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Influence of Perceptions of Motivating Factors on Students' Achievement in Secondary School Physics in Tinderet Sub-County, Kenya

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Abstract:

This study sought to establish the Influence of 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 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. The reliability of the questionnaires was established through a piloting process undertaken in Nandi East Sub-county and was estimated using Cronbach's co-efficient test. The questionnaires were dully modified and used to collect the 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 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 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.

Keywords: Motivation, 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 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.

2. Results and Discussions

The study sought to determine the influence of Perceptions of Motivating Factors on Students' achievement in secondary school physics in Tinderet Sub-county, Kenya. The respondents were assessed on the following;

2.1. Socio – Demographic Characteristics of Respondents

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

2.2. 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 objective of the study.

2.2.1. 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.

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

Table 1: Influence of Access to Textbooks on Students' Motivation towards Achievement in Physics

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).

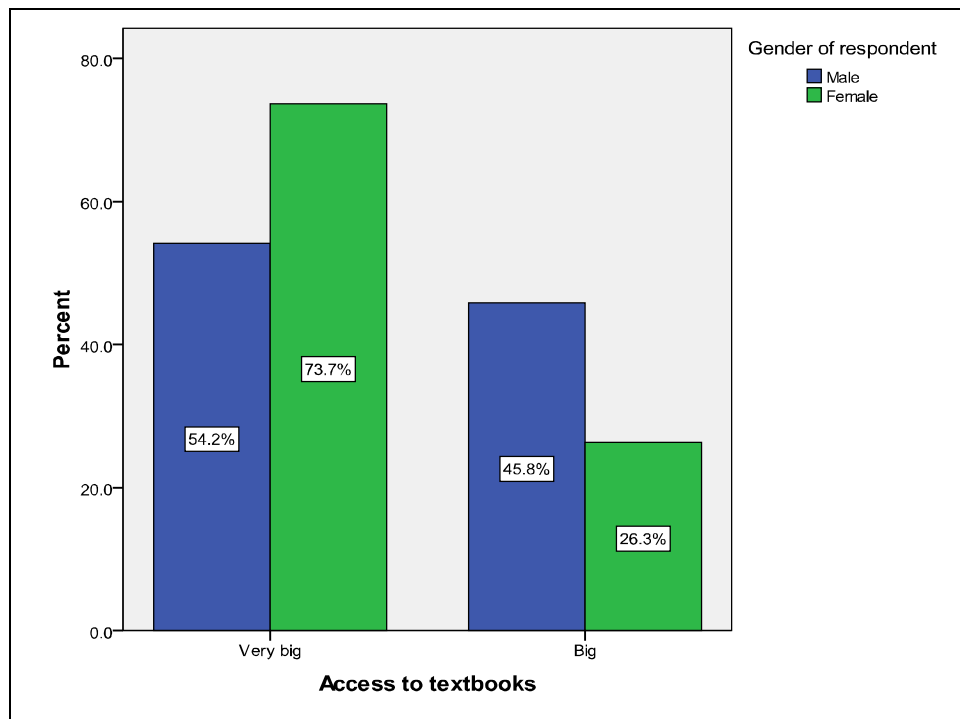


Figure 1: Influence of Access to Textbooks on Students' Motivation towards Achievement in Physics vs Pender of Respondents

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.

2.2.2. 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 1.

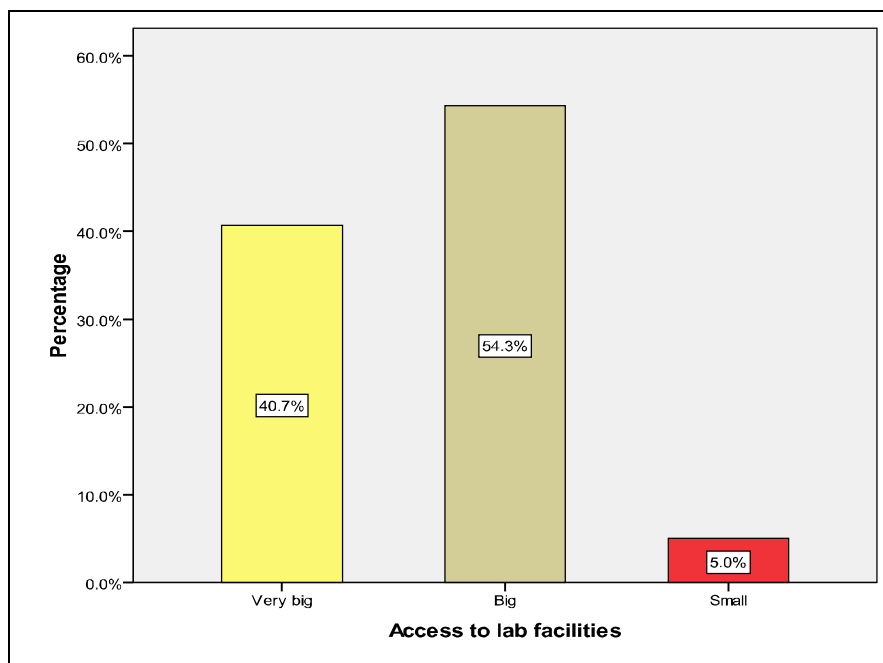


Figure 2: Influence of Access to Lab Facilities on Students' Achievement in Physics

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.

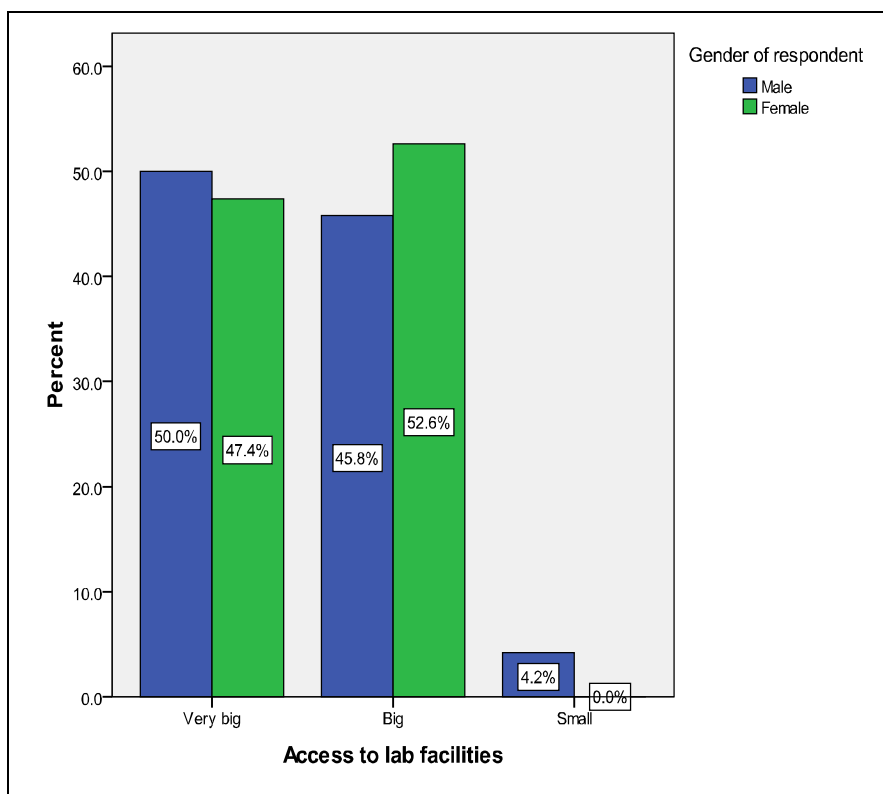


Figure 3: Influence of Access to Lab Facilities on Students' Achievement in Physics Versus Gender of Respondents

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.

2.2.3. 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.

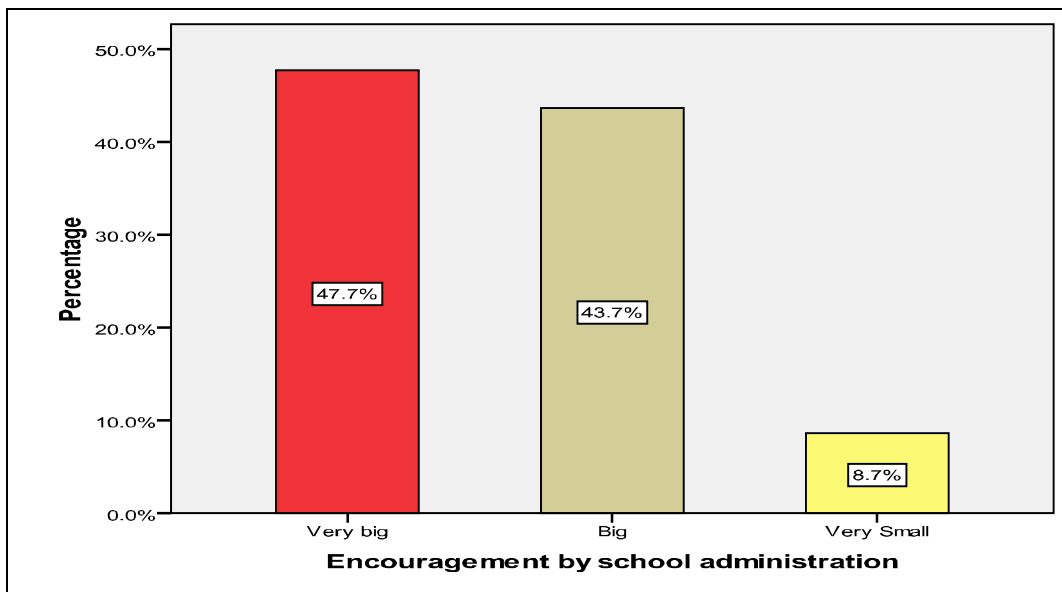


Figure 4: Influence of Encouragement by School Administration on Students' Motivation towards Achievement in Physics

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.

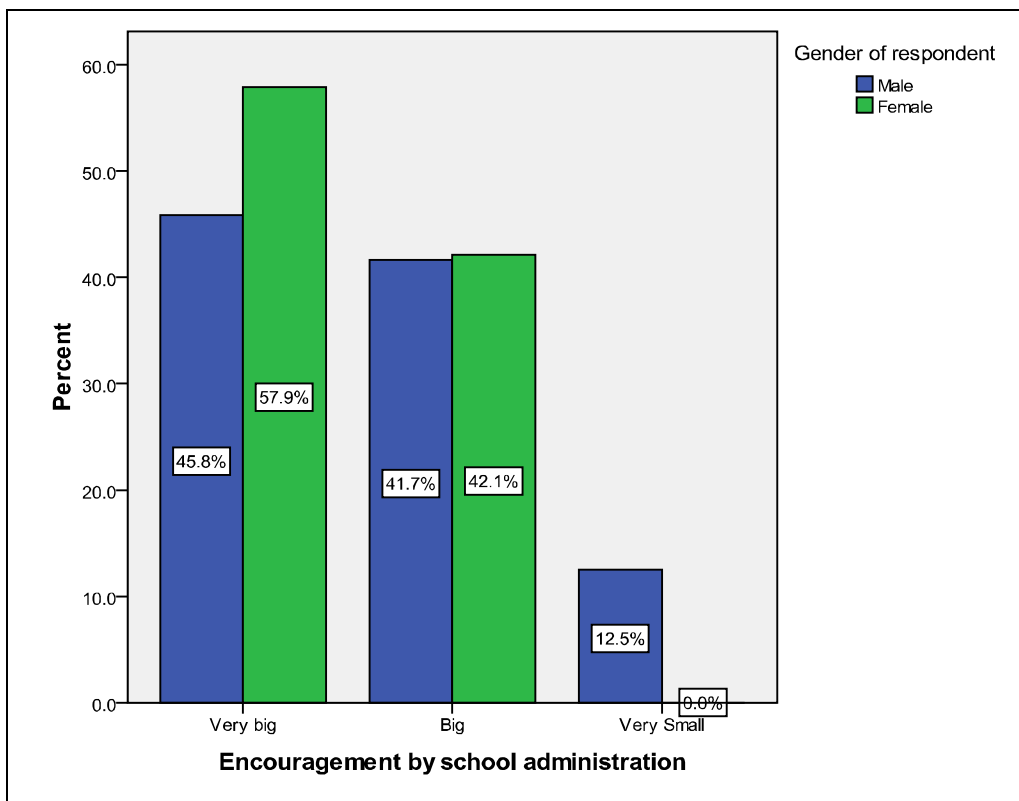


Figure 5: Influence of Encouragement by School Administration on Students' Motivation towards Achievement in Physics Versus Gender

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).

2.2.4. 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.

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

Table 2: Influence of Other Students' Cooperation on Motivation towards Achievement in Physics

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.

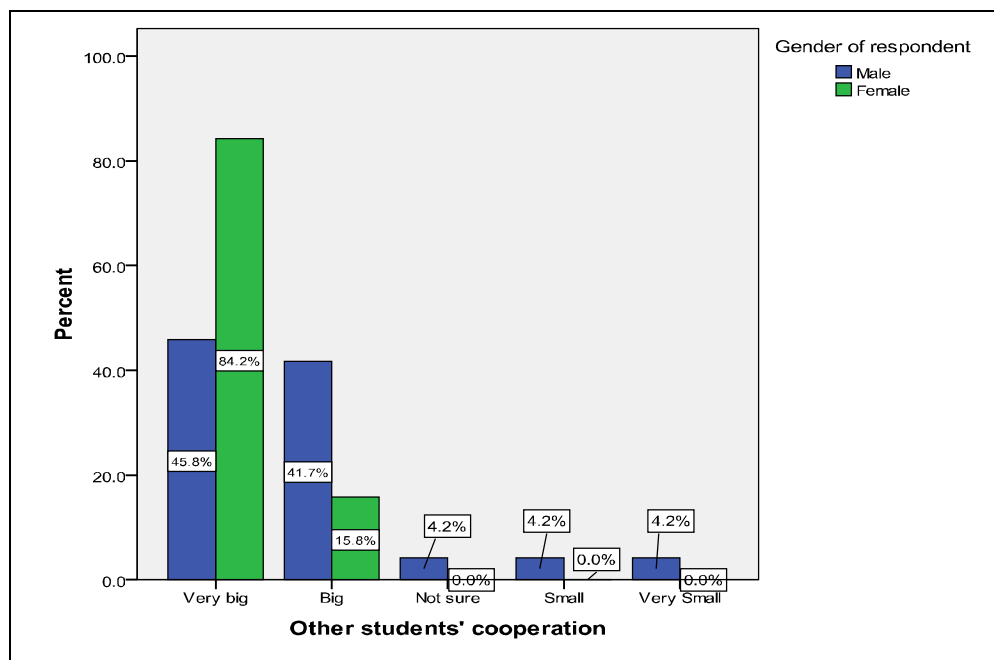


Figure 6: Influence of Other Students' Cooperation on Motivation towards Achievement in Physics versus Gender

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.

2.2.5. 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 7.

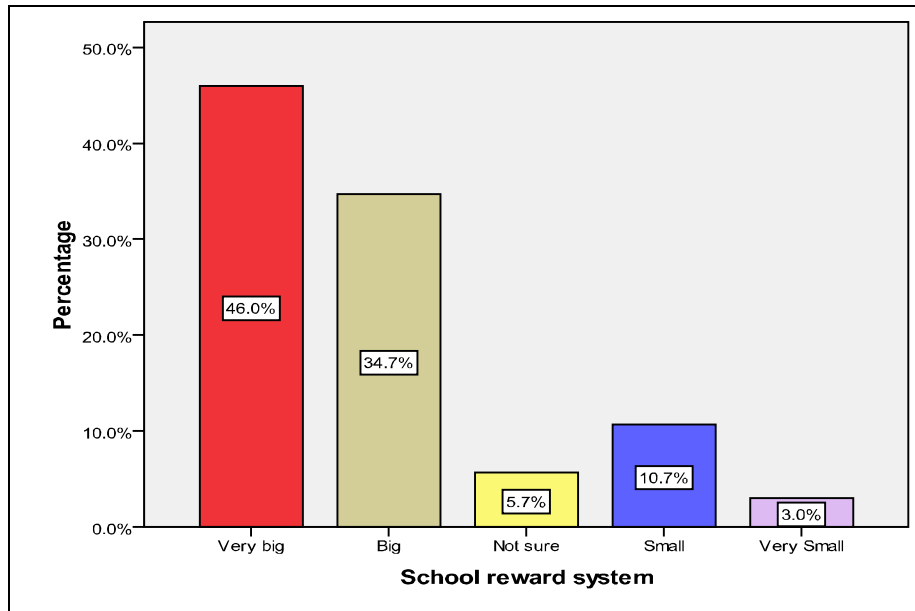


Figure 7: Influence of School Reward System on Students' Achievement in Physics

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).

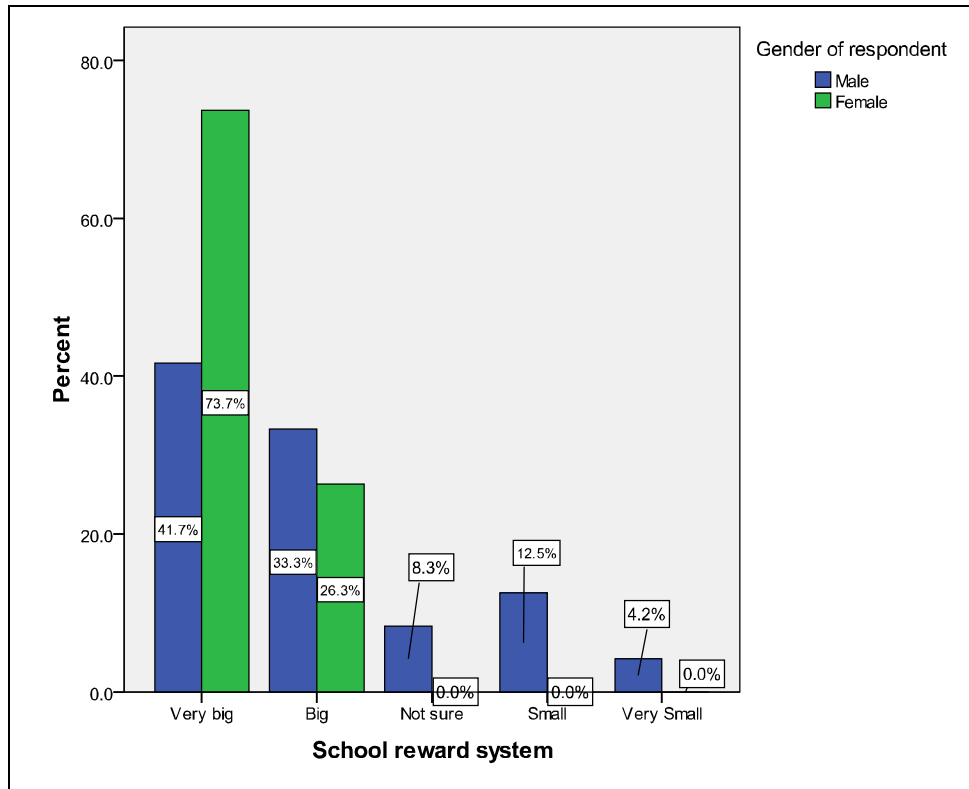


Figure 8: Influence of School Reward System on Students' Achievement in Physics versus Gender

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 genders, 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).

2.2.6. 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 9.

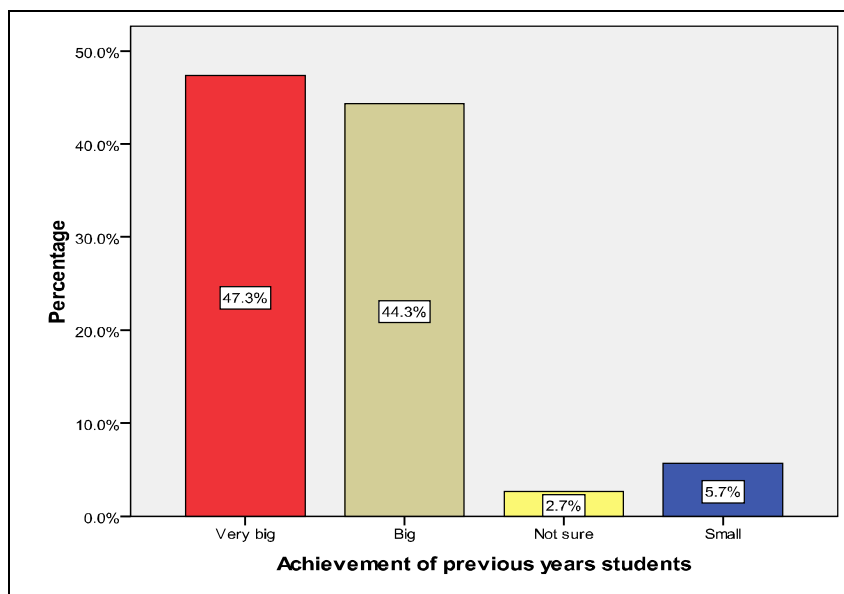


Figure 9: Influence of Achievement of Previous Years' Students' on Achievement in Physics

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.

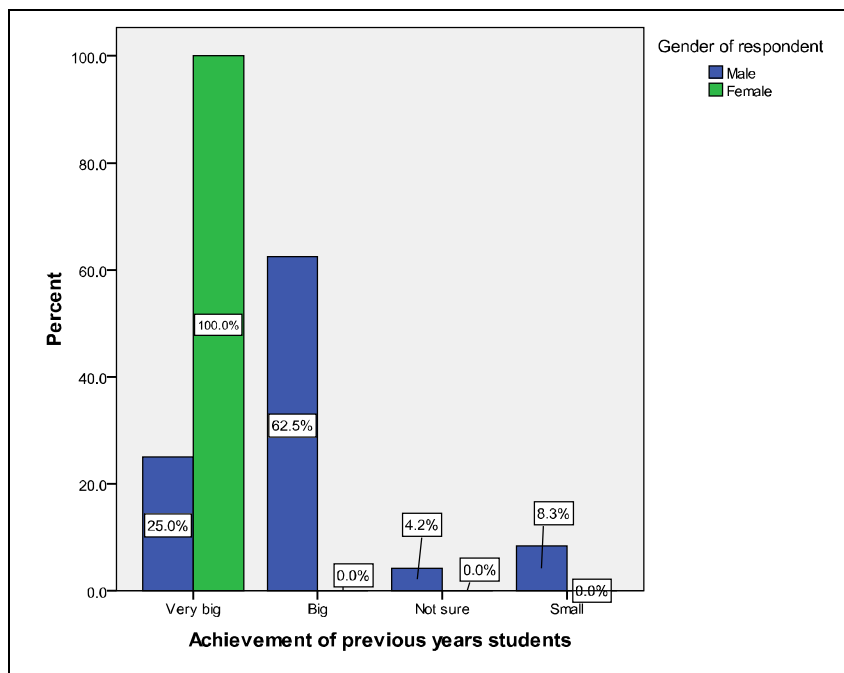


Figure 10: Influence of Achievement of Previous Years' Students' on Achievement in Physics versus Gender

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).

2.2.7. 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 11.

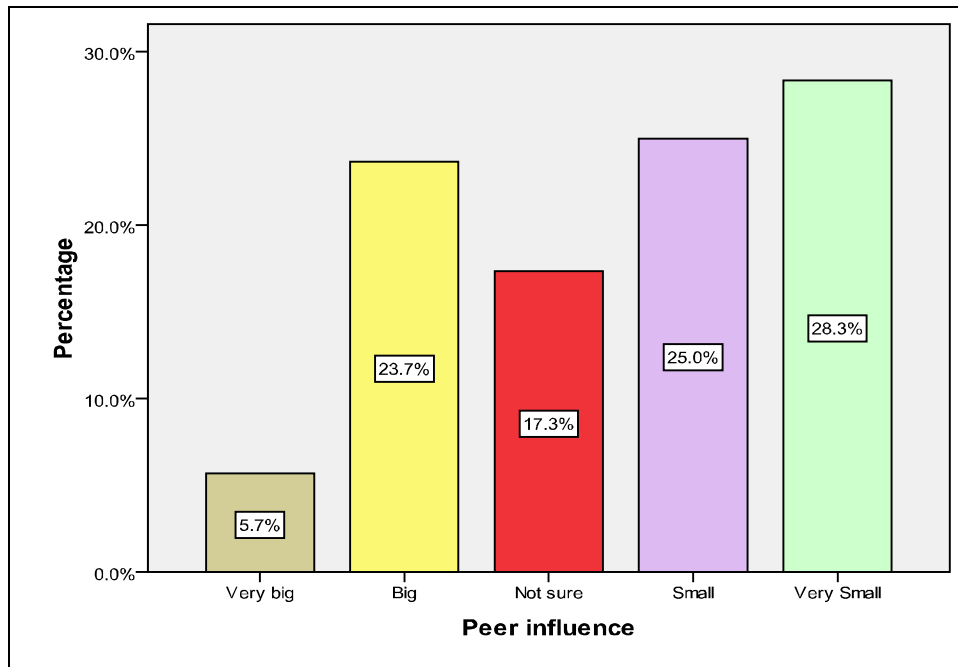


Figure 11: Influence of Peer Influence on Students' Achievement in Physics

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.

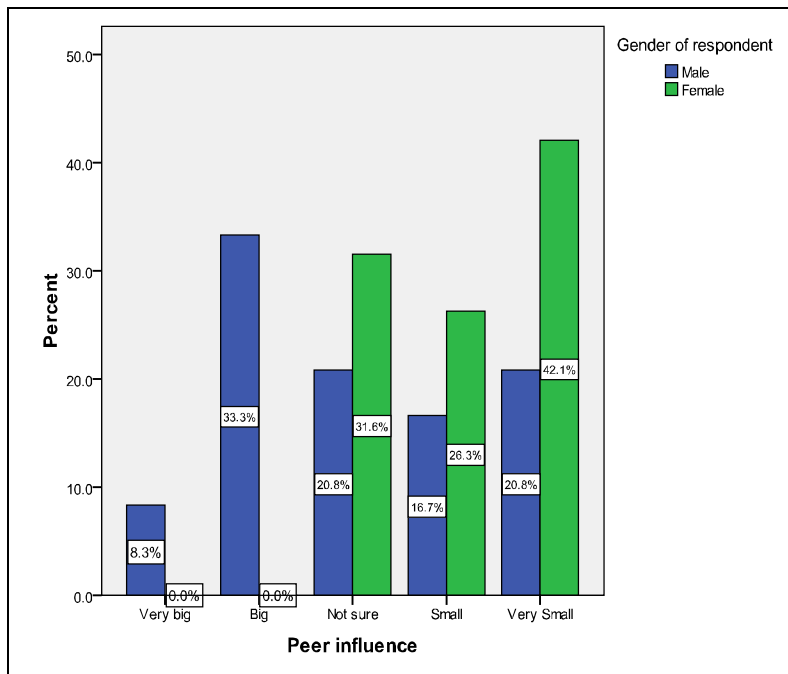


Figure 12: Peer Influence on Students' Achievement in Physics versus Gender

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).

2.2.8. 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.

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

Table 3: Influence of Parents' Co-operation on Students' Motivation towards Achievement in Physics

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.

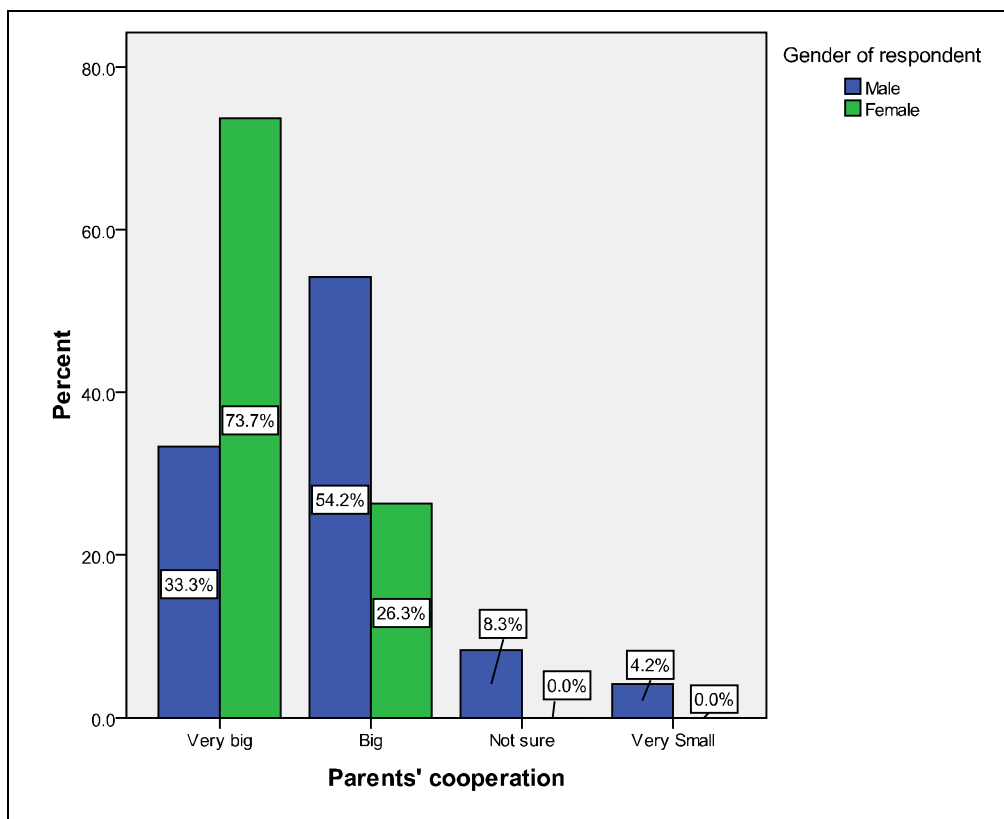


Figure 13: Influence of Parents' Co-operation on Students' Motivation towards Achievement in Physics versus Gender of Respondents

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 genders indicating that the factor had a varying level of influence across the two genders.

2.2.9. 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 14.

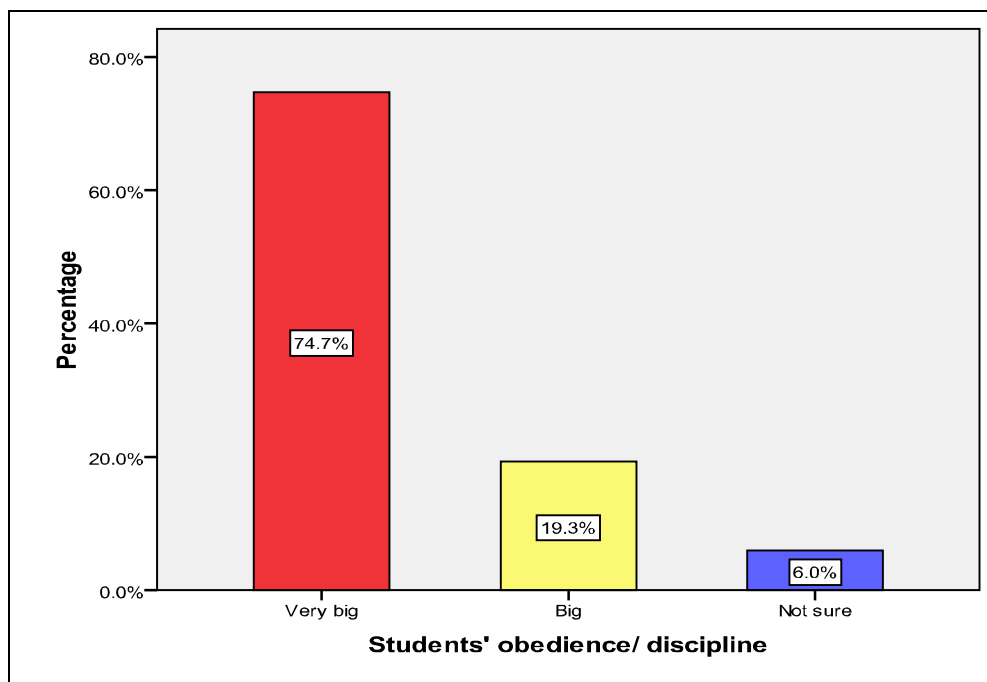


Figure 14: Influence of Students' Obedience/ Discipline on Students' Achievement in Physics

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.

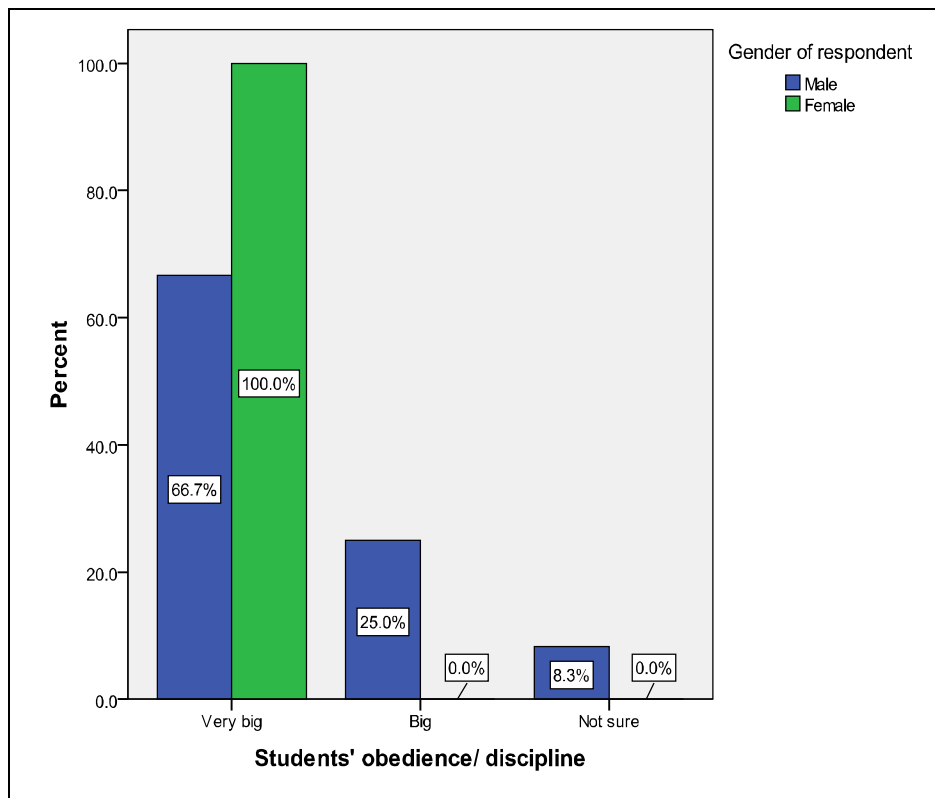


Figure 15: Influence of Students' Obedience/ Discipline on Students' Achievement in Physics versus Gender of Respondents

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.

2.2.10. 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 16.

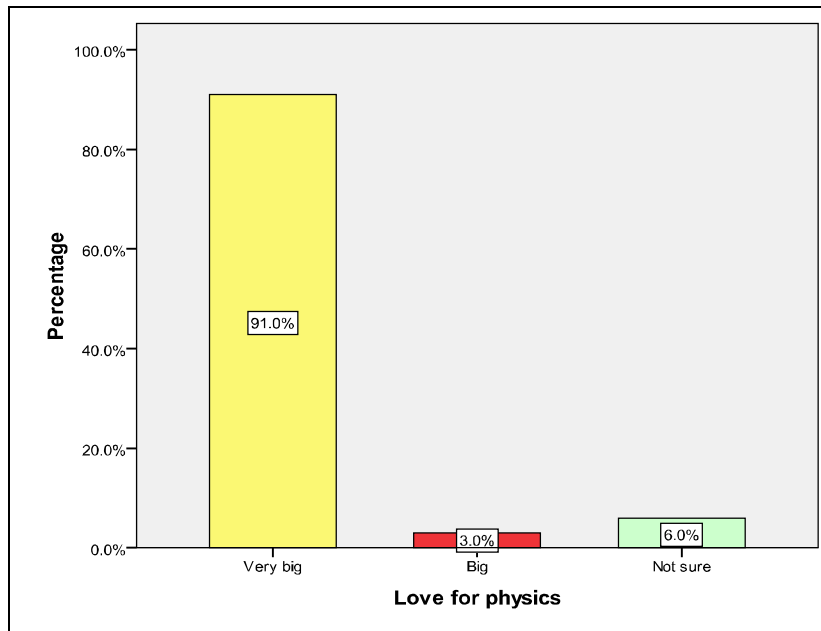


Figure 16: Influence of Love for Physics on Students' Achievement in Physics

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.

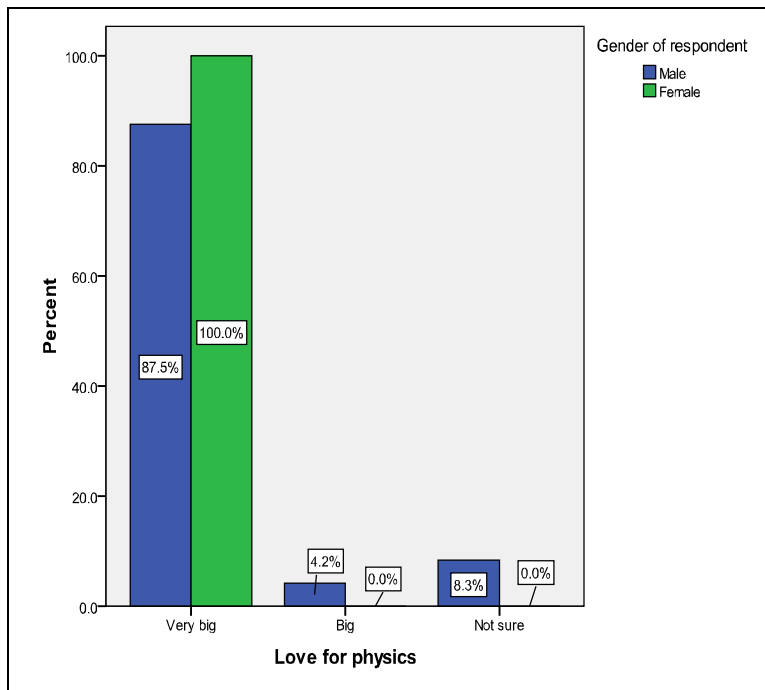


Figure 17: Influence of Love for Physics on Students' Achievement in Physics versus Gender of Respondents

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).

2.2.11. 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 18.

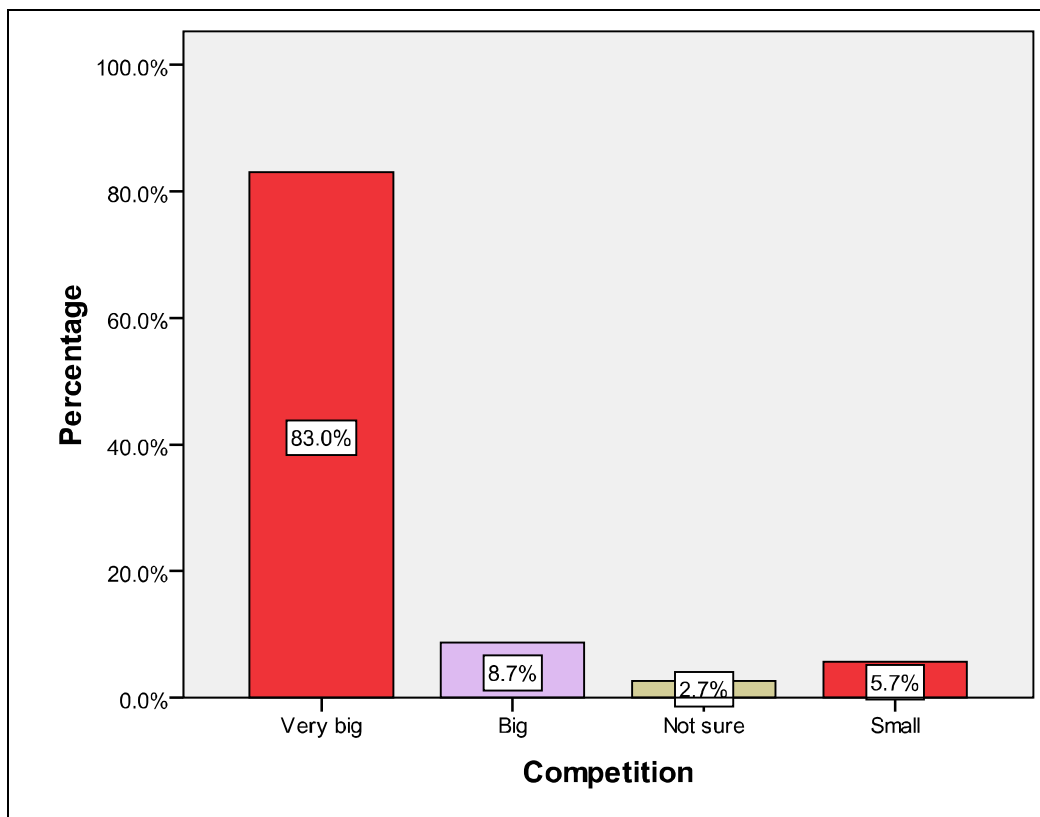


Figure 18: Influence of Competition on Students' Achievement in Physics

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.

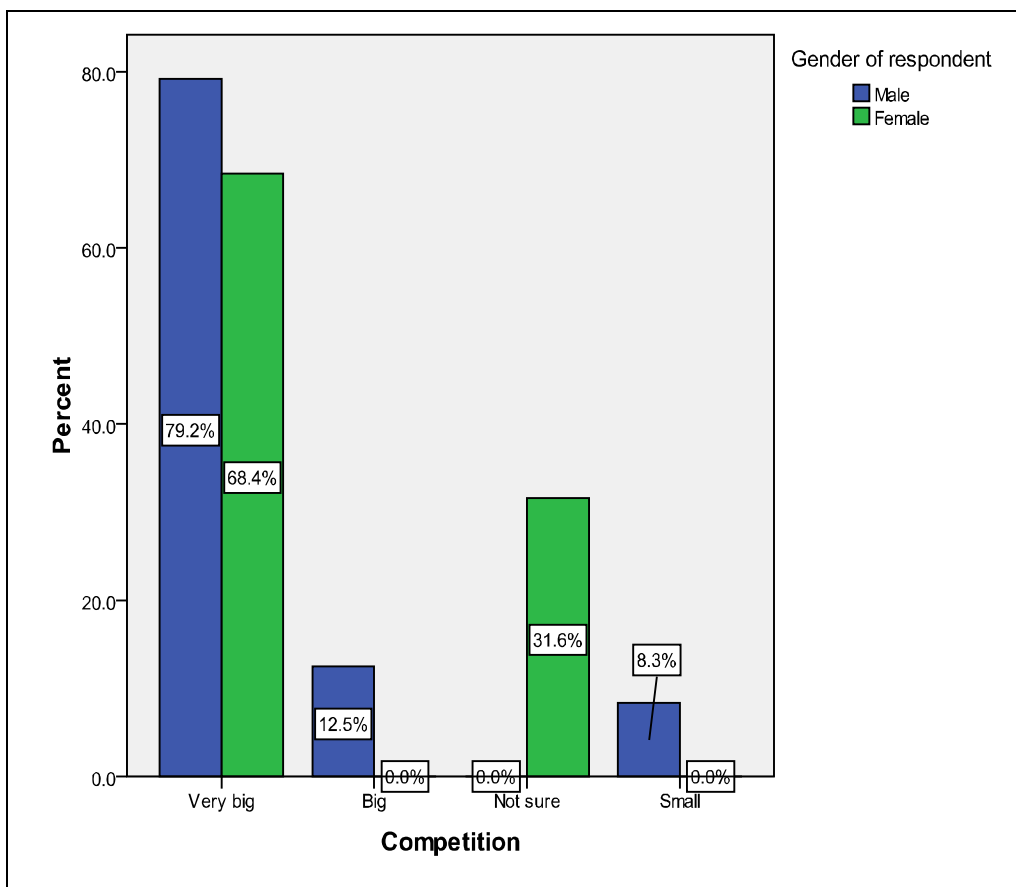


Figure 19: Influence of Competition on Students' Achievement in Physics versus Gender of Respondents

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

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

Link function: Logit.

Table 4: Model Fitting Information

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

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 pattern of interests becomes a pointer to the individuals future careers. Lack of interest is a recipe for frustrations which in turn causes anxiety. Anxiety may arise from such things like unrealistic fear, phobia, depression, rationale impulse among others (Walkins, 2000).

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