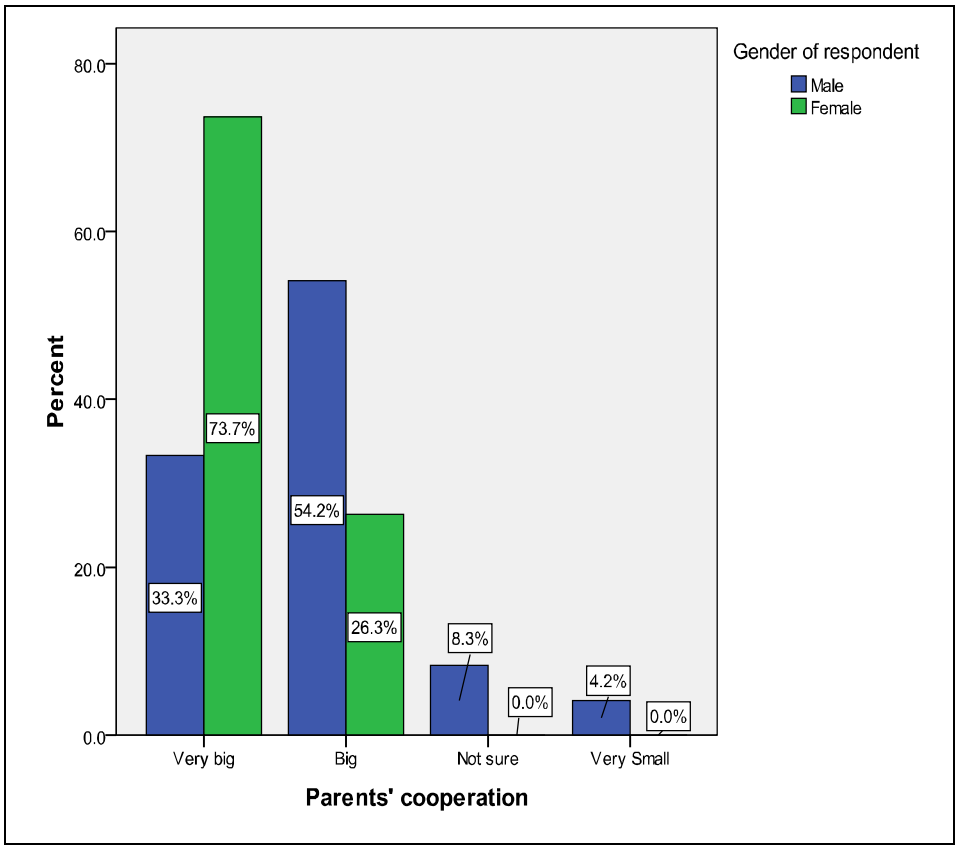

Figure 4.22: Influence of Parents' Co-operation on Students' Motivation towards Achievement in Physics versus Gender of Respondents

The results show that a higher proportion of females (73.7%) than males (33.3%) indicated that parents' co-operation had a very big influence in motivating learners towards achievement in physics. The results vary greatly across the two gender indicating that the factor had a varying level of influence across the two gender.

4.4.9 Students' Obedience/ Discipline

The study sought to establish the extent to which students' obedience/ discipline motivated students towards achievement in physics. The responses are given in Figure 4.23.

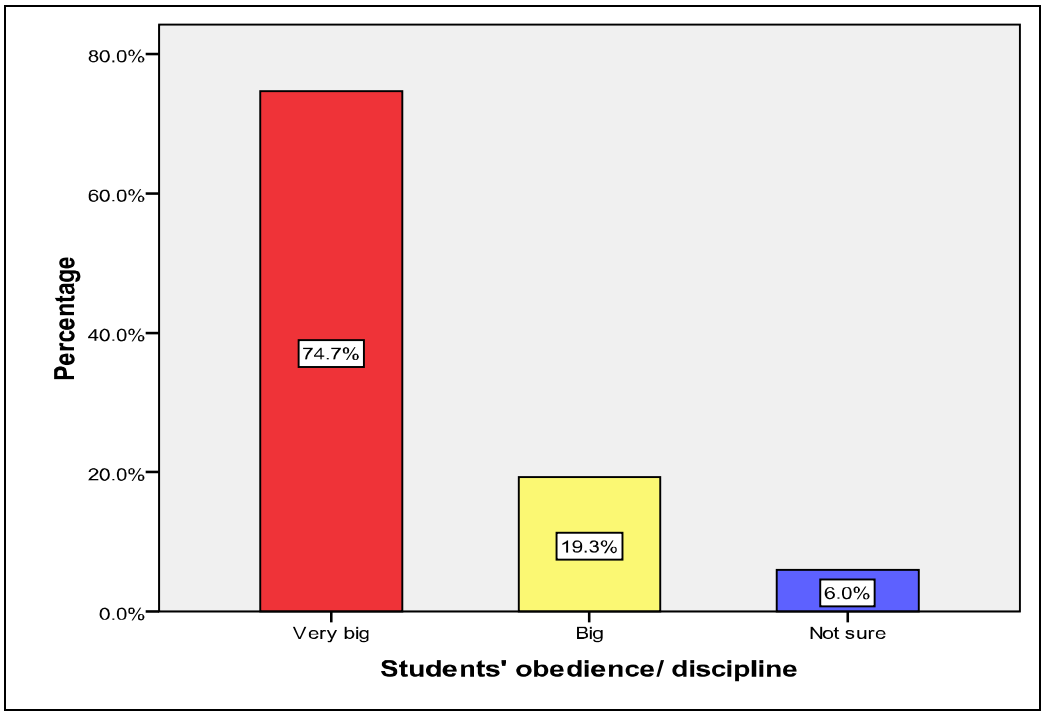

Figure 4.23: Influence of Students' Obedience/ Discipline on Students' Achievement in Physics

From the results, 74.7% of respondents indicated that students' obedience/ discipline had a very big influence, 19.3% indicated that it had a big influence while 6.0% were not sure. From the results, majority of respondents were of the view that students' obedience was very significant in enhancing achievement in physics.

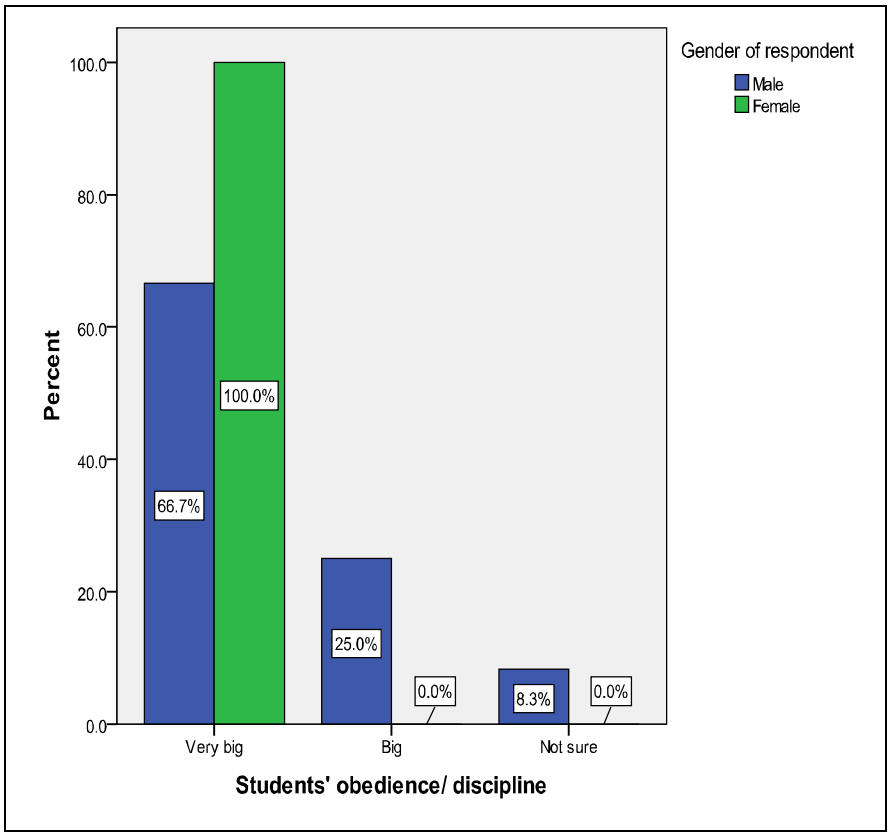

Figure 4.24: Influence of Students' Obedience/ Discipline on Students' Achievement in Physics versus Gender of Respondents

The results show that most students; females (100.0%) than males (66.7%) observed that students' obedience/ discipline had a very big influence in motivating learners towards achievement in physics. This shows that all students, irrespective of gender knew the importance of students obedience and discipline in enhancing a high performance in physics.

4.4.10 Love for Physics

The study further sought to establish the extent to which students' love for physics motivated students' towards achievement in physics. The responses are given in Figure 4.25.

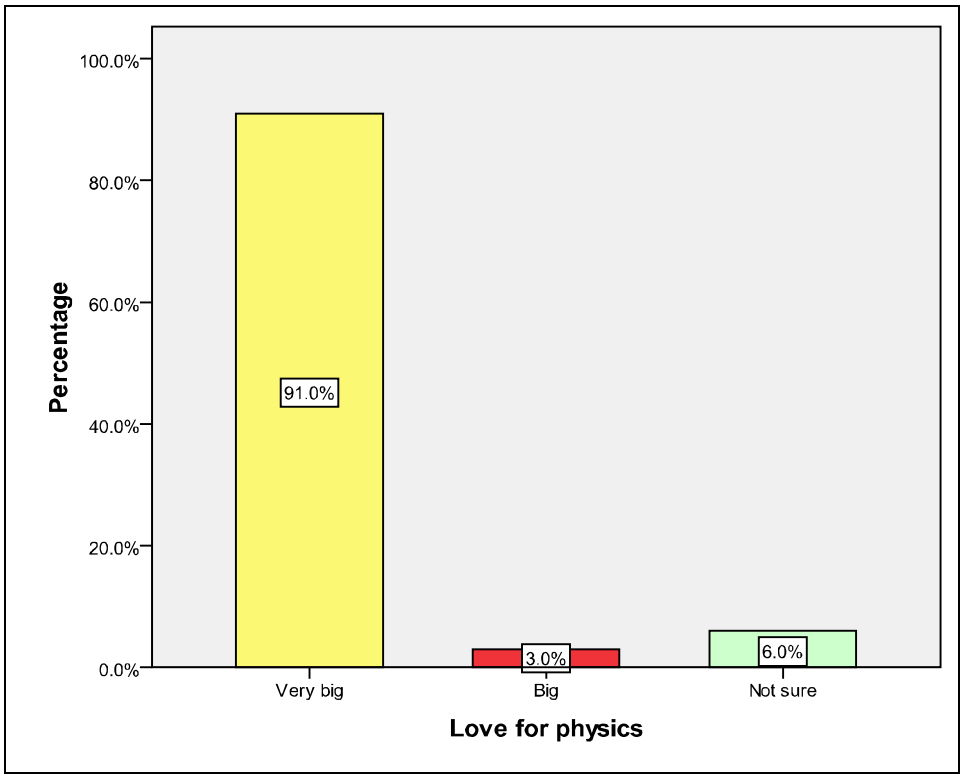

Figure 4.25: Influence of Love for Physics on Students' Achievement in Physics

From the results, 74.7% of respondents indicated that students' love for physics had a very big influence, 3.0% indicated that it had a big influence while 6.0% were not sure. From the results, students' love for physics played a very big role in influencing students' motivation and achievement in physics. The results are in agreement with those of Feldman (1996) who noted that students who have an interest in science tend to like the subject and hence work hard to do well. Students who have interest in science subjects develop unique view of the subject (National Science Board, 2006). They exhibit an observable characteristic like spending more time on science projects, learning about wildlife and studying scientific models.

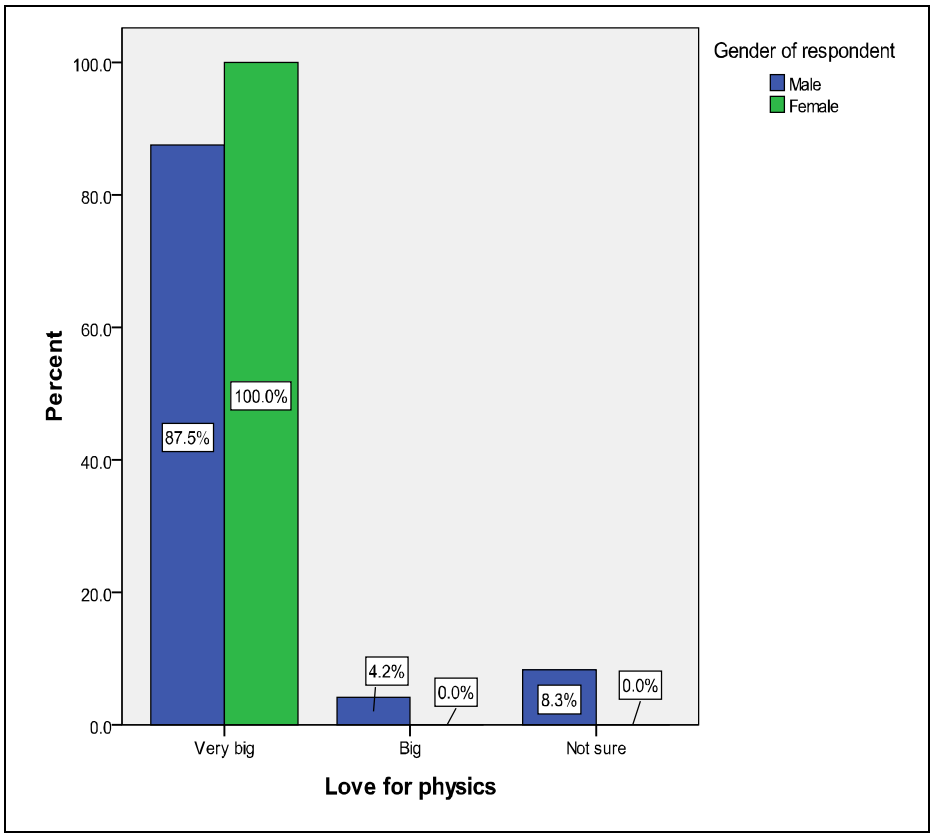

Figure 4.26: Influence of Love for Physics on Students' Achievement in Physics versus Gender of Respondents

The results show that all females (100.0%) and 87.55 of males indicated that love for physics had a very big influence in motivating learners towards achievement in physics. This shows that most students, irrespective of gender were of the view that love for physics was vital in enhancing a high performance in physics.

This supports the findings of Deci (1975) that an individual performs a task in order to achieve certain types of internal states, which he perceives as rewarding. Intrinsic motivation relates to psychological rewards such as recognition of task completed and satisfied by the work itself (Mullins, 1999).

4.4.11 Competition

The study aimed at establishing the extent to which competition among students motivated them towards achievement in physics. The responses are given in Figure 4.27.

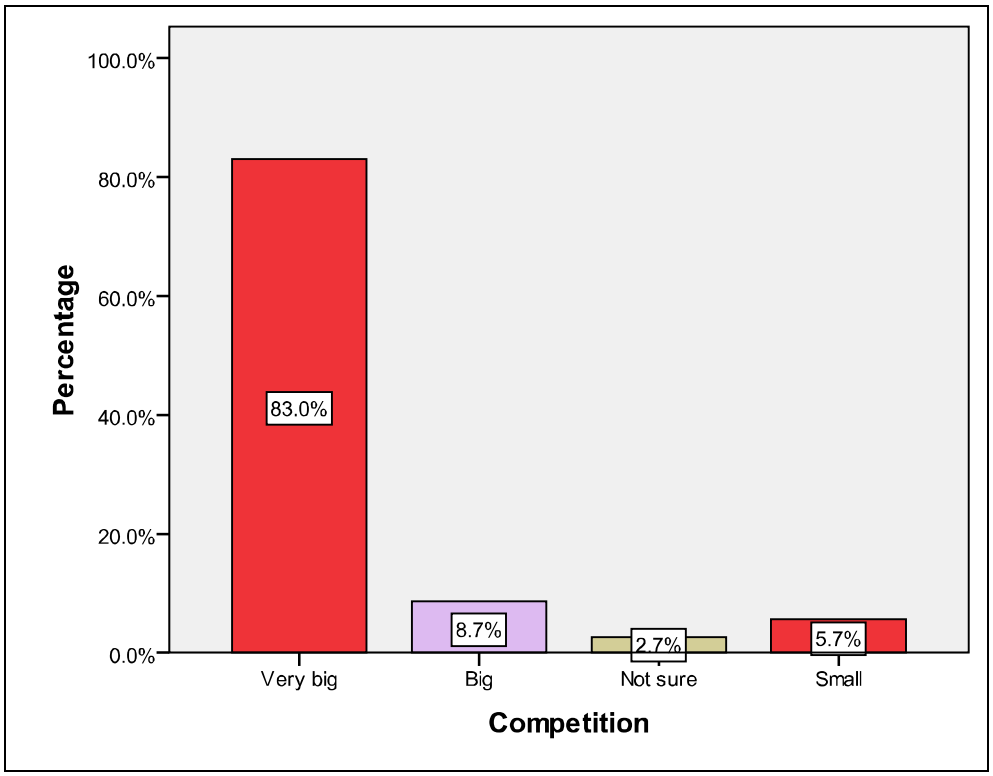

Figure 4.27: Influence of Competition on Students' Achievement in Physics

From the results, 83.0% of respondents indicated that competition had a very big influence, 8.7% indicated that it had a big influence, 2.7% were not sure while 5.7% indicated that it had a small influence. From the results, it is evident that competition played a very big role in influencing students' motivation and achievement in physics.

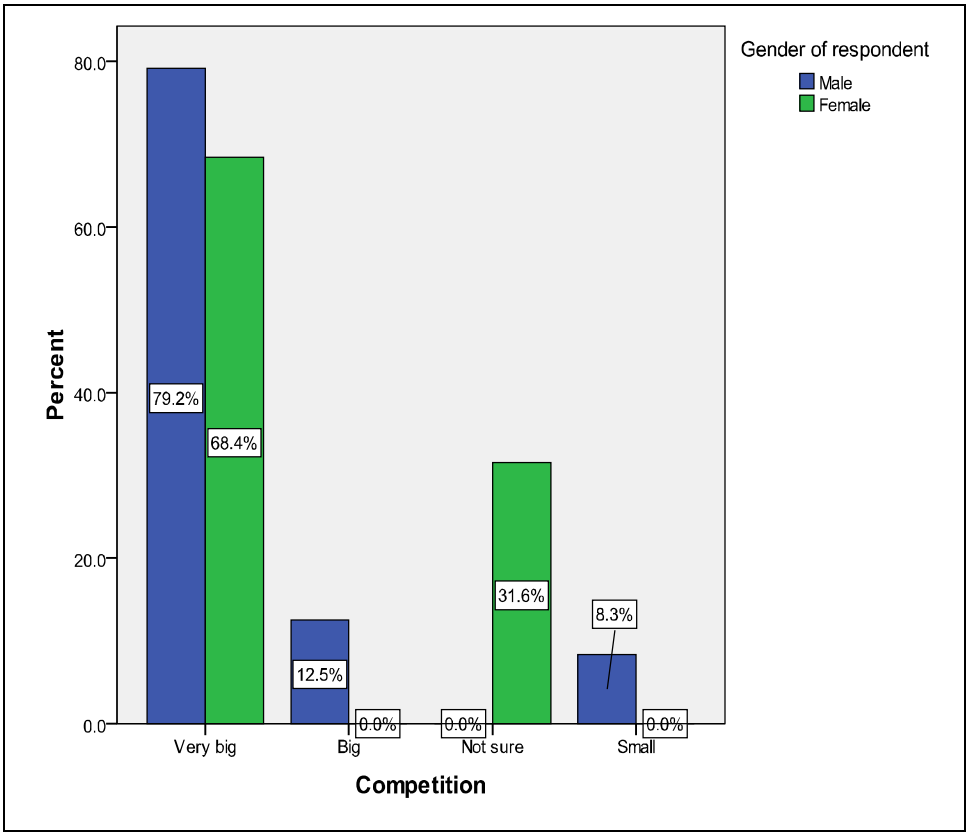

Figure 4.28: Influence of Competition on Students' Achievement in Physics versus Gender of Respondents

The results show that most students; females (68.4%) and males (79.2%) observed that competition among students played a very big role in motivating learners towards achievement in physics.

Regression analysis was carried out to establish whether there was statistically significant influence of gender on students' achievement in physics. The results are given in table 4.13

Table 4.13:
Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	107.793			
Final	88.391	19.402	1	.000

Link function: Logit.

$\chi^2 = 19.40$; df=1, Critical (table) value=3.84

The results indicated that there was a statistically significant ($p<0.05$) influence of gender on students' achievement in physics. This shows that the gender of a student, whether male or female was a strong predictor as to whether the student would perform well in physics or not. This is in agreement with earlier results in table 4.3 which also indicated that students' gender influenced achievement in physics.

George (2006) observes that creativity and interests energizes social needs which are secondary needs and leads to satisfaction of socio activities. Interests on its own can influence an individual in such a way that the pertain of interests becomes a pointer to the individuals future careers. Lack of interest is a recipe for frustrations which inturn causes anxiety. Anxiety may arise from such things like unrealistic fear, phobia, depression, rationale impulse among others (Walkins, 2000).

CHAPTER FIVE

SUMMARY, CONCLUSIONS, IMPLICATION AND RECOMMENDATIONS

5.1 Introduction

The chapter presents summary of study findings, conclusions drawn, and recommendations based on the conclusions.

5.2 Summary of the Findings

The study had two objectives, to: determine the influence of gender on secondary school students' achievement in physics in Tinderet Sub-County and determine the influence of gender on motivation of secondary school students in Physics in Tinderet Sub-County.

From the results of the physics achievement test male students had a higher mean score (12.41) than girls (9.01), hence boys performed better than girls. A one way ANOVA on the results indicated that there. There was a highly significant influence of students' gender on achievement. Most students (61.0%) perceived that students' gender had an influence on their achievement in physics. On the other hand, majority of the respondents were of the opinion that teachers' gender did not have much influence of students' achievement in physics with a Chi Square test of independence conducted on the results indicating that there was no significant variation in the distribution of responses across the different gender ($\chi^2_{4,0.05} = 6.02$; $p<0.05$). Results further showed that most of the respondents (58.0%) were of the view that school type had significant influence of students' achievement in physics. More females were of the view that school type had a very big influence on performance as compared to the males. Adolescent expenses did not have a significant influence on students' achievement in physics, as pointed out by the proportion of 'very big' and 'big' responses (28.0%). From cross tabulation for students' gender vs influence of adolescent expenses on students' achievement in physics, a larger proportion of females (37.9%) were of the view that school type had a significant (very big or big) influence on performance as compared to the males (24.3%). Hence girls were more affected in terms of achievement in physics due to adolescent expenses as compared to boys. Results also pointed out that students' career expectations was very significant in influencing students' achievement in physics. On the contrast, students' physical ability did not have a significant influence on students' achievement in physics, as pointed out by the proportion of 'very small' and 'small' responses (73.7%).

The study established the various motivational factors that influenced students' achievement in physics. From the results, it emerged that access to textbooks plays a very significant role in enhancing students' achievement in physics. Similarly, majority of respondents (95.0%) were of the opinion that access to lab facilities played a significant role in motivating students towards achievement in physics. Other students' co-operation played a very significant role in motivating learners towards achievement in physics. Such co-operation would include group discussions as well as students who are good in physics helping weak ones in understanding certain concepts in physics. On the schools' reward system, majority (80.7%) of respondents indicated that it had 'big' and 'very big' influence, implying that schools' reward system had a significant influence on students' achievement in physics. Results also showed that peer influence did not have much influence on students' achievement in physics. Other factors that were found to be very significant in motivating students towards achievement in physics were: parents' co-operation, students' obedience/ discipline, love for physics as well as competition among students.

5.3 Conclusions of the Study

i. The findings in this study added some knowledge to the empirical research by revealing that boys performed better than girls in the physics achievement test. Factors that are very significant are school type, career expectations, love for physics and student gender. Factors that were not significant in influencing students' achievement in physics were adolescent expenses, physical ability, teachers' gender, initiation ceremonies and domestic duties.

ii. The study established that access to textbooks and lab facilities were very significant in motivating students towards achievement in physics. Other factors that motivated students were other students' co-operation, schools' reward system, parents' co-operation, students' obedience/ discipline and love for physics. Peer influence was not significant in motivating students towards achievement in physics

5.3 Implications of the Study

The findings of this study indicate that secondary school students perceive that students' gender has influence on their achievement in physics. The results however show that the gender of the teacher may not be important in influencing academic achievement. From the results, it was noted that more girls were of the view that initiation ceremonies had a very big influence on performance as compared to the boys. There is a likelihood that girls are more

affected by initiation ceremonies as compared to male counterparts. This finding seem to suggest that we should do away with female initiations especially those that negatively affect them.

The results show that domestic duties do not have much influence on student's achievement in Physics. This implies that gender bias is just the differential treatment of males and females on account of their different sex based on socio-cultural grounds. However, in close relation to the expectation for marriage, girls are often given many more chores in the house than boys thus reducing the time they spend on studies compared to boys. This gives boys a higher chance of performing better than girls in Kenya. This finding seems to suggest that we should allocate both male and female students' equal house chores to enable them compete favourably.

The findings show that the school type has a significant influence on students' achievement in Physics with more girls being of the view that the school type had a very big influence on performance as compared to the boys. This seems to suggest that girls school be placed in boarding school to perform well. The results clearly point out that students' career expectation is very significant in influencing students' achievement in Physics. This suggests that students believe that performing well in school leads to taking a prestigious course at the university which is seen as a stepping stone to a successful future.

The other important implication of the findings is that the students' love for Physics play a very big role in influencing students' motivation and achievement in Physics. This shows that students who have an interest in Physics tend to like the subject and hence work hard to do well.

5.4 Recommendations of the Study

The following recommendations were made based on the findings and the conclusions of the study:

(i) There is need for schools to encourage girls towards performing better in physics. Schools should work hard in promoting factors that promote achievement in physics. This could be through active guiding and counseling departments as well as the career department.

(ii) Motivation factors such as access to textbooks and lab facilities, students' co-operation, schools' reward system, parents' co-operation, students' obedience/ discipline and love for physics should be enhanced so as to improve the performance of secondary schools in Tinderet Sub-County.

5.4.1 Suggestions for Further Research

Some areas for further research came up from the findings of this study;

1. The research did not give an in-depth insight into how each factor affects a student positively hence resulting to achievement. Exclusive research needs to be done on each of the factors e.g. an extensive research needs to be done on how career expectations might result to the Students' achievement in Physics.
2. Similar studies should be carried out in other Sub-counties of the country so as to replicate the study.
3. Further research should be done to establish other factors that influence Students' achievement in Physics.

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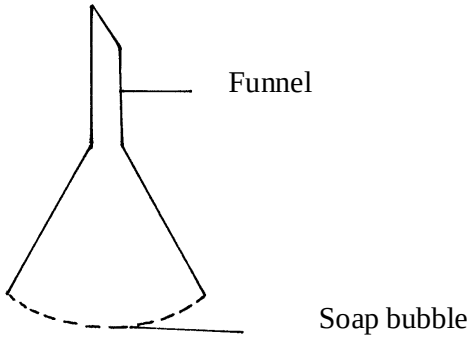
APPENDIX A: FORM FOUR PHYSICS ACHIEVEMENT TEST

Name:……School:……

Instructions: Answer all the questions in the spaces provided.

1. The water level in a burette is $27cm^3$. If 88 drops of water fall from the burette and the average volume of one drop is $0.25cm^3$ what is the final water level in the burette?
(2mks)

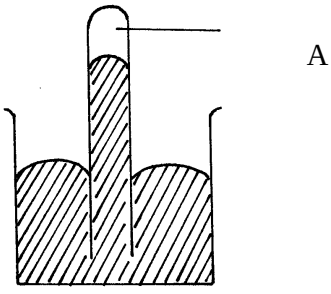
2. A glass funnel is dipped in soap solution, then taken out and blown gently to form a soap bubble as shown below.



Explain why the bubble flattens to a film which then rises up the funnel
(2mks)

3. Why are the bright specks observed in a smoke cell seen to be in continuous random motion? (1mk)

4. The diagram below shows a simple barometer



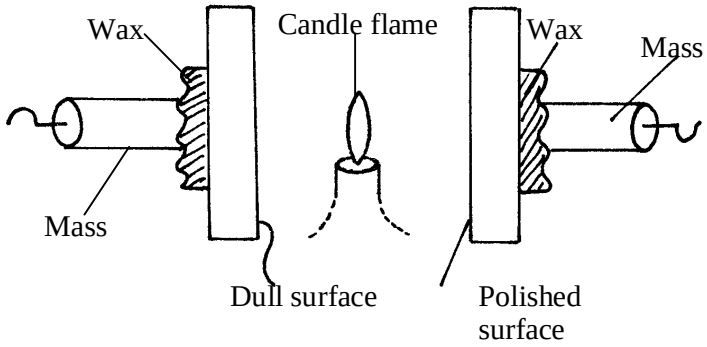
(i) Name the part labeled A (1mk)

(ii) Explain what would happen to the level of mercury in the tube if the barometer was taken high up the mountain (2mks)

5. An object is projected vertically upwards at $15ms^{-1.}$ How long will it take to return to the same level of projection (3mks)

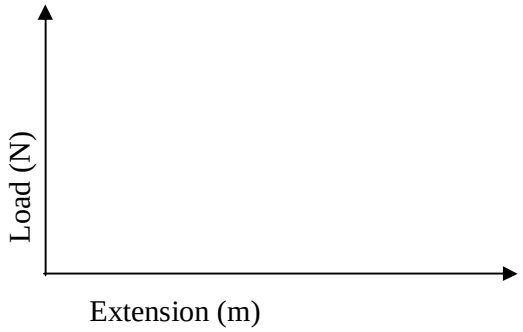
6. On the grid below, sketch a load (N) against extension (m) graph for a helical spring and rubber material (2mks)

7 Two 10g masses are fixed onto two similar aluminum plates, one polished and the other painted black, using wax as shown in the figure below. A Bunsen flame is placed mid way between the plates.



Give and explain the observation made (2mks)

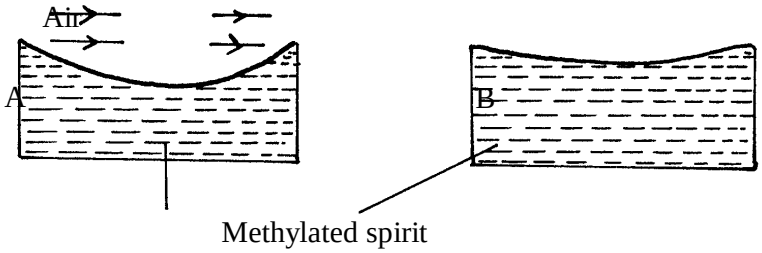
8. A cord 2.5m long has a breaking strength of 500N. One end of the cord is fixed and a 2kg mass attached to the free end moves in a horizontal circular path on a frictionless level surface. Determine the maximum speed if the cord is not to break (3mks)



9. The diagram below shows two horizontal pipes A and B connected to two identical vertical tubes

Water flows in pipe A at a velocity V_1 and in pipe B at a velocity V_2. Explain why the level of water in tube T in B is lower than that of tube T in A (2mks)

10. Some quantity of methylated spirit at room temperature was poured into two Petri dishes, A and B of same surface area. A draught of air was blown over one of them and their temperature taken after some time.



State and explain the one that will be at a lower temperature (2mks)

(i) State Boyles Law (1mk)

(ii)When an inflated balloon is placed in a refrigerator, it is noted that its volume reduces. Use kinetic theory to explain this observation (2mks)

APPENDIX B: QUESTIONNAIRE ON GENDER AND MOTIVATION

Name:……School:……

SECTION A; Influence of Motivation on achievement Instructions

Attempt all questions

1 By use of a tick indicate how each of these motivating factors influences your achievement in physics.

Motivating factor	**Level of influence**				
	Very big	**Big**	**Not sure**	**Small**	**Very small**
Access to textbooks					
Access to Lab facilities					
Encouragement By school Administration					
Other students' co-operation					
School reward system					
Achievement of previous years' students					
Peer Influence					
Parents' co-operation					
Student's Obedience/Discipline					
Love for Physics					
Students' Gender					
Teachers' Gender					
Competition					
Students' Ambition					

Section B; Influence of Gender difference on Students' Achievement

Gender Difference	**Influence Level**				
	Very Big	Big	Not sure	Small	Very Small
Students' gender					
Teachers' gender					
Initiation ceremonies					
Domestic duties					
Mixed school					
Single sex					
Farm work					
Adolescence expenses					
Career expectations					
Physical ability					

APPENDIX C: LETTER OF RESEARCH AUTHORIZATION

REPUBLIC OF KENYA

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOG

Telephone: 254-020-2213471, 2241349
254-020-310571, 2213123, 2219420
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When replying please quote
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NAIROBI-KENYA
Website: www.ncst.go.ke

Our Ref: NCST/RCD/14/012/1171

Date: 27th August 2012

Joseck Okumu Barasa
Egerton University
P.O.Box 536-20115
Egerton.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *"Influence of students' gender differences on their motivation and achievement in secondary school physics in Tinderet District, Kenya,"* I am pleased to inform you that you have been authorized to undertake research in **Tinderet District** for a period ending **30th September, *2012.***

You are advised to report to **the District Commissioner and the District Education Officer, Tinderet District** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

DR. M. K. RUGUTT, PhD, HSC.
DEPUTY COUNCIL SECRETARY

Copy to:

The District Commissioner
The District Education Officer
Tinderet District.

"The National Council for Science and Technology is Committed to the Promotion of Science and

APPENDIX D: RESEARCH PERMIT

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THIS IS TO CERTIFY THAT:
Prof./Dr./Mr./Mrs./Miss/Institution Joseck Okumu Barasa
of (Address) Egerton University
P.O.Box 536-20115, Egerton.
has been permitted to conduct research in

Location *Tinderet*
District
Province *Rift Valley*

on the topic: Influence of students' gender differences on their motivation and achievement in secondary school physics in Tinderet District, Kenya.

for a period ending: 30th September, 2012.

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Research Permit No *NCST/RCD/14/012/117*
Date of issue *27th August, 2012*
Fee received *KSH. 1,000*

Applicant's Signature

Secretary
National Council for Science & Technology

CONDITIONS

1. You must report to the District Commissioner and the District Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit
2. Government Officers will not be interviewed with-out prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2)/four(4) bound copies of your final report for Kenyans and non-Kenyans respectively.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

REPUBLIC OF KENYA

RESEARCH CLEARANCE PERMIT

GPK6055t3mt10/2011

(CONDITIONS see back page)