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Influence of Gender on Student' Achievement in Secondary School Physics in Tinderet Sub-County, Kenya

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Abstract:
This study sought to establish the Influence of Gender 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 was established by three lecturers involved in research because of their vast experience in the supervision of postgraduate studies. The reliability of the questionnaires was established through a piloting process undertake in Nandi East Sub-county and was estimated using Cronbach's co-efficient test. The questionnaires were dully modified and 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 textbooks, lab facilities, other students' co-operation, students' obedience/ discipline and love for the subject were significant in achievement. The study recommends that there is need for schools to encourage girls towards performing better in Physics through active guiding and counseling departments. 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.

Keywords: *Gender, achievement*

1. Introduction

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 individual's 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 the American people believed that boys from upper socioeconomic 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.

2. Materials and Methods

The study was undertaken among the public secondary schools in Tinderet Sub-county of the Nandi County of the republic of Kenya. These were Meteitei Boys High School, St. Marys' Girls High School Tach-Asis, St. John mixed Day Secondary School Tach-Asis and A.I.C Setek Secondary School from Meteitei Division, Tinderet Boys Secondary School, Mutumon Secondary School, Sarwot Secondary School and Got-Ne-Lel Girls Secondary School from Tinderet Division, Cheptonon Boys Secondary School, Kamelilo Secondary School, Senetwo Secondary School and Songhor Girls Secondary School from Songhor Division and Kapcheno Girls secondary School, Henry Kosgei-Kibukwo Boys Secondary School, Kabirer Girls Seconary School and Kibukwo Girls Secondary school from Kabirer Division. All the schools are located within Tinderet Sub-county. Meteitei Division is to the East of the Sub-county, Tinderet Division to the South, Songhor Division to the west and Kabirer Division to the North of the Sub-county. This study targeted all the secondary schools in the study area. The study population comprised the secondary school students in Tinderet Sub-county Kenya, this population was divided into target population upon whom the findings of the study were generalized and the accessible population from whom, a sample of respondents was selected. The target population was the public secondary schools in Tinderet Sub-county Kenya. 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. . 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.

The study population comprised the secondary schools in Tinderet Sub-county, Nandi County Kenya. This population was divided into a target population upon whom the findings of the study were generalized and the accessible population from whom, a sample of respondents was selected. The target population was the secondary schools in Tinderet Sub-county, Kenya. The accessible population was the within Tinderet, Meteitei, Songhor and Kabirer Divisions of Tinderet Sub-county. The students within the secondary schools of these Divisions formed the sample frame from which the study sample was obtained.

The design for the study was correlation research design which was adopted to establish the degree of relationship between two or more variables (Orodho, 2003). The study started with a pre-test that was carried out and the consistency of the Questionnaires were 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.

The study sought to explain the influence of gender on students' achievement in secondary schools mentioned above. The dependent variable was students' achievement in physics while the independent variable was gender. There was application of various teaching/learning tools and resources which include; Teacher staffing, Student discipline, availability of teaching and learning resources, teacher experience, teaching methods among others. Both qualitative and quantitative approaches were applied for systematic data gathering. According to Kaino (1995), the use of complementary methods reveals discrepancies which a single approach can not explain. Deductions were made from the data that was collected basing on the theory that Gender was expected to influence students' achievement. This attempted to verify the theories firmly held in mind.

In the study, the samples of respondents were a combination of students from the secondary schools of Meteitei, Tinderet, Songhor and Kabirer Divisions located in Tinderet Sub-county, Kenya. According to Borg *et al.*, (2003), studies involving sub-groups of respondents, the minimum recommended size for each sub-group is 15 respondents. This means that the engagement of bigger numbers of respondents is expected to yield superior or better findings.

On this basis, every one of the four divisions was treated as a sub- stratum in the study. Each division had 74 respondents. On the basis of the four divisions a total sample size of 300 respondents was used.

On this basis, therefore each division was treated as a sub-group or strata. A stratified sampling procedure was applied in order to treat the secondary schools of each division as strata. Stratified sampling enhances representativeness in studies like this that involves sub-groups of respondents (Fraenkel *et al*, 2002). The stratified sampling procedure equally applied to the students within each of the schools to ensure fair coverage of all students within the schools.

Selection of the population within the strata was by simple random sampling. Simple random sampling gives equal opportunities to respondents (Kathuri *et al*, 1990).

The intension of the research, goals and expected outcome, were stated clearly to guard against rising wrong expectations to the respondents. To generate the data required by the study objectives, both primary and secondary data gathering procedures were used.

The secondary data collection was completed. The data was obtained from journals, annual reports, books and workshop proceeding reports. Similarly, the internet was a vital resource in accessing other relevant online publications. Other secondary sources of data included reports from key sectors i.e. the Ministry of Education, National Council for Science and Technology, Millennium Development Goals, Strengthening of Mathematics and Sciences in Secondary School Education (SMASSE) and United Nations Educational Scientific and Cultural Organization.

Collection of data was preceded by training 2 research assistants so that they could fully understand the context of the study and underlying issues. This involved data obtained directly from the secondary schools through respondents. Pre-tested, closed ended questionnaires and a Physics achievement Test were used to collect data from the students of the secondary schools. The questionnaires were easier to administer because each question item was followed by an alternative answer or choices or choices for the respondent to choose from. The Physics achievement Test attracted short and precise answers. According to Kathuri and Pals (1993), they are appropriate for data collection, since the multiple choices make it possible for the researcher to regulate or control the range and depth of information to be provided by the respondents. Mugenda and Mugenda (2002) further recommended use of closed-ended questionnaires because they are economical in terms of time and monetary expenses. Borg *et al*, (2003) recommended the tool because it is always in a form that is easily analyzable due to the presence of multiple choices. They consisted items on students' gender, teachers' gender, initiation ceremonies, domestic duties, co-educationl schools, single sex school, farm work, adolescent expences, career expectations and physical ability.

A research instrument is reliable if it measures what it purports to measure consistently. According to Mugenda and Mugenda (1999), 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 questionnaire to yield reliable data was established through a pre-testing process in Kenya Tea Growers Association Taito Secondary School located in the neighboring Nandi East Sub-County. In line with the recommendations a random sample of 15 students were used during the pre-testing 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. The instruments were found to be reliable and adopted.

The 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). A draft questionnaire was submitted to the experts in the department of Curriculum, Instruction and Educational Management of Egerton University who reviewed the contents for validity. They assessed and standardized each question item in relation to each objective to ensure relevancy and accuracy. Useful comments were incorporated to improve the effectiveness of the questionnaire

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. Using the SPSS computer package, the data obtained was processed and analyzed by both descriptive and inferential statistics. The data was presented using tables, charts and graphs where appropriate. The chi-square was used to analyze the influence of gender on students' achievement in physics.

One way ANOVA correlation was calculated between variables to establish similarities or differences between rankings. The results indicated that there was a highly significant difference in the distribution of scores between male and female students with F=56.854; df = 1; Critical value for F = 4.00

3. Results and Discussions

The study sought to determine the influence of gender on secondary school students' achievement in physics in Tinderet Sub-County .The respondents were assessed on the following;

3.1. 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.

3.1.1. Gender

The respondents were asked to indicate their gender and the results were recorded in Table 1.

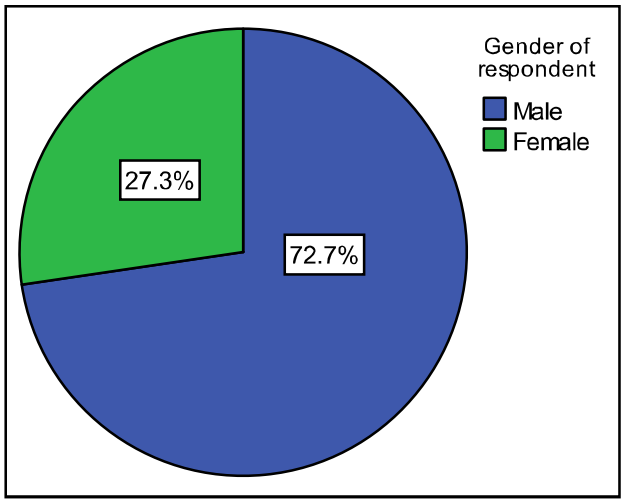

Figure 1: Gender of Respondents

χ^2 = 61.65; *df=1, Critical (table) value=3.84*

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.

3.2. 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).

3.2.1. 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 1.

	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			

Table 1: ANOVA Results on The Students Scores in PAT
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 female students was determined giving the results in Table 1.2.

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

Table 2: Mean Scores for Students in PAT by Gender

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 3 :

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

Table 3: Model Fitting Information

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).

3.2.2. 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 2.

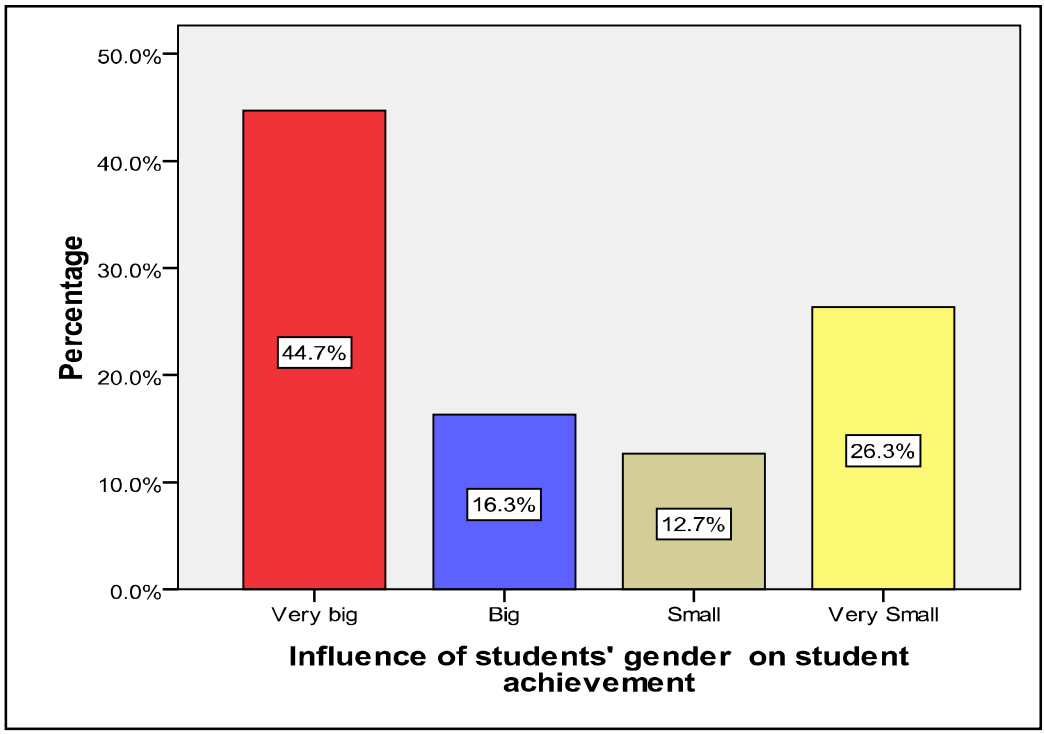

Figure 2: Influence of Student Gender on Students' Achievement in Physics in Tinderet Sub-County
χ^2 = 73.89; *df=3, Critical (table) value=7.81*

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 3.

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%

Table 3: Cross Tabulation for Students' Gender vs. Influence of Students' Gender on Achievement in Physics
χ^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.

3.2.3. 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 3.

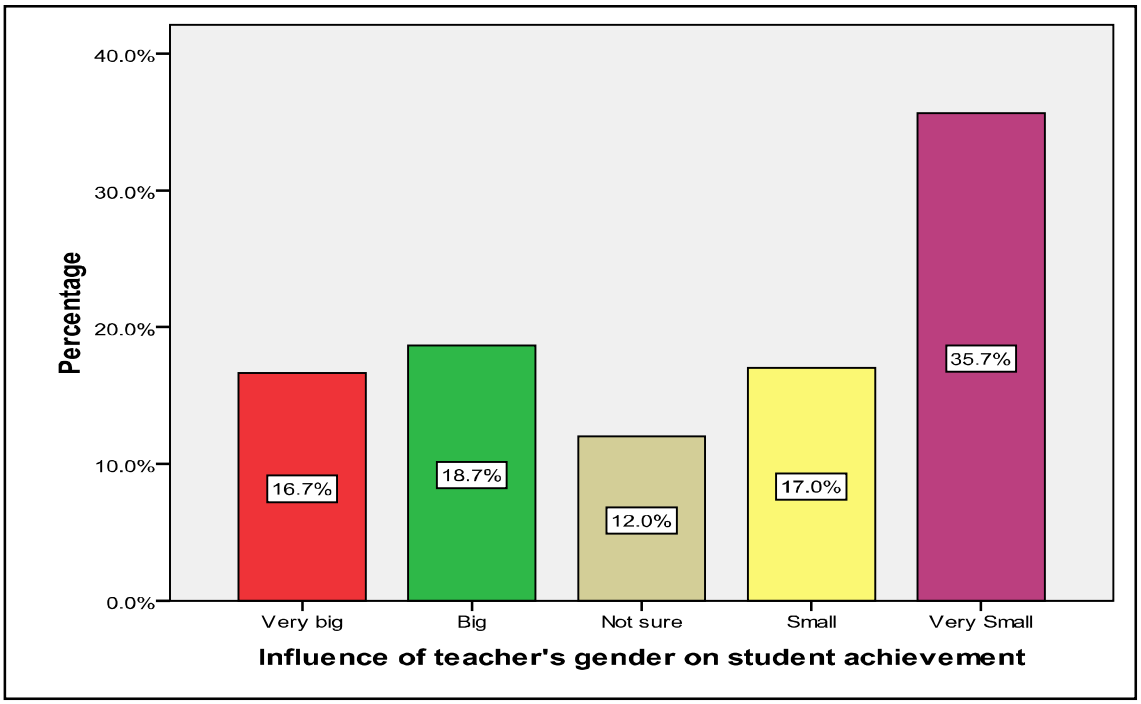

Figure 3: Influence of Teachers' Gender on Students' Achievement in Physics

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.

Gender		**Influence of teacher's gender on student achievement**					**Total**
		Very big	**Big**	**Not sure**	**Small**	**Very Small**	
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%

Table 4: Cross Tabulation for Gender vs. Influence of Teacher' Gender on Students' Achievement in Physics

$\chi^2 = 6.02$; *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.

3.2.4. 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 3.

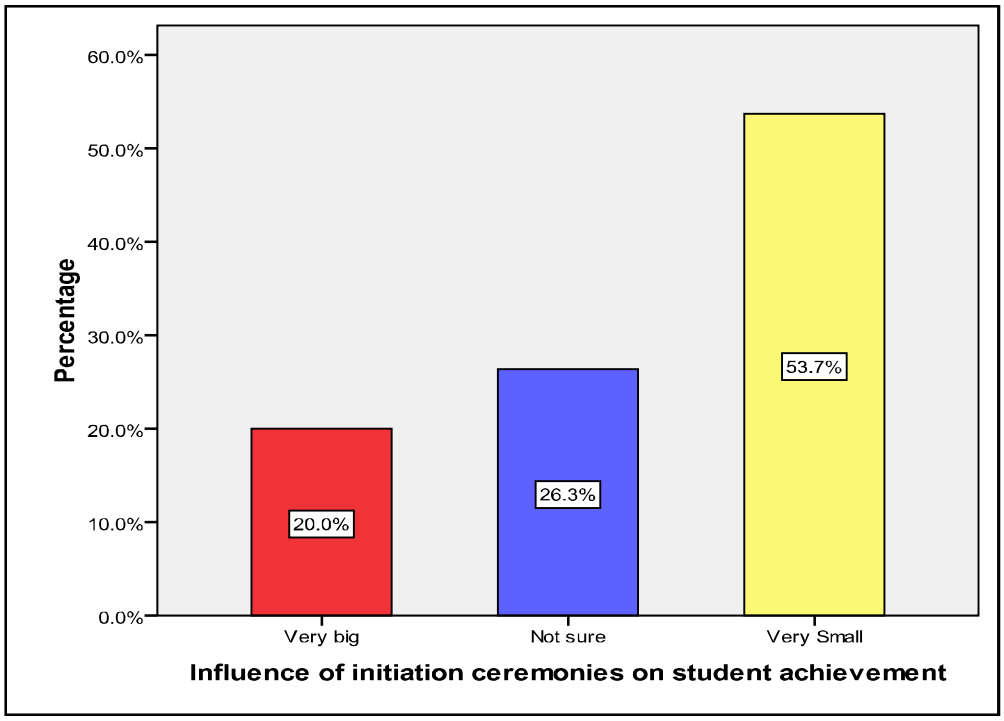

Figure 4: Influence of Initiation Ceremonies on Students' Achievement in Physics

Cross tabulation for the influence of initiation ceremonies on students' achievement in physics across male and female students gave the results in Table 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).

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%

Table 5: Cross Tabulation for Students' Gender vs. Influence of Initiation Ceremonies on Students' Achievement in Physics

$\chi^2 = 41.61$; *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.

3.2.5. 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 5.

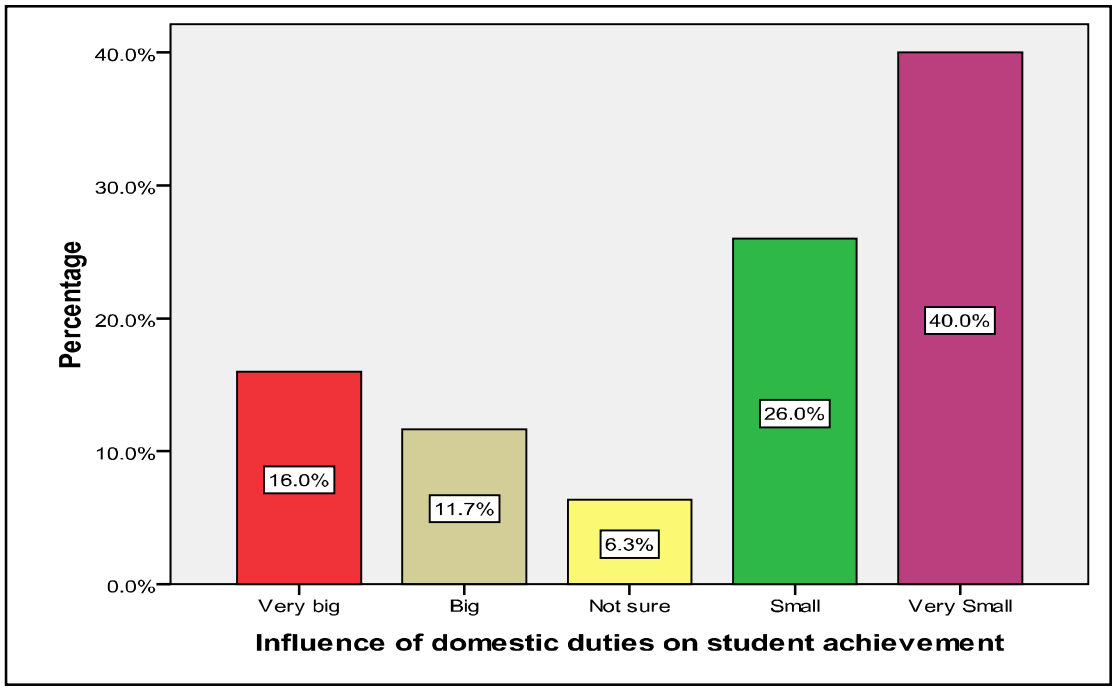

Figure 5: Influence of Domestic Duties on Students' Achievement in Physics

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 6.

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%

Table 6: Cross Tabulation for Students' Gender vs Influence of Domestic Duties on Achievement in Physics
$\chi^2 = 30.17$; *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).

3.2.6. 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 6.

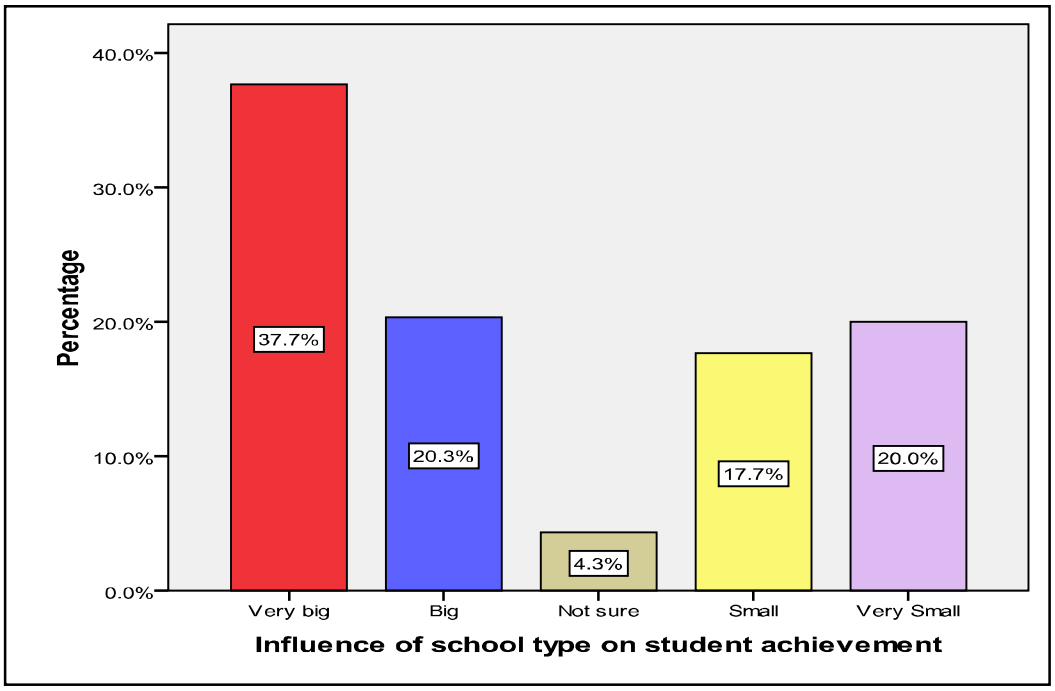

Figure 6: Influence of School Type on Students' Achievement in Physics

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

		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%

Table 7: Cross Tabulation for Students' Gender vs Influence of School Type on Achievement in Physics

$\chi^2 = 23.68$; *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.

3.2.7. 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 7.

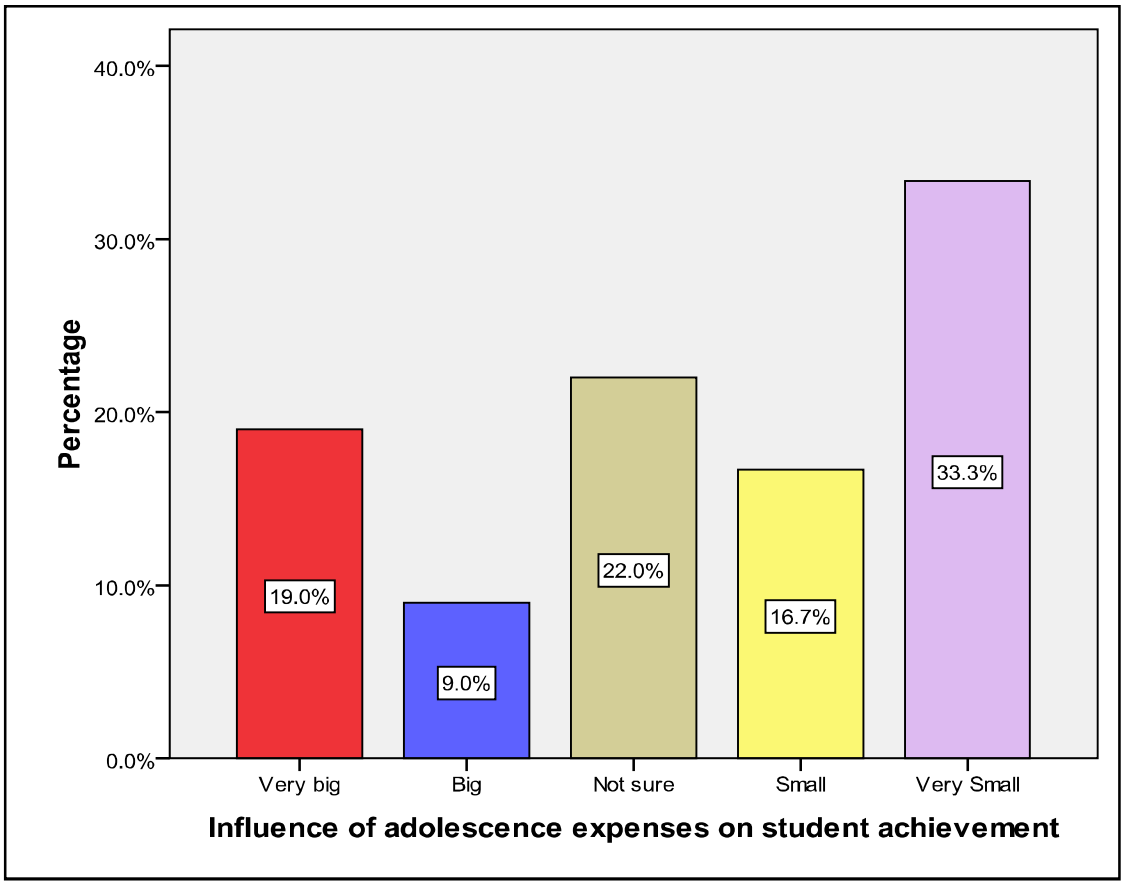

Figure 7: Influence of Adolescent Expenses on Students' Achievement in Physics

From the results in Figure 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 8.

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%

Table 8: Cross Tabulation for Students' Gender vs Influence of Adolescent Expenses on Students' Achievement in Physics
$\chi^2 = 28.77$; *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.

3.2.8. 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 8.

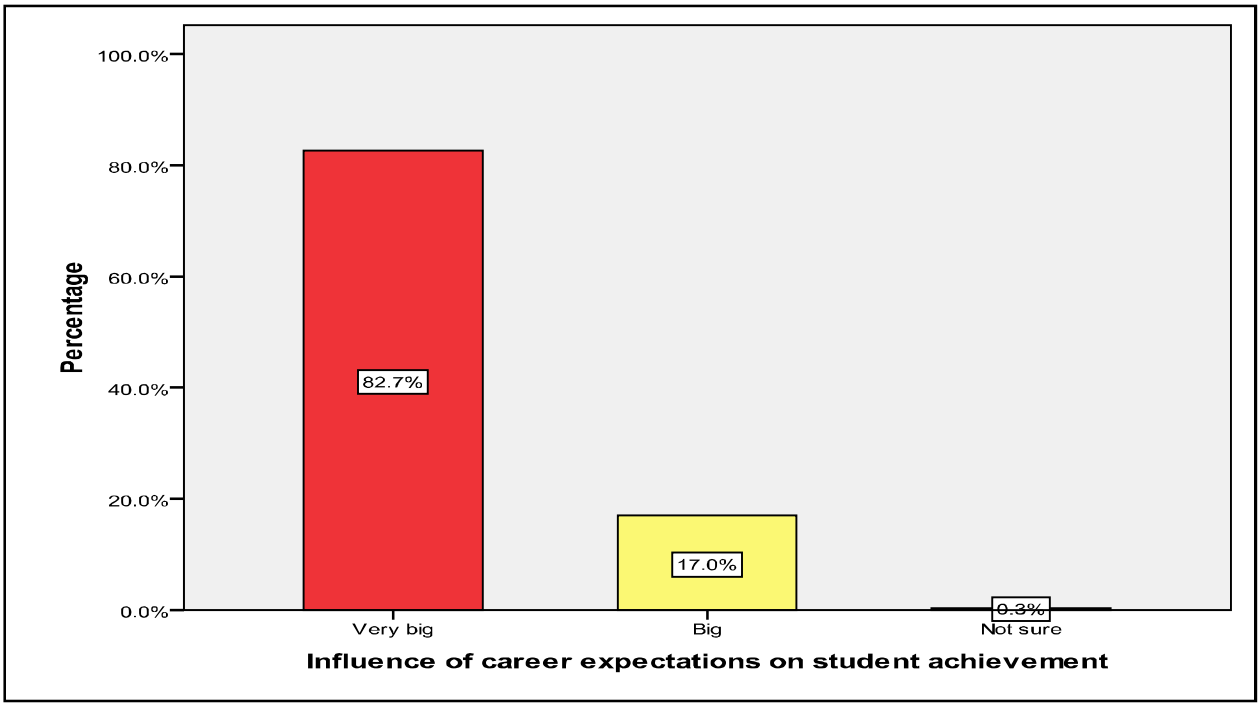

Figure 8: Influence of Career Expectation on Students' Achievement in Physics

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).

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%

Table 9: Cross Tabulation for Students' Gender vs Influence of Career Expectations on Students' Achievement in Physics

$\chi^2 = 19.29$; *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.

3.2.9. 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 9.

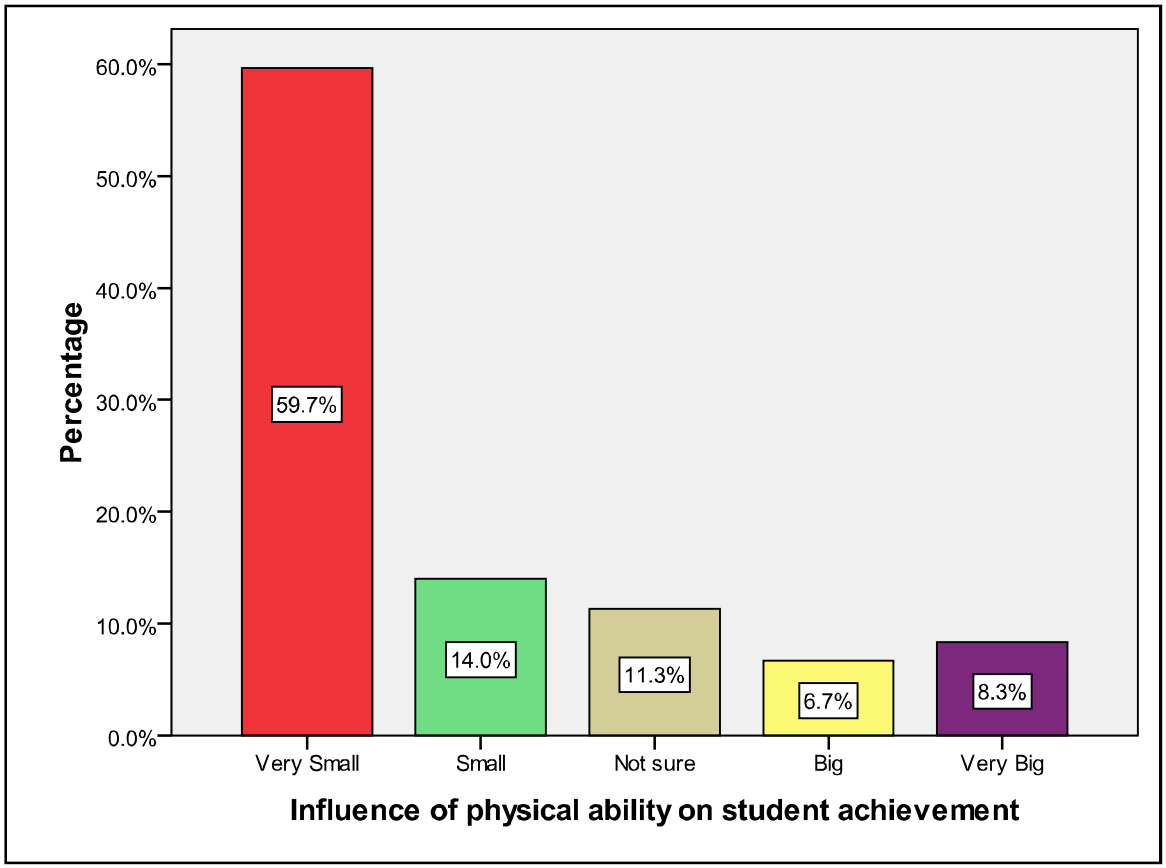

Figure 9: Influence of Physical Ability on Students' Achievement in Physics

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. Conclusion, Implications and Recommendations

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.

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 likelihood that girls are more affected by initiation ceremonies as compared to male counterparts. These findings seem to suggest that we should do away with female initiations especially those that negatively affect them.

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.

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