LOCUS OF CONTROL AND TEST ANXIETY AS CORRELATES OF PERFORMANCE IN PHYSICS AMONG FORM TWO AND THREE STUDENTS IN LAIKIPIA COUNTY, KENYA

BY

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DECLARATION

I declare that this thesis is my original work and has not been presented in any other university/institution for consideration. This research work has been complemented by referenced sources duly acknowledged. Where text, data (including spoken words), graphics, pictures or tables have been borrowed from other sources, including the internet, these are specifically accredited and references cited in accordance in line with anti-plagiarism regulations.

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This thesis has been submitted with my approval as university supervisor.

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DEDICATION

I dedicate this work to my family for your love, inspiration, patience and support. May you always find Favor and Grace in your journey to fulfill your purpose in life.

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ABBREVIATIONS AND ACRONYMS

ANOVA	-	Analysis of Variance
CSLCS	-	College Students' Locus of Control Scale
CSTAS	-	College Students' Test Anxiety Scale
GPAs	-	Grade Point Averages
IZOFs	-	Individualized Zones of Optimal Functioning
LOC	-	Locus of Control
RO	-	Religious Orientation
SPSS	-	Statistical Package for Social Sciences
TA	-	Test Anxiety
TAI	-	Test Anxiety Inventory
UEE	-	University Entrance Exam

ABSTRACT

The research issue addressed by this study was below average performance in physics in Laikipia County. The aim of this research was to examine locus of control and test anxiety as predictors of students' physics performance in public secondary schools in Laikipia County. The study was based on arousal performance theory and Locus of Control Theory. The study employed correlational research design targeting all the 22,091 students and 134 physics teachers in the 84 public secondary schools in Laikipia County. From the 84 public secondary schools in Laikipia County, 20 schools were sampled to take part in the study. From the 20 schools, 400 students from Forms Two and Three were proportionately sampled. Purposive sampling method was used to select one Physics teacher per school. The respondents for the study were therefore 400 students and 20 teachers which made a total sample of 420 respondents. Adapted locus of control and test anxiety questionnaires and interview guides were used to collect information. Piloting study was carried out in three schools using a sample of 30 students to test the validity and reliability of the research instruments. The study collected both quantitative and qualitative data. Inferential and descriptive statistics were used to analyse quantitative data. The statistics used include frequency counts, means, percentages, Pearson correlation analysis, ANOVA and the t-test. Qualitative data were thematically analysed as per the research questions. The findings revealed that there was a negative correlation between locus of control and physics performance (r_{pb} (400) = -.013, p = .79). The correlation was not statistically significant. Qualitative data obtained from the physics teachers showed that most of the students relied on external locus of control to perform well in physics. Regarding the association between test anxiety and physics performance, it was found that the two variables had significant negative correlation, r (400) = -.148, $p < 0.05$. Qualitative data showed that nearly half of the students scored low marks in physics because of test anxiety. It was established that the mean difference in locus of control scores between male and female respondents was not statistically significant (t (398) = - 1.13, $p > .05$). There was a significant mean difference in test anxiety scores between male and female respondents, t (398) = - 4.25, $p < .00$. The mean score difference in physics performance between male and female respondents was statistically significant, t (398) = 2.33, p = .020. The findings indicated that the differences in the mean scores of locus of control across the school categories were not statistically significant, F (2, 397) = 2.38, $P > .05$. It was also established that the mean differences in test anxiety scores across the school types were statistically significant, F (2, 397) = 2.25, $p < .05$. The mean difference in physics performance across the three categories of schools was significant, F (2, 397) = 33.78, p = .00. Based on the findings, policy makers should develop learning resources to train students on how to develop internal locus orientation to enhance physics performance. Parents, teachers and other stakeholders should constantly assist the students so that they can build confidence in their academic abilities and examination preparation strategies to reduce test anxiety. Policy makers and all other stakeholders in the education sector should come up with training and support programs to help students develop internal locus of control and reduce test anxiety levels.

CHAPTER ONE

INTRODUCTION AND CONTEXTUALIZATION OF THE STUDY

1.1 Introduction

This chapter highlights the background to the study, statement of the problem, purpose of the study, research objectives, research hypotheses, significance of the study, delimitation and limitations of the study, assumptions of the study, theoretical and conceptual framework and operational definition of terms.

1.2 Background to the Study

Physics is one of the science subjects that are taught in secondary schools in all education systems across the world. It is believed that physics is one of the oldest subjects taught in schools dating back to the time of great philosophers such as Aristotle, Plato and Socrates (Sutton, 2006). The subject has evolved over time to become a key pillar in the leading technologies that play a significant role in economic and social development all over the world. In this subject, concepts such as properties of matter, energy and nature, patterns and laws of the universe are taught. Owing to the technology based direction that world of schooling and work is taking; the role of physics knowledge and skills cannot be overemphasized (Murei, 2016). Secondary school education in this subject forms a basis for further education and training in physics related fields in tertiary institutions and universities.

Despite the high premium that is attached to physics education in this technological era, enrolment and performance in physics remain significantly low in most countries around the globe. In USA, Kelly (2013) reported that the minority groups were underrepresented

in science subjects. In reference to the Science, Technology, Engineering and Mathematics (STEM) survey that was carried out in 2011, the researcher noted that enrolment in physics among African-American and Hispanic students stood at 21% and 19% respectively. It was also reported that performance in the subject among majority of the students was below average. Ebora (2016) revealed that enrolment in physics in Batangas City in Philippines was low compared to the average national enrolment. However, the academic standing of the students enrolled in physics was satisfactory.

Ojih et al. (2016) state that despite the importance of physics as a unifying factor in this technological era, over the years performance in the subject has been deteriorating. The problem cuts across the secondary schools, tertiary colleges and universities. For example in tertiary institutions, the physics department enrolls a scanty number of students (Taale, 2011). This problem is universal and it seems to be creeping even to other physics related courses. Primarily, this problem begins in secondary schools when a few students choose to take physics a situation that is even complicated the more when majority of them perform poorly. Mbamara and Eya (2015) argued that the disparity in performance between physics and other science subjects is unacceptable. This problem continues to persist even when efforts have been made to ensure that all the science subjects are given equal attention.

Regionally, Semela (2010) noted that performance in physics related undergraduate programmes was dwindling. The researcher also revealed that the physics mean score in Ethiopian National Entry examination was low compared to other subjects. According to Munene (2014), performance in physics in Kenya has remained low over the years. It was established that a substantial number of schools were not offering physics in form three and four. Murei (2016) avers that despite the importance of physics education, performance

has not been remarkable. Very few students have been choosing the subject compared to other science subjects. In the last three years (2015-2017), the performance of students in physics in KCSE has not registered a significant improvement.

Table 1.1

Students' enrolment performance in Physics, Biology and Chemistry by gender in Laikipia County

Subjects	Gender	2017		2016		2015	
		Enrolment	Mean score	Enrolment	Mean score	Enrolment	Mean score
Physics	Male	519	4.521	428	4.208	389	4.136
	Female	310	4.427	304	4.114	256	4.106
	Total	829	4.474	732	4.161	645	4.121
Biology	Male	1245	2.118	1185	2.862	1104	3.392
	Female	1615	2.318	1501	2.906	1224	3.428
	Total	2863	2.218	2686	2.884	2328	3.410
Chemistry	Male	1530	2.788	1483	2.457	1272	3.181
	Female	1850	2.794	1625	2.449	1393	3.177
	Total	3380	2.791	3108	2.453	2665	3.179

Source: KNEC Annual Examination Report (2017)

Physics enrolment in Laikipia County is low compared to Biology and Chemistry. In year 2017, students who enrolled in physics were 829 compared to 2863 students in Biology and 3380 students in Chemistry. Furthermore, in terms of performance, students performed well in Biology and Chemistry compared to Physics. For instance, in the year 2017 students

obtained a mean score of 2.218 in Biology, a mean score of 2.791 in Chemistry and a mean score of 4.474 in Physics. In relation to gender, results in the table shows that there was a gender difference in both enrolment and performance in Physics among students in public secondary schools in Laikipia County. Male students performed well in Physics compared to female students. According to the report from the Ministry of Education, boys exhibit higher levels of spatial ability and hence this may explain the reason why there is a higher enrolment and performance in physics among boys than girls in national exams (KNEC, 2017).

Nationally, enrolment in Physics over the years in secondary schools has been low compared to other science subjects taking into account the role of physics in science, innovation and technology. Table 1.2 illustrates the enrolment trend of students who sat for Physics, Biology and Chemistry KCSE examination in years 2015, 2016 and 2017 respectively.

Table 1.2

Secondary Schools Students' National enrolment in Science Subjects

Subjects	Year		
	2015	2016	2017
Physics	139,100	149,790	160,186
Biology	463,564	509,982	545,666
Chemistry	515,888	566,836	606,518
Total	1,118,552	1,226,608	1,312,370

Source: KNEC Annual Examination Report (2017)

Table 1.2 shows a low enrolment trend of students in physics compared to Chemistry and Biology in years 2015, 2016 and 2017. It is therefore clear that there are various factors which lead to low enrolment of students nationally in physics compared to the other two optional subjects. A number of studies have been conducted to investigate the factors associated with enrolment and performance in physics. The factors that have been associated with this problem include; negative attitude towards the subject, teaching methods, learner's ability and lack of learning materials (Kweya, et al., 2015; Lyons, 2005; Munene, 2014). However, little is known on how locus of control and test anxiety influence performance in physics, hence the need for this study.

Locus of control is a popular construct in educational research that is based on social learning theory. It refers to the way students account for personal successes and failure in school (Zisan, 2010). According to Miu (2010), those people having an internal locus of control are said to attribute happenings in their lives to the consequences of their own deeds while those people having an external locus of control hold the belief that most of life events occur by chance. Therefore, those students having internal locus of control believe that their behaviours and the outcomes of such behaviours are directly related. As a result, such students seek to gain more control over their academic experiences than those students with external locus of control. Locus of control greatly impacts on the lives of learners, primarily because their decisions in relation to academic achievement, discipline, interpersonal relationships, career decisions, and health are affected by their perception of control (Shinde & Joshi, 2011). It is also one of the major factors which influence people's test anxiety level and consequently their academic performance (Akca et al., 2015).

Test anxiety refers to that feeling of apprehension or uneasiness that students normally experience before, during or after a test because of fear of uncertainty, concern, or worry. Zeidner (1998) defines test anxiety as the physiological, behavioral, and phenomenological responses accompanying concerns regarding possible negative outcomes (such as failure) in a test or other evaluation situations. Test anxiety may be described as the feeling that students have in situations where the outcome really counts or where there is intense pressure to perform well. Some students are considerably distressed by the test taking experience to a point where they are unable to fully demonstrate their potential. For such students, the time spent in examinations becomes excruciatingly painful moments where their self-efficacy and motivation are at risk (Hu, 2017). Students who continuously experience failure in examinations or low-test performances in spite of great effort may develop feelings of incompetence and shame. In addition, test anxiety, and the consequent poor performance in tests, has been shown to negatively influence both self-esteem and self-efficacy (Valiune & Perminas, 2016). Therefore, it can be concluded that students are influenced psychologically, physically and academically by the examinations that they take.

Test anxiety has been shown to be correlated with personality variables such as neurotism and extraversion (Gupta & Dutta, 2012). On the other hand, Asmali (2017) established that examination anxiety is negatively associated with extraversion personality traits, imagination and emotional stability. Evaluative tests are common in life – whether they are school tests to measure content masterly such as national examinations, or evaluations given to employees for promotion decisions (Mukolwe, 2015). Whatever the objective, tests come with a lot of pressure of achievement and in many cases this leads to test-related

anxiety (Huberty, 2010). Some students, even though possessing high levels of meta-cognition skills, end up failing to show in examinations the content knowledge gain during the learning period. A student may be well disciplined, attends all lessons, do all his/her assignments, yet perform poorly in examinations. Such a student can be said to be manifesting test anxiety (Onyekuru & Ibegbunam, 2014).

A Kenyan study by Syokwaa et al. (2014) revealed a prevalence of test anxiety level of 27% among students in secondary schools. The study also established that test anxiety was significantly related to academic performance, with girls being more prone to test anxiety. The researchers also found that students with high test anxiety levels performed poorly in examinations, suggesting a negative correlation between the two variables. Similarly, Mukholwe (2015) found that majority of Kenyan students experienced test anxiety which correlated negatively with academic achievement. Poor performance in physics by students in Kenyan secondary schools has been of concern to researchers such as Njiru and Karuku (2015). Little has been done on the relationship between test anxiety and physics performance in Laikipia County. As such, this study sought to find out the role of locus of control and test anxiety in predicting students' physics performance in secondary schools in Laikipia County.

1.3 Statement of the Problem

The central problem addressed by this study was the low enrolment and poor performance in physics. The fact that a small percentage of students in Kenya, and specifically in Nyahururu Sub County, choose physics as an examinable subject presents a significant challenge to the overall qualification of the general work force. Despite the low enrolment in physics, performance in the subject has been consistently below average. In secondary

schools, the fact that selection of a course has a direct relationship with the student's achievement in the subject could be the reason why physics is less appealing to many students especially the weak ones.

Continued low enrolment and poor performance in physics would derail the country's social and economic development especially in this technology era due to insufficient skilled labour force. Owing to the practical nature of physics as a subject, a well-grounded understanding of its concepts has the potential of creating employment and enhancing innovation to improve the quality of life. This is important especially at this moment when the county and the country at large are struggling with a myriad of challenges such as high rate of unemployment and inadequate usable skills among graduates. Therefore, due to the vast negative effects associated with low enrolment and poor performance, this problem urgently requires empirical investigation to arrest the situation.

Many studies have been conducted globally and nationally on causes of poor performance in physics and the findings have attributed these to: lack of instructional materials, inappropriate pedagogy, ill equipped laboratories, low mastery of the content by teachers and negative attitude of the teachers and students among others (Heidi et al., 2007; Omar, 2017). However, empirically it is not clear the role played by test anxiety and locus of control in determining students' performance in physics. Students with internal locus of control believe that they are the cause of their success or failure which makes them to become more self-reliant in problem solving and achieving their goals due to believing in their ability to do so. Does it automatically follow that internal locus of control is associated with lower levels of test anxiety and better performance in physics? This study explored for answers to this research problem.

1.4 Purpose of the Study

The purpose of this study was to examine the extent to which locus of control and test anxiety are related to students' physics performance in public secondary schools in Laikipia County in an effort to provide empirical data to address the problem of low performance in physics.

1.5 Research Objectives

The objectives of the study were:

i. To find out the relationship between locus of control and physics performance among secondary school students in Laikipia County.
ii. To establish the relationship between test anxiety and physics performance of secondary school students in Laikipia County.
iii. To find out whether there is gender difference in locus of control, test anxiety and physics performance among secondary school students in Laikipia County.
iv. To find out whether locus of control, test anxiety and physics performance of secondary school students differ by school type.

1.6 Research Hypotheses

The following alternative hypotheses were tested:

H_{a1} There is a relationship between locus of control and physics performance among secondary school students in Laikipia County.

H_{a2} There is a relationship between test anxiety and physics performance among secondary school students in Laikipia County.

H_{a3} There are gender differences in, test anxiety, locus of control and physics performance among secondary school students in Laikipia County.

H_{a4} There are differences in locus of control, test anxiety and physics performance of students across school type.

1.7 Significance of the Study

The study findings may help teachers of physics to understand the individual differences that influence students' performance in physics. By studying the impact of test anxiety on performance in physics, teachers may be in a position to design intervention measures that could assist those high levels of anxiety. Similarly, teachers and teacher counselors may be in a position to assist those students with external locus of control, thus improving performance in physics. This may help the students to excel in physics and pursue key careers such as engineering and agriculture that significantly contribute to social and economic development. The study may also make a contribution to empirical literature on test anxiety, locus of control and students' performance in physics.

1.8 Delimitation and Limitations of the Study

1.8.1 Limitations of the Study

There was no control of the responses that were provided but the researcher explained the purpose of the study to increase the reliability of the responses. The study was carried out in selected public secondary schools in Laikipia County. Therefore, generalization of the results can only be done with caution.

1.8.2 Delimitations of the Study

Owing to the large number of the schools in Laikipia County, the study was conducted in only selected secondary schools. The study used a representative sample to increase the external validity of the results. There are many personality variables that could be associated with performance in physics. In this study however, only locus of control and test anxiety were studied. This is because these factors have not been extensively studied especially in Laikipia County.

1.9 Assumptions of the Study

The following were the study assumptions: that all the schools that participated in this study had sufficient and adequate infrastructure and learning resources for effective teaching and learning of physics. The teachers and students were to cooperate in providing relevant, honest, accurate and reliable information to enhance the credibility of the findings.

1.10 Theoretical and Conceptual Framework

1.10.1 Theoretical Framework

The study was anchored on two theories in order to explore the relation between the two main research variables: Inverted -**U**-Principle theory (Yerkes & Dodson, 1908) and Locus of Control Theory (Rotter, 1966). The two theories are described below.

a) Arousal and Performance Theory (Yerkes & Dodson, 1908)

Arousal and Performance theory is based on the Law of Drive Theory by Yerkes and Dodson (1908). The theory describes how arousal is associated with performance. Arousal is defined as the magnitude of activation or excitement that is produced in the central nervous system in order to elicit the production of the energy that is needed for performing

a given task (McCandless, 1967). The amount of arousal that an individual experiences determines how effective the individual is in performing a given task. The main argument in the **U**-principle theory is that high level of arousal increases performance. However, very high continuous levels of arousal would lead to deterioration in performance (Galvin, 1994). It follows that, at the beginning of arousal state, people have confidence in their ability to control arousal pressure, and this is associated with improved performance. But when arousal pressure is too high, individuals begin to have doubts in their coping abilities, and their performance starts to go down.

Therefore, a progressive relationship exists between levels of arousal and student's capacity to perform optimally in academics. If a student is very anxious, this could interfere with performance since the student's concentration starts focusing more on the build-up in anxiety, thus losing focus on the task. This shifting of attention causes anxiety levels to rise, resulting in the individual's failure to maintain a balance that is needed in order to perform effectively.

The arousal – performance progression is a gradual process, starting at a low level, then going to the highest levels. At every level, the functioning of an individual changes in conformity to the corresponding interaction between arousal and performance. When the level of arousal is high, the individual gradually improves his/her quality of performance, until arousal reaches the optimal point at the top of the inverted 'U'. However, when arousal level rises above the optimal point, the individual's performance starts to lower, up to a point whereby arousal level is too high results to dismal performance (Rathus & Nevid, 1995). Borrowing from this theory, it can be argued that solving a simple or easy Physics task is normally facilitated by high level of arousal as it would not need simultaneously

focusing on several factors (Galvin, 1994). However, solving a complex physics task that requires many steps would call for lower arousal levels. Both under-arousal and over-arousal could lead to negative performance effects in physics. This theory was important to this study because it provides explanations regarding the effects of anxiety levels on the student's performance in physics. Arousal and performance theory does not provide an explanation how physics students associate their performance; whether it is influenced by external or internal factors. Locus of control theory was therefore used to complement arousal and performance theory.

b) Locus of Control Theory

This theory that was proposed by Julian Rotter (1966) falls under the social learning theories category, and is an approach that focuses on learned behaviour. For Rotter, as for other social learning theorists, man's behaviour is directional and goal determined; an individual will respond to the behaviour that will give him maximum satisfaction in any circumstance. The theory places considerable weight on the idea that an individual learns which behaviours are likely to provide the most satisfaction in any given situation. Rotter shuns determinism and believes in freedom of movement, that is, the belief that the behaviours which an individual has learnt to depend on to meet his/her needs will actually lead to satisfaction of the needs (Rotter, 1982). High freedom of movement refers to an individual's expectancy that many of his or her behaviours will lead to success while low freedom of movement refers to his or her expectancy that the behaviour will be unsuccessful (Ryckman, 1978).

The concept of locus of control originated from the theory of social learning (Rotter et al., 1972). Lefcourt (1991) points out that, in terms of social learning theory, locus of control

develops out of generalization from a build-up of specific experiences which enables people to perceive the sequences of their lives. In other words, locus of control is referred to as the assumed states which serve to demonstrate why some individuals' aggressively, tenaciously, and freely try to deal with difficult situations, while other people give in to a range of negative emotions. For some people, most of the experiences in life are dependent on the effort put in pursuit of goals. Such individuals end up believing that outcomes are generally dependent on the personal effort put into them, and as a result such individuals are more likely to expend more effort pursuing tasks that are important to them (Lefcourt, 1991).

In contrast, people who operate from milieus that are less responsive can fail to see the links between efforts expended in a task and outcomes. For example, in communities where graft, nepotism, and other unjust practices dominate the economic scene, people mostly perceive success largely as a function of being related to the right people (or luck) than it is of effort or ability. As a consequence, people in such communities may end up spending more of their time and effort in activities such as prayer or gambling, instead of instrumentally engaging in behaviours that would help to create the desired outcomes (Lefcourt, 1991).

Locus of control therefore is a generalized expectation about the causation of the drive behind any behaviour or outcomes, with one end of the un-dimensional continuum labelled internal, and its opposite end labelled external. Students with an internal locus of control are said to hold the conviction that they are the cause of the reinforcements that they experience; in other words, such students believe that their actions or qualities are key determinants of the outcomes in their lives. On the contrary, students with an external locus

of control hold the belief that the outcomes they experience are mainly a result of outside factors for example luck, other individuals or social context (Lefcourt, 1991). According to Rotter (1982), excessive belief in either external or internal locus of control is unhealthy and unrealistic. However, empirical evidence has demonstrated that internal locus of control is associated with many positive outcomes and this has been shown by Engler (1999) to be more conducive to positive social adjustment and functioning. This theory was the most appropriate for this study because it explains how physics students attribute their success or failure in the subject. The theory provided a basis for understanding the reasons the students give for the grades they score in physics. This study sought to establish if locus of control is associated with test anxiety among students.

1.10.2 Conceptual Framework

This study aimed at establishing the role of locus of control and test anxiety in predicting physics performance among secondary school students in Laikipia County, Kenya.

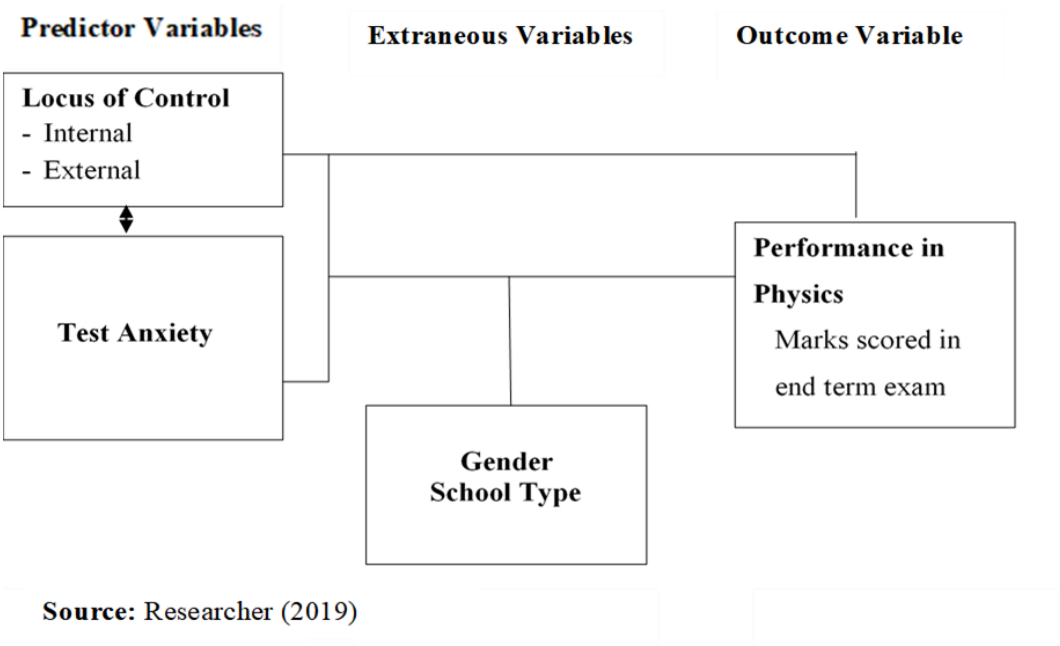

Figure 1.1 Conceptual model for the study variables

The predictor variables of the study were locus of control and test anxiety. Locus of control consists of two levels; external and internal. Levels of test anxiety were grouped as normal, moderately high, high or extremely high (Rajiah et al., 2014). In line with the Inverted -U-Principle theory (Yerkes & Dodson, 1908), it was expected that learners exhibiting high levels of examination anxiety performed poorly in Physics examinations as compared to those with moderate or low levels of test apprehension. The study was also to find out whether students with an external and internal locus of control differ in test anxiety levels and performance in Physics. The dependent variable of the study was students' performance in physics, which was measured using students' performance in the subject in the previous end-of-term examinations. The study also had one intervening variable, that is, students' attitude. It was hypothesized that the student's attitude may affect the association between locus of control, test anxiety and performance in physics.

1.11 Operational Definition of Terms

Externals This is the student's score on the belief that external factors, for example other people, luck or social context influence their physics performance

Internals It refers to the student's score on the belief that he/she is responsible for the reinforcements experienced while learning physics

Locus of control This is the student's score on the general expectation about the causation of reinforcements or performance in physics

Physics Performance Refers to the grade or total score that a student obtains in a physics examination. It was standardized to make it comparable

Test Anxiety A score on the student's feeling of apprehension or uneasiness experienced before, during or after a test as a result of worry, concern or fear of uncertainty

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter presents a review of literature related to the study. The literature was reviewed under the following themes: locus of control and test anxiety; locus of control and academic performance; test anxiety and academic performance; and gender differences in locus of control, test anxiety and academic performance. Thereafter a summary of the reviewed literature is provided.

2.2 Relationship between Locus of Control and Academic Performance

Academic performance is considered to be a very crucial factor to measure learners' performance in an educational setting. It is also used to determine one's future in the occupation sector and promotion related aspects. According to Al-Anzi (2005), academic achievement has a great impact not only to the learners, but also to the people and the environment surrounding them. An individuals' personality and belief in the causes of his/her success or failures plays a very important role in influencing their academic achievement. Students' LOC is one of the vital aspects in an academic setting (Choudhury & Borooah, 2017). The following are the previous studies conducted to examine the relationship between LOC and academic performance among students.

A research by Nejati et al. (2012) examined the association between LOC and the academic performance of learners while controlling for satisfaction with quality of life. The study sample consisted of 267 university students from Iran University. The findings of the study revealed a significant positive correlation between LOC and students' academic achievement. However, LOC was found not to be significantly related to quality of life and

life satisfaction. Since the study involved a sample of university students, there was need to involve a sample of secondary school students to find out if similar results would be obtained.

Abid et al. (2016) investigated the influence of LOC on academic achievement of college students. Students' LOC level was evaluated using the Internal-External LOC Scale (Rotter, 1966). Descriptive statistics and linear regression analysis were used in data analysis using SPSS program. The study found out that students who were internally oriented in LOC performed better in academics and they were more effective and proactive in the classroom. Conversely, students with an external LOC were more passive in class. The study focused on general academic achievement while the current research focused on physics performance for more specific findings.

In another study, Kader (2014) examined the association of locus of control, student's motivational orientation, and performance in a microeconomics course. The findings of the analysis revealed that students with internal LOC performed better in examinations, reported lower levels of test anxiety, were more superior in mastery approach, and expended more effort in academics than students with external LOC. In addition, linear regression results showed that LOC had significant negative effect on academic achievement. In his study on the link between LOC and the academic achievement of first- and second-generation learners, Bostic (2010) established that students with an internal LOC significantly differed in academic performance with their counterparts with external LOC, with the internally oriented students performing better.

Choudhury and Borooah (2017) conducted a correlational study with the aim of examining the association of LOC with academic performance of undergraduate college students. This study selected 240 female and male university students to participate in the study. The results indicated that external LOC and academic performance of the students were not significantly related. This means that increase in the level of external LOC does not enhance academic achievement level of the students.

Hrbackova et al. (2012) set out to examine the link between LOC, meta-cognition and learning outcomes. The statistics used in this study were correlation analysis and regression analysis. These statistics were used with an aim of exploring the moderating effect of meta-cognition in the association between LOC and academic performance. The findings of the analysis revealed that internal LOC had a direct influence on both academic performance and meta-cognition. Nonetheless, external LOC did not affect academic achievement either directly or through meta-cognition. It was also revealed that internal LOC and academic achievement were not significantly related with meta-cognition.

Nongtdu and Bhutia (2017) conducted a study to investigate the relationship between LOC and academic achievement of students sampled from a University in Meghalaya state of India. This study employed a descriptive survey design targeting a sample of 797 students. The study established that a significant proportion of students had an average internal and external LOC. In particular, the researchers found significant differences in internal LOC scores of urban versus rural students, Commerce versus Science students, and Science versus students taking Arts courses but it was revealed that there were no significant gender differences in internal LOC score and Arts versus Commerce students. It was also revealed that no significant differences existed in external LOC across gender, locale, and between

Commerce versus Arts students; but significant differences were identified between Commerce versus Science and between Arts versus Science students. From these findings, the researchers arrived at the conclusion that internal LOC and academic performance were positively correlated for learners pursuing different courses, and with respect to both gender and rural-urban college settings. The study also concludes that students in both urban and rural colleges didn't have significant difference across gender in terms of their external LOC and academic performance.

Hassaskhah and Jahedi (2015) examined the association between LOC and academic performance. The researchers adopted non-experimental ex-post facto design. The study sampled 387 students majoring in English from different universities in Iran. Data used for this study was collected using Internal-External LOC Scale (Rotter, 1966). The findings of this research revealed that there was a significant correlation between LOC orientation and academic performance. It was further established that high levels of external LOC were associated with an increase in the probability of performing poorly in examinations whereas an increase in internal LOC led to improved academic performance.

2.3 Relationship between Test Anxiety and Academic Achievement

The phenomenon of anxiety is a common occurrence in the lives of human beings, and its effects are felt in how effectively people perform different tasks. A moderate amount of anxiety is necessary to keep people working hard and taking responsibility of what they do (Donnelly, 2009). However, when anxiety level increase, people's physical and mental health is threatened, and this could negatively affect their performance at personal, social or educational settings (Zahrakar, 2008). Tugan (2016) examined the link between test anxiety and academic performance of Turkish students attending 9th grade in a private high

school. Data used for this study were collected using Driscoll's (2007) WTA scale. Academic performance of the students was measured using English language proficiency and high school placement scores. The researcher used Pearson product moment correlation analysis to examine the relationship between academic performance and students' test anxiety scores. From the study findings, it was established that test anxiety and academic performance were negatively correlated.

Onyekuru and Ibegbunam (2014) designed a correlational research to investigate the relationships of LOC, test anxiety, and academic performance of students. The target population comprised of 498 respondents. Among them, 364 students were sampled to participate in the study. The researchers utilized two instruments to collect data: College Students' LOC Scale and the College Students' Test Anxiety questionnaire. The study established that 28.6 percent of the participants reported low levels of test anxiety, 18.1 percent reported high levels of anxiety, while 53.3 percent of the respondents reported moderate levels of test anxiety. Correlation analysis results revealed that test anxiety and academic performance were negatively correlated (r = - 0.22, $p<0.05$). This is an indication that learners with low test anxiety have higher chances of performing better in academics compared to those with high test anxiety. It was further revealed that internal LOC and academic achievement had a weak positive correlation (r= 0.191, $p<0.05$) and a negative association between external LOC and academic performance (r= - 0.081, $p<0.05$).

A correlational study by Akinleke (2012) investigated the relationships among test anxiety, self-esteem, and academic achievement among students. It was found out that low anxiety levels were associated with high academic achievement whereas high anxiety was associated with low academic achievement. It was also established that students' self-

esteem and their academic achievement had a significant positive relationship. This means that learners with higher self-esteem get higher scores in academics than students' with low self-esteem. With this regard, Akinleke (2012) suggested that education stakeholders should come up with policies that will assist learners to deal with anxiety and also come up with a curriculum that will help them during their learning process. As a consequence, this would lead to improved academic performance of individual student.

Balogun, et al. (2017) set out to investigate the mediating influence of motivational orientation in the association of test anxiety with academic achievement. A sample of 393 university students was used among them 192 male students and 201 female students. Test anxiety was found to negatively affect academic achievement ($\beta = -.23$; $p < .05$) whereas motivational orientation was found to positively influence academic achievement ($\beta = .38$; $p < .05$). It also emerged that motivational orientation acted as a significant moderator of the correlation between test anxiety and learning outcomes ($\beta = .10$; $p < .01$).

Ramezani et al. (2016) examined the association between test anxiety and student's academic performance among medical students. The researchers established that the mean score of respondents' test anxiety was 10.10±4.99 and the average GPA of their end semester was 15.56 ± 1.58, respectively. The results further showed 37.8% of the students' test anxiety was mild, 26.5% of the students' were found to have moderate test anxiety while the remaining proportion had a severe test anxiety. Correlation analysis results revealed that students' severe anxiety test scores and academic achievement were not significantly related (p=0.385, r=-0.152). However, it was established that the anxiety level in female students was higher than that of male students ($p = 0.012$, $t = -2.563$).

In their study, Dawood et al. (2016) explored the link between test anxiety and academic performance among university students studying nursing. The cross sectional study sampled of 277 students to fill the questionnaires. The findings of the analysis indicated that test anxiety score of the respondents ranged from 20 to 74. Among the respondents, 14.4% showed severe test anxiety, 50.9% experienced moderate test anxiety while 24.7% of them experienced mild examination anxiety. Pearson's correlation analysis results revealed a significant but negative correlation between examination anxiety and academic performance, (r = -0.14, p = 0.01). However, it further emerged that student's academic scores and their GPAs had a negative insignificant correlation (r = -0.09, p = 0.15).

DordiNejad et al. (2011) determined the association of test anxiety with academic achievement of university students in Iran. The researchers sampled 150 students to complete questionnaires. The collected data were analyzed using Man Whitney and Spearman correlation. The study found out that test anxiety negatively affected students' performance in academics. It also emerged that those students enrolled for lower degrees were likely to be more anxious than the students in higher levels; as such students were more familiar with the process of taking tests.

Rana and Mahmood (2010), working with post-graduate students, examined the association of test anxiety with academic achievement. The study sample comprised of 414 students who were sampled using random sampling from various departments in a public university. Data used for this study were collected using the Test Anxiety Inventory (TAI) and analyzed using Pearson correlation and multivariate regression analyses. The study established that test anxiety was negatively associated with academic performance scores. The findings further indicated that worry, a cognitive factor included in the study,

contributed more to test anxiety scores than affective factors (emotional). Locally, there is a scarcity of empirical literature on the relationship between LOC and physics performance which prompted the need for the current research.

2.4 Gender Differences in LOC, Test Anxiety and Academic Performance

Previous studies have demonstrated that gender has a significant impact on students' test anxiety level. It is extensively argued that gender influences exposure and growth of test anxiety (Basso et al., 2011; Danju & Uzunboylu, 2017). For instance, a study by Faqe et al. (2017) aimed at finding out how test anxiety can be reduced amongst 12^{th} grade learners at Iraqi schools. The study was both quantitative and qualitative in nature. The respondents were 450 learners attending 12^{th} grade in five high schools in the Iraqi's Kurdistan region. The statistics used to analyze data included; standard deviation, mean and t-test. The results indicated that all the sampled students experienced high levels of test anxiety. Among them, female learners were more anxious compared to male learners, while learners pursuing art courses had lower test anxiety scores than science students.

Karatas et al. (2013) carried out a study with an aim of establishing the link between examination anxiety and academic performance of secondary school learners in Turkey. The study sample comprised of 194 senior high school students. The study used Test Anxiety Inventory" to measure students' anxiety level while students' academic performance data were obtained from school administration. The results established the existence of a significantly negative relationship between examination anxiety and test scores. Furthermore, it was established that, even though girl's test anxiety and performance in University Entrance Exam (UEE) had a negative relationship, the correlation between the female students' UEE and their GPA was significant and positive.

In relation to male students, Karatas et al. (2013) established that a significantly positive correlation existed between UEE and GPA scores. Results of independent t- test revealed the existence of significant differences in test anxiety scores and academic achievement with respect to female learners and in UEE with respect to male learners.

In their study, Majzub et al. (2015) sought to find out the extent to which LOC and academic performance were related, and the role of gender in the relationship. The study sample for this research was comprised of 204 students in their 1st year at Yarmouk University, Jordan. The study established that academic performance and LOC were significantly related. Among the male students, an internal LOC was found to have a positive correlation with academic performance (r =.36, p =.00) and negatively related with external LOC (r =-.21, p=.04). In addition, internal LOC had a positive correlation with female students' academic performance (r =.27, p =.006) while external LOC was negatively correlated with performance (r =.002, p=.982). The results further revealed that male students were more likely to be internal and external than their female counterparts.

Ghazvini and Khajehpour (2011) explored for gender disparities in the factors influencing academic achievement of high school learners, with a specific focus of academic self-concept, LOC, and the learning strategies used in Mathematics and Literature. The study used a sample of 363 students in the 1st, 2nd and 3rd academic years. The findings revealed a significant difference between male and female students in all the variables studied. Female students were characterized by internal LOC, effectiveness in time management, high motivation, high anxiety, and use of self-testing strategies, and obtained higher scores in Literature. On the other hand, male students were characterized by internal LOC and were found to be more likely to concentrate for long and process information better;

obtained higher scores in mathematics. The study did not find gender differences in external LOC and academic self-concept. These findings by Ghazvini and Khajehpour (2011) opine that female and male students vary in their cognitive-motivational functioning in academic environments, with female students having a more adaptive approach to learning tasks.

Mukolwe (2015) conducted a study in Kenya to examine the influence examination anxiety on academic achievement and other selected correlates, which were, academic procrastination, LOC and academic resilience. The findings revealed that most of the respondents experienced exams anxiety. Girls were high on academic resilience and were more of internalisers, while boys were high in academic procrastination and were more of externalisers. It was further established that exams anxiety was significant and negatively related to academic performance. Academic procrastination positively and significantly correlated with exams anxiety, but negatively and insignificantly correlated with academic performance. Locus of control a significant correlation with exams anxiety, but positively and insignificantly correlated with academic performance; and academic resilience negatively and insignificantly correlated with exams anxiety, but positively and insignificantly correlated with academic performance. From the findings of the research, this study by Mukolwe (2015) concludes that exams anxiety was a real phenomenon that affected students' academic performance in exams, and that academic procrastination, locus of control and academic resilience are important factors in relation to exams anxiety and academic performance.

2.5 Summary of Literature Review and Gap Identification

This chapter has discussed a review of empirical studies related to the proposed study on the role of LOC and test anxiety in predicting performance physics among secondary school students. The review focused on LOC and examination anxiety, whereby researchers such as Rastegar and Heidari (2013) established a significant but negative relationship between internal LOC and test anxiety. Further, Olaitan and Moroluyo (2014) reported a significant and positive relationship between exam anxiety, LOC and academic achievement of students. The review also explored gender differences in LOC, test anxiety and academic performance. Researchers have however not focused on test anxiety and LOC and their relationship with performance in Physics in Kenya. Furthermore, most of the studies used college and university students. This study therefore sought to establish the role of LOC and test anxiety in predicting performance in physics among secondary school students in Laikipia County, Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section highlights the research design, variables, research methodology, location of the study, target population , sampling techniques and sample size, research instruments, piloting study, validity of the study, reliability of the study, data collection technique, data analysis, logistical and ethical considerations.

3.2 Research Design

The researcher adopted a correlational research design. Kothari (2019) opines that the aim of correlational design is to give a portrayal of the current situation in a given population.The design fitted within the current study because the interest of the researcher was to simply collect data on the current situation regarding LOC, test anxiety and physics performance of students in Laikipia County without manipulating any variables. The choice of this design was made on the account that there was no manipulation of the independent variables of the study, and neither was there any random assignment of the participants to treatment conditions. It is on the strength of the foregoing reasons that the researcher found this design ideal for the study. Thus the design enabled the researcher to examine the role of LOC and test anxiety in predicting physics performance.

3.3 Variables

The predictor variables of the study were locus of control and test anxiety. Locus of control consists of two levels; internal and external. Levels of test anxiety were grouped as normal, moderately high, high or extremely high. The outcome variable of the study was students'

performance in physics, which were measured using students' performance in the subject in the previous end-of-term examinations. The predictor and outcome variables were measured at interval scale. The intervening variables were gender of the student and school type. The variables were measured at nominal level.

3.4 Location of the Study

This research was conducted in Laikipia County, Kenya which is located in the Rift Valley in Kenya. Laikipia County borders Samburu County to the North and Baringo County to the West. The county covers an area of 9,462 Km^2. The county has a population of 399,227 (with 49.8% male and –50.2% female). Laikipia County has a total of 84 public secondary schools with an enrolment of 22,091 students. The county was preferred for this study for several reasons. First, the division has various types of public secondary schools, and thus fits in survey research designs. These are boys, girls, mixed, day and boarding as well as National, Extra-County, County and sub-County schools, which represent the diversity of schools in the nation. The county has also been registering below average performance in physics.Lastly, a study carried out in Kakamega County by Mukolwe (2015) recommended that other studies on exam anxiety should be carried out in other regions for more conclusive findings.

3.5 Target Population

Population of a study is to the totality of people or elements sharing common and defined characteristics, and regarding whom the results of a study are to be generalized (Polit & Beck, 2010). This research targeted all the 22,091 form two and form three students in 84 public secondary schools in Laikipia County. Also 134 Physics teachers in all 84 secondary schools were targeted. Form two and form three students were targeted because they fall

within the age bracket of 14-18 years that is recommended for the LOC and test anxiety scales.

3.6 Sampling Techniques and Sample size

3.6.1 Sampling Techniques

A Sample is defined as a given number of people or elements that are selected to represent the entire population to be studied. The sample is selected in such a way that any conclusions made from the study findings based on the sampled group should reflect the true characteristics of the population from which the sample was selected (Orodho, 2002). Out of the population of 22, 091 students, the researcher selected a representative sample using Krejcie and Morgan's (cited in Cohen, Manion & and Morrison, 2007) sample size determination formula given below:

$$s = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1\text{-}P)}$$

Where:

X^2 = table value of Chi-Square for 1 degree of freedom at the desired confidence level of 3.84 (1.96 *1.96 = 3.841)

N = the population size, in this case 22,091 students

P = the population proportion (assumed to be 0.5)

d – the degree of accuracy expressed as a proportion (0.05)

Using this formula to calculate the desired sample size gives 378 as the least number of respondents who should be sampled from a population of 22,091 students in Laikipia County. In order to increase the questionnaire return rate, it was advisable to select a sample slightly bigger than the statistical minimum. Therefore, the researcher selected a sample of 400 students. The students who participated in the study were proportionately selected using stratified random sampling technique. In proportional selection, the number of selected students in each level is relative to the size of the different types of schools in the County (Lohr, 2010).

3.6.2 Sample Size

The sample size consisted of 20 out of 117 public secondary schools in Laikipia County. Stratified random sampling with proportionate allocation was used in selection of schools. The schools were first stratified based on type, with three strata – boys only, girls only and mixed-gender schools. After this the proportionate number of schools were selected per stratum totalling to 20 schools. Proportionate sampling was used to select students from Forms Two and Three giving a total of 400 students. The researcher involved Form Two and Form Three students in order to obtain a representative sample considering the fact that in most secondary schools physics is an optional subject. Purposive sampling technique was used to select Physics teachers. The respondents for the study were therefore 400 students and 20 teachers, a total of 420 respondents.

Table 3. 1

Sample Size

School type	No. of schools	Student enrolment	No. of physics Teachers	Sample		
				Schools	Students	Teachers
Public boys' schools	8	3915	14	1	43	1
Public girls' schools	9	4177	12	2	46	2
Mixed gender schools	100	29472	114	17	311	17
Total	117	36564	140	20	400	20

3.7 Research Instruments

Two research instruments were used: interview schedules and questionnaires. The researcher adapted the questionnaires that were used. Interview schedules were developed and used during personal interviews with Physics teachers. This was meant to achieve triangulation in data collection, in which several types of instruments are developed to gather data (Mugenda & Mugenda, 2003).

3.7.1 Questionnaire for Students

According to Peil (1993), the use of a questionnaire ensures that respondents remain anonymous; they have more time to reflect on the questions and may result in more meaningful answers, which are more objective than those of interviews. Questionnaires also enable researchers to gather information from a large population over a short period

of time than is possible using the interview method. Since the study targeted a large number of students (400), the researcher considered questionnaires more appropriate.

The questionnaire consisted of three sections: Section one collected background data, including gender, age, class and performance of the students in Physics. Section two collected information on test anxiety among the students. This section comprised of adapted test anxiety scale, which was developed by Nist and Diehl (1990) to measure the level of student' exam anxiety. This is a free to use scale that consists of ten items on a 5-point Likert-type format. The total scores for the scale range from 10 – 50, with scores between 10 and 19 indicating low level of exam anxiety; scores between 20 and 35 denote moderate level of exam anxiety, while scores between 36 and 50 indicate high level of exam anxiety.

Section three comprised of adapted Internal-External LOC Scale (I-E), developed by Rotter (1966) to measure LOC. The Internal-External LOC scale consisted of 29 pairs of questions, including 6 filler items, using a forced choice design. The respondent chooses from each pair a statement that corresponds to his or her description of the generalized expectancy. In this scale, a student can score between zero and 23. A score between zero and 13 would indicate internal locus of control whereas a score of 14 and above would indicate external locus of control. The self-administered took about 25 minutes to complete.

3.7.2 Interview Schedule for Teachers

Semi structured interview schedule was used in conducting interviews with Physics teachers on the problems noted among their students during examinations related to test anxiety, and the interventions in place to assist students manage anxiety during examinations.

3.8 Pilot Study

Piloting of the instruments was carried out in three schools from Laikipia County to establish the reliability and validity of the instruments. The sample size consisted of 30 students and three physics teachers. These three schools did not take part in the actual study. The participants' answers enabled the researcher to reorganize questions that were confusing to the students. Ambiguous items in the questionnaires were amended to enhance the reliability and validity of the study. The pilot study also enabled the researcher to become more familiar with the process of data collection.

3.8.1 Validity of the Research Instruments

Validity is the degree to which a research tool accurately assesses what it purports to assess (Gay, 1992). Best and Khan (1993), assert that content validity of a research instrument is ascertained through a professional's judgement who in this case was the university supervisor. The university supervisor was used to ascertain content and face validity of the questionnaires and interview schedule.

3.8.2 Reliability of the Research Instruments

Reliability is the extent to which a test consistently measures what it is supposed to assess. Therefore, reliability measures the extent to which a research tool produces steady results after repeated trials.

For the Locus of Control Scale, which is a standardized instrument, Rotter (1966) established a reliability coefficient of 0.70 using a sample of 400 students. He also computed test-retest consistency coefficients for two subgroups of his sample, with an *r*-value of .72 for 60 college students after one month. After two months, an *r*-value of .55 was obtained for 117 college students. Rotter suggested that part of the decrease after the two-month period was due to differences in administration (group vs. individual). Most of the locus of control studies have been carried out using the Rotter scale. Pilot study was used to establish the reliability of the scale using a sample of secondary schools students in Kenya.

Table 3. 2

Reliability Coefficients for test Anxiety Scale

Cronbach's Alpha	Part 1	Value	.62
		N of Items	6[a]
	Part 2	Value	.85
		N of Items	5[b]
	Total N of Items		11

The researcher used split-half technique to establish the reliability of the research instruments. As indicated in table 3.2, the reliability coefficient obtained for part 2 was

within the acceptable range. Mugenda and Mugenda (2003) recommend that a reliability coefficient of 0.7 or more is acceptable.

Table 3. 3

Reliability Coefficients for Locus of Control Scale

Cronbach's Alpha	Part 1	Value	.87
		N of Items	15[a]
	Part 2	Value	.92
		N of Items	14[b]
	Total N of Items		29

As indicated in Table 3.3, the reliability coefficients were within the recommended range.

3.9 Data Collection Techniques/procedure

The researcher personally administered the questionnaires to the students and conducted interviews with Physics teachers. The sampled students were given the consent form to read and understand the purpose of the study and then taken through the instructions on how to fill the questionnaire. Once they indicated that they had understood what they were required to do, they were allowed to fill the questionnaires. Upon completion, the researcher collected the filled research tools for analysis. The data collection process took a period of two weeks.

3.10 Data Analysis

The study employed quantitative and qualitative approaches to analyze the data. The raw data were first checked for incomplete items and then coded. The instruments were then scrutinized for completeness and adequacy of responses. The researcher checked for errors, omissions, illegible responses, blankness and irrelevant responses. Once all questionnaires

were scanned, the coding process began. Coding entailed identification and classification of the responses in a codebook as per the research questions for quantitative analysis. As for interview data, the responses transcribed and then arranged as per the research objectives. This was done in a thematic manner which included the respondent's direct quotes. Quantitative data analysis was performed using SPSS software Version 25. Descriptive statistics: frequencies, means, and percentages were employed during analysis. The output of the analysis was presented using tables, pie charts and graphs. Inferential statistics was used to test the following hypotheses;

H_{01} : There is no significant relationship between locus of control and physics performance among secondary school students in Laikipia County. Statistical test; Point biserial correlation.

H_{02} : There is no significant relationship between test anxiety and physics performance among secondary school students in Laikipia County. Statistical test; Pearson product moment correlation.

H_{03} : There are no significant gender differences in, test anxiety, locus of control and physics performance among secondary school students in Laikipia County. Statistical test; independent samples *t*-test.

H_{04} : There are no significant differences in locus of control, test anxiety and physics performance of students across school type. One way ANOVA.

3.11 Logistical and Ethical Considerations

3.11.1 Logistical Considerations

An introductory letter was obtained from the graduate school, Kenyatta University which was used to apply for a research permit from the National Council of Science and Technology (NACOSTI). Once the permit was granted, authorization to carry out the study in Laikipia County was sought from the County Education Office. The researcher then organized with the school principals on when to collect data.

3.11.2 Ethical Considerations

All study participants were made aware, before the study, of their freedom to take part or not take part in the study, with only those who signed the consent form being involved in the study. All the data that were collected from the respondents were handled with utmost confidentiality and for academic purposes only. The names of the study respondents or those of their schools were not made public. Study participants were assured that there were no penalties for failure to take part in the study.

CHAPTER FOUR

PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter contains the findings of the study and interpretation of the results. It starts with the presentation of general and demographic information followed by descriptive statistics for the students' physics performance. The other sections are presented as per the study objectives, hypothesis testing and then discussion of the findings. The study objectives were organized as follows;

i. To find out the relationship between locus of control and physics performance.

ii. To establish the relationship between test anxiety and physics performance.

iii. To find out whether there is gender difference in locus of control, test anxiety and physics performance.

iv. To find out whether locus of control, test anxiety and physics performance of secondary school students differ by school type.

4.2 General and Demographic Information

This section presents the return rate of the research instruments, age of the students who were involved in the study and gender. It also discusses the gender of the students by form and school type.

4.2.1 Return Rate

Table 4.1 presents the return rate of the research instruments.

Table 4. 1

Return Rate

School type	Research instruments administered			Return Rate	
	Schools	Students	Teachers	Students	Teachers
Public boys' schools	1	43	1	100%	100%
Public girls' schools	2	46	2	100%	100%
Mixed gender schools	17	311	17	100%	100%
Total	20	400	20	100%	100%

The study was carried out in 1 public boys' school, 2 girls' schools and 17 co-educational schools. In public boys' schools, 43 questionnaires were administered and all the questionnaires returned translating to 100% return rate. One physics teacher from public boys' school was interviewed. In public girls' schools, 46 questionnaires were administered and all the questionnaires were returned translating to 100% return rate. The return rate of the interview guides for physics teachers from girls' public schools was 100%. The sample size from mixed gender schools was 311 students and 17 physics teachers. A total of 311 questionnaires were administered and the return rate was 100%. To collect qualitative data, 17 interview guides were administered to physics teachers and all of them were recovered translating to 100% returned. The overall return rate of the research instruments was 100%. The 100% return rate was achieved because the researcher delivered the research

instruments in person, guided the respondents how to fill them and supervised the whole process of responding to the items. The questionnaires were filled and collected the same day.

4.2.2 Demographic Data

The study was carried out in boys' schools, girls' schools and co-educational schools. The sample consisted of students and physics teachers and the distribution of gender of the respondents is presented in Table 4.2.

Table 4. 2

Gender of the Respondents

	Students		Teachers	
	Frequency	Percent	Frequency	Percent
Male	228	57.0	13	65
Female	172	43.0	7	35
Total	400	100.0	20	100

Table 4.2 indicates that there were two categories of respondents; students and teachers. Majority of students (228) representing 57% were males while 172 (43%) were female. The findings reveal that majority of the students who were taking physics were boys. The same trend was observed among the teachers. The results showed that 13 (65%) physics teachers were males while 7 (35%) were females.

Table 4. 3

Gender of the Respondents from Co-educational Schools

School Type	Gender		Total
	Male	Female	
Co-educational schools	185(59%)	126(41%)	311

Table 4.3 indicates that majority of the respondents (185) representing 59% were males while 126 representing 41% were females.

The researcher also sought to find out the age of the students who were involved in the study by form and the findings are presented in Table 4.4.

The age of the students as per the classes was also examined and the results are as shown in Table 4.4.

Table 4. 4

Age of the Students by Form

Form	Age				
	N	Mean	Std Dev.	Minimum	Maximum
Form 2	202	16.54	1.18	14	24
Form 3	198	17.38	1.11	15	22
Total	400	16.96	1.22	14	24

Table 4.4 shows that the mean age of form two students was 16.54 years with a standard deviation of 1.18. The minimum age was 14 years while the maximum age 24 years. The mean age for form three students was 17.38 years and the standard deviation was 1.11. The

maximum age was 22 years while the minimum age was 15 years. The results indicate that some of the form three and form two students were younger and others were older than is expected of form two and form three students. This might be attributed to starting schooling earlier for those who are too young or being delayed in schooling by health factors, truancy or socio-economic factors.

The findings in Table 4.4 show that the mean of the ages of the respondents was 16.96 years with a standard deviation of 1.22. The minimum age was 14 years while the maximum age was 24 years. The results indicate that some students were older than expected. The aged students might have delayed in schooling due to irregular school attendance due to poverty, truancy or illness that made them to repeat classes. On the other hand some students were aged below the expected age of form two and form three students. The students might have started going to school younger than its recommended.

Since the study was carried out among form two and form three students, it was important to analyze the sample that was used. The results are as shown in Table 4.5.

Table 4. 5

Sample Size per Form

	Frequency	Percent
Form 2	202	50.5
Form 3	198	49.5
Total	400	100.0

Table 4.5 shows that the respondents who were sampled from form two were 202 representing 50.5% while those who were sampled from form three were 198 representing 49.5%. The results indicate that the number of students sampled from form two and from three was almost equal.

The results of the number of students per gender sampled from each form are presented in Table 4.6.

Table 4. 6

Gender of the Students by Form

		Form		Total
		Form 2	Form 3	
Gender	Male	107(46.9%)	121(53.1%)	228(100%)
	Female	95(55.2%)	77(44.8%)	172(100%)
Total		202(50.5%)	198(49.5%)	400(100%)

Note. ( ) Percent

Table 4.6 indicates that 107 (46.9) and 121 (53.1) male respondents were selected from form 2 and form 3 respectively. The total sample of male respondents who were involved in the study were 228. On the other hand, 95 (55.2) and 77 (44.8) female respondents were selected from form two and form three respectively making a total of 172 female respondents who were involved in the study. The findings indicate that majority of the students who were taking physics were boys. The same trend was observed both in form two and three. The results corroborate the findings presented in Table 4.3 showing that there were more male students than female students enrolled in physics. The findings reveal

the gender disparity in enrolment and performance in science subjects in the Kenya. Similar results were reported by Imbova (2018) in a study that was carried out in Kakamega County. The study established that the gender disparity was associated with cultural factors, students' attitude and socio-economic factors.

Table 4. 7

Gender of the Respondents by School Type

		School Type			Total
		BS	GS	MG	
Gender	Male	43	0	185	228
	Female	0	46	126	172
Total		43	46	311	400

Note. BS – Boys' schools; GS- Girls' School; MG- Mixed Gender

The results indicate that 43 boys were selected from boys' secondary schools, 46 girls were sampled from girls' secondary schools, 185 boys were sampled from mixed gender day schools while 126 girls were selected from mixed gender day secondary schools. The findings also indicate that more boys were taking physics than girls. This disparity may be attributed to the negative attitude towards physics among most female students and cultural orientation.

4.3 Descriptive Statistics for the Students' Physics Performance

Physics performance was measured using the student's physics grade in the previous end of term examination. The physics scores of the students were then transformed into T scores. The descriptives of the T scores are presented in Table 4.8.

Table 4. 8

Descriptives of Physics Performance T Scores

	N	Mean	*SD*	Min	Max	Range	Skewness	Kurtosis
	400	50.00	10.00	31.14	68.68	37.54	.10	-.92

The mean of the T scores was 50.00 with a standard deviation of 10.00. The maximum score was 68.68 while the minimum score was 31.14. The range was 37.54 and the skewness coefficient of .10 indicated that the scores were near normal distribution.

Physics performance of the students was categorized into low, average and high levels. Any score below 35 was categorized as low performance, a score between 36 and 59 was categorized as average performance while a score of 60 and above was categorized as high performance in physics. The results are presented in Table 4.9.

Table 4. 9

Levels of Physics Performance Scores

	Level	Frequency	Percent
	Low	42	10.5
	Average	279	69.8
	High	79	19.8
	Total	400	100.0

The results indicate that majority of the respondents (279) representing 69.8% had average performance in physics, 79 respondents (19.8%) had high scores while 42 respondents

(10.5%) had low scores in physics performance. The results are consistent with qualitative information obtained from physics teachers. Most of the teachers reported that physics performance in their schools was average. The reasons given by the teachers concerning the relatively better performance in physics include; motivation, positive attitude among the students, most of the topics are practical and the importance of careers that require physics knowledge. Most of the teachers also indicated that physics performance was average.

The researcher also analyzed the physics performance mean scores for the three categories of schools and the results are presented in Table 4.10.

Table 4. 10

Physics Performance Mean Scores for the School Categories

School Type	Mean	N	Std. Dev.	Kurtosis	Skewness
Boys' schools	58.37	43	6.12	-.99	-.15
Girls' schools	55.78	46	7.61	-.41	-.06
Mixed gender schools	47.99	311	9.82	-.73	.36
Total	50.00	400	10.00	-.92	.10

The physics mean score for boys' schools was 58.37 (*SD* = 6.12) while the mean for girls' schools was 55.78 (*SD* = 7.61). The mean score for mixed gender schools was 47.99 with a standard deviation of 9.82. The findings show that boys' schools performed better in physics than girls' school and mixed gender day secondary schools. The interviewed teachers indicated that most female students had negative attitude towards physics. Qualitative data also indicated that some female students did not have interest to work hard in physics.

Similar results were obtained when the mean of boys and girls sampled from mixed gender schools was computed.

Table 4. 11

Physics Mean score by Gender in Mixed Gender Schools

Gender	*N*	Mean	Std Dev.	Minimum	Maximum
Male	185	51.56	5.28	32.24	67.32
Female	126	44.56	6.11	31.14	62.21

The results presented in Table 4.11 show that the physics performance mean score for boys was 51.56 (*SD* = 5.28) with 32.34 and 67.32 as the minimum and maximum scores respectively. The mean score of the girls was 44.56 (*SD* = 6.11). The maximum score was 62.21 while the minimum score was 31.14. Imbova (2018) reported that the gender difference in performance in science subjects with boys performing better than girls was attributed to the negative attitude girls have towards science subjects. The disparity was also attributed to socio-cultural belief that sciences and mathematics subjects are for boys while arts and language subjects are for girls.

4.4 Relationship between Locus of Control and Physics Performance

This section contains descriptive statistics for the students' locus of control scores, hypothesis testing and discussion of the results.

4.4.1 Descriptive Statistics for the Students' Locus of Control

The descriptive statistics for locus of control are presented in Table 4.12.

Table 4. 12

Description of Locus of Control Scores

	N	Mean	*SD*	Min	Max
Locus of control score	400	9.62	2.76	2.00	17.00

Note. *N*- Sample Size; *SD* – Standard Deviation; Min – Minimum; Max- Maximum

The results show that the mean of locus of control scores was 9.62 (*SD* = 2.76). The minimum score was 2.00 while the maximum score was 17.00. The results suggest that majority of the students had internal locus of control orientation. The researcher also examined the levels of locus of control and the findings are presented in Table 4.13.

Table 4. 13

Locus of Control Levels

	Frequency	Percent
Internal	348	87.0
External	52	13.0
Total	400	100.0

The scale used to measure LOC comprised of 29 items with 6 filter items and therefore a student was expected to score between zero and 23. A score between zero and 13 would indicate internal locus of control whereas a score of 14 and above would indicate external locus of control. As shown in Table 4.13, 348 respondents representing 87% had internal locus of control orientation while 52 respondents (13%) had external locus of control.

A cross tabulation of the levels of locus of control orientation and the gender of the students was conducted and the results are shown in Table 4.14.

Table 4. 14

Levels of Locus of Control by Gender

		LOC Levels				Total	
		Internal	Percent	External	Percent	Freq.	%
Gender	Male	200	57.5	28	53.8	228	57
	Female	148	42.5	24	46.2	172	43
Total		348	100	52	100	400	100

The results in Table 4.14 indicate that 200 boys representing 57.5% had internal locus of control orientation and 28 (53.8%) boys had external locus of control orientation. A total of 148 (42.5%) girls had internal locus of control orientation while 24 (46.2%) girls had external locus of control. The results indicate that majority of the students for both boys and girls had internal locus of control.

The researcher also computed the levels of locus of control by school category and the results are shown in Table 4.15.

Table 4. 15

Levels of Locus of Control by School Category

		School Type			Total
		BS	GS	MG	
LOC Levels	Internal	38(88%)	39(85%)	271(87%)	348(87%)
	External	5(12%)	7(15%)	40(13%)	52(13%)
		43(100%)	46(100%)	311(100%)	400(100%)

Note. LOC-Locus of Control; BS-Boys' Schools; GS- Girls' Schools; MG-Mixed Gender schools.

The results indicate that in all the categories of schools, majority of the students had internal locus of control. Hassaskhah and Jahedi (2015) established that an increase in internal locus of control was associated with an increase in academic achievement. Therefore, based on the findings presented in Table 4.15, most of the students were expected to perform well in physics. In fact the findings have been supported by the results in Table 4.10 which showed that most of the respondents scored averagely in physics.

4.4.2 Hypothesis Testing

The first objective of this study was to find the association between locus of control and physics performance among students in public secondary schools. To find out if the two variables were significantly related or not, the researcher advanced the following hypothesis;

H_{01} There is no significant relationship between locus of control and physics performance.

To test the hypothesis, the collected data was analyzed using Point Biserial correlation analysis because LOC was a categorical variable while physics performance was a continuous variable. The results are presented in Table 4.16.

Table 4. 16

Correlation between Locus of Control and Physics Performance

		Physics score
Locus of control score	Pearson Correlation	-.013
	Sig. (2-tailed)	.79
	N	400

The researcher hypothesized that there is no significant relationship between locus of control and physics performance. The correlation results presented in Table 4.16 indicate that locus of control and physics performance had negative correlation (r_{pb} (400) = -.013, p = .79). The correlation was not significant. Based on the findings, therefore, the null hypothesis was retained. The findings indicate that an increase in locus of control score is associated with a decline in physics performance. According to the Rotter (1966) scale that was used to measure LOC, high scores mean external locus of control orientation whereas low scores mean internal locus of control orientation. Therefore, to a small extent external locus of control orientation of the students was linked to low scores in physics performance while internal locus of control was associated with high scores in physics performance.

Based on the scale that was used, increase in the scores was associated with external locus of control while decrease in scores was associated with internal locus of control. The

findings imply that an increase in external locus of control score leads to a decrease in physics performance. On the other hand, an increase in internal locus of control leads to a slight increase in physics performance. The findings were supported by qualitative data obtained from the physics teachers which showed that most of the students relied on extrinsic motivation to perform well in physics. The teachers interviewed indicated that they had to make their lessons interesting so that the students would like the subject. The use of diverse teaching methods and practical were reported to have an influence on physics performance.

From the findings presented in Table 4.16, the researcher got interested in establishing if the mean difference in physics performance between students with internal locus of control and external locus of control was statistically significant or not. The data were subjected to independent samples T test and the results are presented in Table 4.17.

Table 4. 17

Independent Samples T Test

		T	*Df*	Sig. (2-tailed)	Mean difference
T_Score for physics performance	Equal variances assumed	.47	398	.64	0.71
	Equal variances not assumed	.43	63.601	.67	0.71

The results shown in Table 4.17 indicate that the mean score difference in physics performance scores for students with internal locus of control and external locus of control was not statistically significant ($t(398) = 0.47,\ p = .64$). The results imply that even though the physics mean score of students with internal locus of control was higher than that of students with external locus of control, the difference was not statistically significant.

4.4.3 Discussion of the Results

The findings that there is a negative association between locus of control and physics performance are consistent with the results of studies conducted earlier even though the relationship was not significant. Most of the studies conducted on locus of control focused on academic achievement as the outcome variable. A study by Nejati et al.(2012) among university students revealed that locus of control was significantly related to academic achievement. However, the study did not explore the relationship between internal locus of control, external locus of control and academic achievement. The current study established that internal locus of control had a positive correlation with physics

performance. The correlation was not significant. On the other hand, external locus of control was found to have a negative and significant correlation with physics performance.

Similar findings were reported by Abid et al. (2016) in a research conducted using a sample of college students. The researchers established that students with internal locus of control performed better in academics than those students with external locus of control. Students with internal locus of control where reported to be more active and effective in the classroom while students with external locus of control where reported to be passive. The characteristics of students with internal locus of control are associated with more academic engagement which results to meaningful learning and hence better academic results. On the contrary, students with external locus of control do not actively participate in learning activities. As a result, they learn very little and end up performing lowly in academics.

Kader (2014) studied the association between locus of control and academic achievement in economics course. The results showed that learners with internal locus of control performed better in the course than students with external locus of control. Respondents with internal locus of control reported lower levels of test anxiety, used mastery goal approach and expended more in academics. In a non-experimental study by Hassaskhah and Jahedi (2015), it was established that locus of control significantly correlated with academic achievement. High levels of external locus of control were associated with high probability of poor performance in academics whereas high levels of internal locus of control were associated with better scores.

Based on the findings of this study and the theoretical conceptualization of the association between locus of control and academic performance, the problem of poor performance in physics may be associated with locus of control. Even though the findings revealed that majority of the respondents had internal locus of control, the scores were close to external locus of control. Therefore, the poor performance in physics in Laikipia County is associated with external locus of control orientation of the students.

4.5 Relationship between Test Anxiety and Physics Performance

This section contains descriptive statistics for test anxiety scores, hypothesis testing and discussion of the results.

4.5.1 Descriptive Statistics for the Students' Test Anxiety

The descriptive statistics for the students' test anxiety scores that were computed are presented in Table 4.18.

Table 4. 18

Descriptives Statistics for Test Anxiety Scores

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
Test anxiety	400	31.00	10.00	41.00	22.90	5.84	.21	-.16

The mean of test anxiety scores was 22.90 with a standard deviation of 5.84. The maximum score was 41.00 while the minimum score was 10.00. The expected maximum and minimum scores were 50 and 10 respectively. The results indicate that generally the students involved in the study had moderate level of test anxiety.

The levels of test anxiety scores were categorized into low, moderate and high as shown in Table 4.19.

Table 4. 19

Levels of Test Anxiety

		Frequency	Percent
	Low	111	27.8
	Moderate	281	70.3
	High	8	2.0
	Total	400	100.0

The results indicate that 281 respondents representing 70.3% had moderate level of test anxiety, 111 respondents (27.8%) had low level of test anxiety while only 8 respondents (2%) had high level of test anxiety. The results confirm the findings presented in Table 4.20 showing that on average the respondents had moderate level of test anxiety.

Table 4. 20

Levels of Test Anxiety by School Type

School Type				Total
	Low	Moderate	High	
Boys' schools	12(28%)	31(72%)	0	43(100%)
Girls' schools	9(20%)	36(78%)	1(2%)	46(100%)
Mixed gender schools	90(29%)	214(69%)	7(2%)	311(100%)
Total	111(28%)	281(70%)	8(2%)	400(100%)

Table 4.20 shows that 31 respondents representing 72% sampled from boys' schools had moderate levels of test anxiety while 12 respondents representing 28% had low level of test anxiety. In girls' schools, 20%, 78% and 2% of the respondents had low, moderate and high levels of test anxiety respectively. In mixed day schools, 29% of the respondents had low level of test anxiety, 69% of the respondents had moderate level of test anxiety while 2% of the students had high level of test anxiety.

4.5.2 Hypothesis Testing

The second objective of this study was to investigate the relationship between test anxiety and physics performance**.** To examine how the variables correlated, the following null hypothesis was advanced;

H_{01} There is no significant relationship between test anxiety and physics performance among secondary school students.

To test the hypothesis, the data were subjected to Pearson product moment correlation analysis and the results are presented in Table 4.21.

Table 4. 21

Relationship between Test Anxiety and Physics Performance

		Test Anxiety
T-score for physics performance	Pearson Correlation	-.148**
	Sig. (2-tailed)	.003
	N	400

The results showed that there was a significant negative correlation between test anxiety and performance in physics, r (400) = -.148, $p < 0.05$. Therefore, the null hypothesis was rejected. The results were supported by qualitative data obtained from the physics teachers. Majority of the teachers indicated that low performance in physics was associated with high levels of test anxiety. Most of the teachers reported that nearly half of the students scored low marks in physics because of text anxiety. Students who appeared to be good in physics failed tests because they exhibited high levels of test anxiety. The findings imply that an increase in test anxiety leads to a significant decline in physics performance.

On the other hand, low test anxiety level is associated with high performance in physics. This is shown in Table 4.22.

Table 4. 22

Levels of Test Anxiety and Physics Mean Score

Levels of test anxiety	Mean	N	Std. Deviation
LOW	51.07	111	10.73
Moderate	49.76	281	9.66
High	43.52	8	9.48

Table 4.22 indicates that respondents with low level of test anxiety had the highest mean of 51.07 (*SD* = 10.73) in physics performance while those with high level of test anxiety scored the least mean of 43.52 (*SD* = 9.48) in physics performance.

The researcher sought to find out if the mean differences across the levels of test anxiety were significant or not. The data were analyzed using ANOVA and the findings are shown in Table 4.23.

Table 4. 23

One Way ANOVA

	Sum of Squares	*Df*	Mean Square	*F*	*Sig.*
Between Groups	478.70	2	239.35	2.41	.019
Within Groups	39421.31	397	99.30		
Total	39900.00	399			

The results presented in Table 4.23 show that there were significant mean differences in physics performance among the students with different levels of test anxiety, $F = 2.41$, $p < 0.05$. The researcher conducted post hoc analysis to establish if there were significant mean differences in physics performance in each of the pairs of the levels of test anxiety.

Table 4. 24

Tukeys' HSD Analysis Results

(I) Levels of test anxiety	(J) Levels of test anxiety	Mean Difference (I-J)	Std. Error	Sig.
Low	Moderate	1.30	1.12	.013
	High	7.55	3.65	.007
Moderate	Low	-1.30	1.12	.013
	High	6.25	3.57	.019
High	Low	-7.55	3.65	.007
	Moderate	-6.25	3.57	.019

The results show that there were significant mean differences in physics performance among students with low, moderate and high levels of test anxiety. The results imply that the level of test anxiety significantly affected the performance of the students in physics. Similar findings were reported by Faqe, et al. (2017) in a study that was carried out among primary school pupils. The researchers established that pupils who experienced high levels of test anxiety scored poorly in academics because of lack of concentration.

4.5.3 Discussion of the Results

The findings that there was a significant negative relationship between test anxiety and physics performance support the results of past research conducted in the area. A study by Tugan (2016) that was conducted among ninth grade children established that test anxiety was negatively related to academic achievement. The researcher reported that children who had low level of test anxiety scored high marks in achievement test while those with high

level of test anxiety scored low marks. The inverse relationship between test anxiety and academic achievement is attributed to the fact that at the beginning of arousal (low level of test anxiety) students are confident about their ability to perform well in academics and are able to control the arousal. When the arousal is high (high level of test anxiety), the students begin to doubt their ability and therefore are unable to control the arousal which negatively affects their performance.

Another research carried out by Onyekuru and Ibegbunam (2014) also supported the results of the current study. The study showed that test anxiety and academic achievement were negatively correlated (r = - 0.22, p <0.05). It was further revealed that there was a weak positive correlation between low level of test anxiety and academic performance. High level of test anxiety was associated with low scores in academic performance. The current study established that students with low level of test anxiety had a better mean score in physics performance than those students with high level of test anxiety. Akinleke (2012) suggested that to enable learners to perform well in academics, they should be assisted to reduce anxiety levels during examinations. The current study supports this assertion because majority of the students involved in the study reported average levels of test anxiety and average performance in physics. From the correlation results obtained, if the students are guided to reduce test anxiety they would improve in physics performance.

4.6 Gender Differences in Locus of Control, Test Anxiety and Physics Performance

This section presents the findings on gender differences in locus of control, test anxiety and physics performance.

4.6.1 Gender Differences in Locus of Control

The researcher sought to find out if there were gender differences in the scores of locus of control of the students. The following null hypotheses were tested;

H_{01} There was no significant gender differences in locus of control among secondary school students.

H_{02} There was no significant gender differences in test anxiety among secondary school students.

H_{03} There was no significant gender differences in physics performance among secondary school students.

The descriptives of locus of control scores by gender are presented in Table 4.25.

Table 4. 25

Description of Locus of Control by Gender

	Gender	N	Mean	Std. Deviation
Locus of Control Score	Male	228	9.49	2.75
	Female	172	9.80	2.77

The results indicate that male students scored a mean of 9.49 (*SD* = 2.75) which was higher than that of female students which was 9.80 (*SD* = 2.77). To establish if the mean score difference in LOC was statistically significant or not, the researcher conducted independent samples T test and the results are presented in Table 4.26.

Table 4. 26

Independent Samples t-test

		t-test for Equality of Means		
		t	Df	Sig. (2-tailed)
Locus of control score	Equal variances assumed	-1.13	398	.26
	Equal variances not assumed	-1.13	367.06	.26

The results presented in Table 4.26 revealed that the mean score difference in locus of control scores between male and female respondents was not statistically significant (t (398) = - 1.13, $p > 0.05$). Therefore, the null hypothesis which stated that there were no significant gender differences in locus of control among secondary school students was retained. The findings imply that even though male respondents scored a slightly higher mean than female respondents, the difference was not statistically significant. This implies that the mean score difference in LOC between male and female students was meaningful.

4.6.2 Gender Differences in Test Anxiety

To examine gender differences in test anxiety scores, the mean of test anxiety scores and independent samples t – test were computed and the results are presented in Table 4.27.

Table 4. 27

Description of Test Anxiety Scores by Gender

	Gender	N	Mean	Std. Deviation
Test Anxiety	Male	228	21.84	5.46
Scores	Female	172	24.30	6.03

The results indicate that female respondents scored a mean of 24.30 with a standard deviation of 6.03 while male respondents scored a mean of 21.84 with a standard deviation of 5.46. The findings showed that female respondents scored a higher mean than male respondents.

The researcher hypothesized that there are no significant gender differences in test anxiety among secondary school students. To test this hypothesis, the researcher conducted independent samples t-test and the results are presented in Table 4.28.

Table 4. 28

Independent Samples T-test

		t-test for Equality of Means		
		T	*Df*	Sig. (2-tailed)
Test Anxiety scores	Equal variances assumed	-4.252	398	.00
	Equal variances not assumed	-4.193	347.77	.00

Table 4.28 shows that there was a statistically significant mean difference in test anxiety scores between male and female respondents, t (398) = - 4.252, $p < 0.00$. Therefore, the

null hypothesis was rejected. The results imply that female students had higher test anxiety than male students. The study established that there was a negative significant relationship between test anxiety and physics performance. This explains why male respondents performed better in physics than female respondents. The results support the findings of Karatas et al. (2013) who established that there were significant differences in test anxiety scores and academic achievement with respect to female learners and in university entry exams with respect to male learners.

4.6.3 Gender Differences in Physics Performance

The third sub objective in objective four was to establish if there were gender differences in physics performance or not. The researcher sought to test the following hypothesis;

There was no significant gender difference in physics performance.

Table 4.29 presents the physics mean scores for male and female respondents.

Table 4. 29

Physics Mean Scores by Gender

	Gender	N	Mean	Std. Deviation
T Score	Male	228	51.01	10.28
	Female	172	48.66	9.47

The results indicate that male respondents had a mean score of 51.01 with a standard deviation of 10.28 while the female respondents scored a mean of 48.66 with a standard deviation of 9.47. As indicated, the male respondents had a higher mean score than female respondents.

To establish if the mean difference was statistically significant or not, the researcher advanced the following hypothesis;

There is no significant gender difference in physics performance.

The hypothesis was tested using t test and the results are presented in Table 4.30.

Table 4. 30

Independent Samples T-Test

		t-test for Equality of Means		
		T	*Df*	Sig. (2-tailed)
T Scores	Equal variances assumed	2.33	398	.020
	Equal variances not assumed	2.36	382.47	.019

Table 4.30 indicates that the mean score difference in physics performance between male and female respondents was statistically significant, t (398) = 2.33, $p < .020$. The mean difference was in favour of male respondents. Therefore, the null hypothesis was rejected and the alternative one adopted. The results imply that male respondents performed better in physics than female respondents. Ghazvini and Khajehpour (2011) also found that male students performed better in academics than female students.

4.6.4 Discussion of the Results

The study aimed at establishing if there was gender difference in locus of control. The findings showed that the mean difference in locus of control scores between male and female respondents was not statistically significant. Past research work reviewed also reported similar findings. A study by Majzub et al. (2015) which was conducted among university students established that female students were characterized by internal locus of

control and use of self-testing strategies while male students were characterized by internal locus of control and were more likely to concentrate in studies for long. The results further revealed that male students were more likely to exhibit internal LOC orientation than their female counterparts. The results of the current study found that majority of the students with internal LOC were male. This explains why male students performed better in physics than female students. Students with internal LOC orientation are more confident and always seek to successfully accomplish academic tasks resulting to better performance in academics.

The study established that there were significant gender differences in test anxiety. Female students reported high levels of test anxiety compared to the boys. The findings corroborate the results of Syokwaa et al. (2014). The study used a sample of secondary school students and the findings revealed that girls were more prone to test anxiety than boys. Students with high levels of test anxiety performed poorly in examinations. This might be the reason why female students lag behind the male students in physics performance. The qualitative data obtained from physics teachers also indicated that high levels of test anxiety negatively affected performance in physics. The teachers stated that test anxiety is manifested in several ways such as uneasiness, forgetting basic concepts, confusion, missing school during exams, restlessness, faking sickness, last minute revision, sweating and cheating. These characteristics make it difficult for the students to remember the concepts resulting to poor performance in physics. The poor performance in physics in Nyahururu Sub County may be attributed to high levels of test anxiety.

The study findings showed that there was a significant gender difference in physics performance. The boys performed better in physics than the girls. The findings were consistent with the results of other studies conducted earlier. Ghazvini and Khajehpour (2011) reported that male and female students vary in their motivational orientation and academic achievement. The gender differences in physics performance may be attributed to cultural factors beliefs that science subjects belong to boys. Some of the teachers who were interviewed also indicated that majority of the girls did not select physics. It was also reported that even those girls who were taking physics had the perception that physics is a difficult subject. This perception and other cultural beliefs contribute to low enrolment and poor performance in physics witnessed in Nyahururu Sub County.

4.7 Differences in Locus of Control, Test Anxiety and Physics Performance by School Type

The fourth objective of this study was to find out if there were gender differences in locus of control, test anxiety and physics performance by school type. This section presents differences in locus of control, test anxiety and physics performance by school type.

4.7.1 Differences in Locus of Control by School Type

Table 4.31 presents the descriptive statistics of locus of control scores by school type.

Table 4. 31

Description of Locus of Control Scores

School Type	Mean	Std. Deviation	Minimum	Maximum
Boys' schools	8.77	2.91	2.00	16.00
Girls' schools	9.61	2.74	3.00	15.00
Co-educational schools	9.74	2.73	3.00	17.00
Total	9.62	2.76	2.00	17.00

The results indicate that students from mixed gender schools had a mean score of 9.74 (*SD* = 2.73). The maximum score was 17 while the minimum score was 3. Students from girls' schools scored a mean of 9.61 (*SD* = 9.61). The maximum score was 15 while the minimum score was 3. Students from boys' schools had the lowest mean score of 8.77 (*SD* = 2.91). In this category of schools, the maximum score in locus of control was 16 while the minimum score was 2.

The study hypothesized that there was no significant mean difference in locus of control scores across the different categories of schools. The hypothesis was tested using ANOVA and the results are presented in Table 4.32.

Table 4. 32

One way ANOVA

	Sum of Squares	*Df*	Mean Square	*F*	*Sig.*
Between Groups	35.945	2	17.97	2.38	.09
Within Groups	3002.05	397	7.56		
Total	3037.98	399			

The findings in Table 4.32 indicate that the differences in the mean scores of locus of control across the school categories were not statistically significant, F (2, 397) = 2.38, P > 0.05. Therefore, the null hypothesis was retained. The researcher conducted post hoc analysis to find out if the mean differences in the groups of the school categories were significant. The results are presented in Table 4.33.

Table 4. 33

Tukey's HSD Analysis Results

(I) School Type	(J) School Type	Mean Difference in LOC (I-J)	Std. Error	Sig.
Boys' schools	Girls' schools	-.84	.58	.32
	Mixed gender schools	-.98	.45	.07
Girls' schools	Boys' schools	.84	.58	.32
	Mixed gender schools	-.13	.43	.94
Mixed gender schools	Boys' schools	.98	.45	.07
	Girls' schools	.13	.43	.94

The results indicated that none of the mean differences in locus of control scores for the groups of school categories was statistically significant. The results indicate that even though there were mean differences in locus of control scores across the three categories of schools, the scores did not differ greatly.

4.7.2 Differences in Test Anxiety by School Type

The descriptive statistics of differences in test anxiety scores by school type are presented in Table 4.34.

Table 4. 34

Description of Test Anxiety Scores by School Category

School Type	Mean	Std. Deviation	Minimum	Maximum
Boys' schools	21.58	5.38	13.00	35.00
Girls' schools	22.61	5.83	12.00	37.00
Co-educational schools	24.51	5.88	10.00	41.00
Total	22.90	5.84	10.00	41.00

The results showed that the mean of test anxiety scores for students sampled from boys' schools was 21.58 (*SD* = 5.38). The maximum score was 35 while the minimum score was 13. The mean of test anxiety scores for students from girls' schools was 22.61 (*SD* = 5.83). In this category, the maximum score was 37 while the minimum score was 12. Students from co-educational schools had the highest mean score of 24.5 (*SD* = 5.88) in test anxiety. The maximum score was 41 while the minimum score was 10. The results presented in Table 4.23 shows that there was a negative correlation between test anxiety scores and physics performance and as indicated in Table 4.11 students from boys' schools scored the

highest mean while students from mixed gender schools scored the lowest mean. Therefore, the results also confirms the findings that an increase in test anxiety is associated with a decline in academic performance as reported by Karatas et al. (2013).

To establish if the mean differences were statistically significant the researcher advanced the following hypothesis;

There is no significant mean difference in test anxiety across the school types

The hypothesis was tested using ANOVA and the results are presented in Table 4.35.

Table 4. 35

One way ANOVA

	Sum of Squares	*Df*	Mean Square	*F*	*Sig.*
Between Groups	152.63	2	76.32	2.25	.01
Within Groups	13442.17	397	33.86		
Total	13594.80	399			

The findings indicate that the mean differences in test anxiety scores across the school types were statistically significant, F (2, 397) = 2.25, $p < 0.05$. The null hypothesis was rejected.

To establish how the groups of the school type contributed to the significant mean difference in test anxiety scores, post hoc analysis was conducted using Tukey's HSD and the results are presented in Table 4.36.

Table 4. 36

Tukey's HSD Analysis Results

(I) School Type	(J) School Type	Mean Difference (I-J)	Std. Error	Sig.
Boys' schools	Girls' schools	-2.03	1.23	.23
	Mixed gender schools	-.11*	.95	.00
Girls' schools	Boys' schools	2.03	1.23	.23
	Mixed gender schools	1.92*	.92	.00
Mixed gender schools	Boys' schools	.11*	.95	.00
	Girls' schools	-1.92*	.92	.00

The results indicate that the mean difference in test anxiety scores between students from girls' schools and those from boys' schools was not statistically significant. The mean difference between test anxiety scores for students from girls' schools, boys' schools and those from mixed gender schools was statistically significant. The results imply that students from mixed gender schools scored a lower mean in physics performance compared to students from boys' schools and girls' schools.

4.7.3 Differences in Physics Performance by School Type

The descriptive statistics in physics performance by school type are presented in Table 4.37.

Table 4. 37

Physics Performance Mean Scores for the School Categories

School Type	Mean	N	Std. Dev.	Min	Max
Boys' schools	58.37	43	6.12	48.21	68.68
Girls' schools	55.78	46	7.61	37.97	68.68
Mixed gender schools	47.99	311	9.82	31.14	68.68
Total	50.00	400	10.00	31.14	68.68

As indicated in Table 4.37, students from boys' schools had the highest mean of 58.37 (SD = 6.12) physics performance, students from girls' schools had a mean of 55.78 (*SD* = 7.61) and students from mixed gender schools scored a mean of 47.99 (SD = 9.82).

To find out if the mean differences in physics performance were statistically significant or not, the researcher tested the following hypothesis.

There are significant differences in physics performance across the school types.

The hypothesis was tested using ANOVA and the findings are presented in Table 4.38.

Table 4. 38

One way ANOVA

	Sum of Squares	*Df*	Mean Square	*F*	*Sig.*
Between Groups	5802.97	2	2901.48	33.78	.00
Within Groups	34097.03	397	85.89		
Total	39900.00	399			

Table 4.38 shows that the mean difference in physics performance across the three categories of schools was statistically significant, F (2, 397) = 33.78, p < .00. Therefore, the null hypothesis was accepted. Post hoc analysis was conducted to establish how the mean scores in physics performance of each of the groups differed.

Table 4. 39

Tukey's HSD Analysis Results

(I) School Type	(J) School Type	Mean Difference (I-J)	Std. Error	Sig.
Boys' schools	Girls' schools	2.59	1.97	.39
	Mixed gender schools	10.38*	1.51	.00
Girls' schools	Boys' schools	-2.59	1.97	.39
	Mixed gender schools	7.79*	1.46	.00
Co-educational schools	Boys' schools	-10.38*	1.51	.00
	Girls' schools	-7.79*	1.46	.00

The results indicated that the mean difference in physics performance between boys' schools and girls' schools was not statistically significant. The mean difference in physics performance of students from boys' schools, girls' schools and co-educational schools was statistically significant. Students from co-educational schools lagged behind in physics performance due to high levels of test anxiety among majority of the students. The results were supported by the findings of Tugan (2016) who found that test anxiety and academic performance were negatively correlated.

4.7.4 Discussion of the Results

The study established that there were no significant mean score differences in locus of control across the school categories. These findings may be attributed to the fact the most of the students across the school categories had internal locus of control orientation. Majzub et al. (2015) reported that male students were more likely to have internal locus of control while female students were more likely to have external locus of control. Some of the teachers interviewed stated that most girls had external locus of control. They assisted the girls through thorough revision, consultation and counseling. Therefore, the differences in physics performance among students from the three school categories may not be attributed to locus of control orientation.

The findings revealed that the mean differences in test anxiety scores across the school types were statistically significant. Students from boys' schools had the lowest mean score in test anxiety while students from mixed gender schools had the highest mean score in test anxiety. The results explain why students from boys' schools scored the highest mean in physics performance while students from mixed gender schools scored the lowest mean. Similar findings were reported by Onyekuru and Ibegbunam (2014) in a study among college students. The study examined the relationship between test anxiety and academic achievement and the findings showed that the two variables were negatively correlated. Students with low test anxiety performed better in achievement tests compared to students with high levels of test anxiety. Balogun et al. (2017) also established that test anxiety negatively affect academic achievement. High levels of test anxiety makes the students to lose confidence in their academic ability resulting to poor performance. Qualitative data

also revealed that test anxiety negatively affected performance in physics. It was reported that students who manifested high levels of test anxiety performed poorly in physics. This explains why students from co-educational schools had the lowest mean score in physics performance.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the findings, conclusions based on the study objectives and recommendations.

5.2 Summary

The study sought to find out the relationship between locus of control and physics performance, to establish the relationship between test anxiety and physics performance, to find out whether there is gender difference in locus of control, test anxiety and physics performance and to find out whether locus of control, test anxiety and physics performance of secondary school students differ by school type in Laikipia County.

Regarding the association between locus of control and physics performance**,** descriptive statistics showed that majority of the respondents had internal locus orientation. Majority of the students who were taking physics were male and had internal type of locus of control orientation. The researcher hypothesized that there was no significant relationship between locus of control and performance in physics. It was established that locus of control was negatively related to performance in physics. The correlation was not significant. The results imply that an increase in locus of control scores (external locus) leads to a significant decline in physics performance. It was also established that external locus of control correlated negatively with performance in physics while internal locus of control correlated positively with performance in physics. The findings imply that an external locus

of control contribute to low performance in physics while internal locus of control contribute to high performance in physics.

In the second objective, the study also sought to find out the relationship between test anxiety and physics performance. Descriptive analysis of test anxiety scores showed that majority of the respondents had moderate levels of test anxiety. The results of Pearson correlation analysis indicated that there was a negative and significant relationship between test anxiety and physics performance. The findings imply that high levels of test anxiety were associated with low scores in physics performance while low levels of test anxiety were associated with high scores in physics performance. The results were supported by qualitative data obtained from the physics teachers. Majority of the teachers indicated that low performance in physics was associated with high levels of test anxiety.

The third objective of this study was to find out if there were gender differences in locus of control, test anxiety and physics performance. Regarding gender differences in locus of control, it was established that female respondents had a higher mean in locus of control than male respondents. When the scores were subjected to independent samples T test, it was revealed that the mean difference in locus of control scores between male and female respondents was not statistically significant. Concerning gender differences in test anxiety, it was found that female respondents had scored a higher mean in test anxiety compared to their male counterparts. The mean score difference in physics performance between male and female respondents was statistically significant. The results explain why male respondents performed better in physics than female respondents. The mean score difference in physics performance between male and female respondents was statistically significant.

In the fourth objective, the study aimed at finding out if there were gender differences in locus of control, test anxiety and physics performance by school type. The results showed that respondents from mixed gender schools had the highest mean score followed by respondents from girl's schools. Students from boy's schools had the lowest mean score in locus of control. The findings of inferential statistics using one way ANOVA showed that the differences in the mean scores of locus of control across the school categories were not statistically significant. Further analysis using Tukey's HSD test revealed that none of the mean differences in locus of control scores for the groups of school categories was statistically significant.

Concerning mean differences in test anxiety scores, it was established that respondents from mixed gender schools had the highest levels of test anxiety followed by those from girls' secondary schools. Respondents from boys' secondary schools scored the lowest mean in test anxiety. The results of one way ANOVA showed that the mean differences in test anxiety scores across the school types were statistically significant. The findings on physics performance showed that boys' schools had the highest mean score followed by students from girls' schools. Students from mixed gender schools scored the lowest mean in physics performance. The mean score difference in physics performance across the three categories of schools was statistically significant.

5.3 Conclusion

The study sought to find out the association between locus of control and physics performance among secondary school students in Laikipia County. The findings indicated that locus of control was negatively associated with physics performance. The correlation was not statistically significant. High scores of locus of control (external locus) negatively

affected physics performance while low scores of locus of control (internal locus) positively affected physics performance. Students with internal locus of control believe that their effort and qualities determine their academic performance while those with external locus of control belief that academic performance is influenced by external factors such as luck and the school environment. Based on these results, internal locus of control is more important in determining academic performance than external locus of control.

The study established that there was a negative and significant relationship between test anxiety and physics performance. Students with low levels of test anxiety score highly in academics whereas students with high levels of test anxiety score low grades in academics. At the beginning of arousal students feel confident about themselves to perform well but when the arousal becomes too high, academic performance begins to decline. When the students are very anxious, they concentrate more on the anxiety thus losing concentration on the learning task. The shift in attention results to more anxiety making the student to loose balance that is required to performance effectively in learning tasks. Therefore, it is important that secondary school students in Laikipia County are guided on how to reduce test anxiety levels for better academic performance.

The findings showed that there was gender difference in locus of control with more boys exhibiting internal locus of control than girls. Since the results indicated that internal locus of control enhanced physics performance, it is necessary that students are made to understand that inner drive in more important in learning than relying on external factors. Female students were also found to have high levels of test anxiety than male students.

This negatively affected their performance in physics. Male respondents performed better in physics than female respondents. From the results obtained, female students need to be sensitized on the importance of physics to the society and in career development so that they can compete favorably with male students.

The findings on gender differences in locus of control, test anxiety and physics performance by school type showed that students from mixed gender schools were disadvantaged in all the aspects that were studied. Therefore, there is need strengthen programs in mixed gender schools to address test anxiety and motivation to enhance their performance in physics.

5.4.1 Policy Recommendations

i. Based on the findings that locus of control was negatively and significantly related to physics performance, policy makers should develop learning content that should be included in life skills education to train students on how to develop internal locus orientation to enhance physics performance.

ii. Parents, teachers and other stakeholders should constantly assist the students so that they can build confidence in their academic abilities and examination preparation strategies to reduce test anxiety. This will go a long way in improving the quality of learning outcomes. Policy makers should also formulate guidelines and learning content that can be used to train students on how to reduce test anxiety.

iii. Policy makers and all other stakeholders in the education sector should come up with training and support programs that target girls to help them develop internal locus of control and reduce test anxiety levels. This will enhance physics performance among

female students and hence make them compete favorably with boys in physics and science related courses.

5.4.2 Recommendations for Further Research

i. The study was carried out in Laikipia County and therefore similar studies should be carried out in other counties for more conclusive findings.

ii. Since the study established that locus of control and test anxiety were negatively related to physics performance, there is need for further research on the causes of test anxiety internal and external locus of control. The findings may be used to guide students to improve in physics performance.

iii.The study used a sample of secondary school students and correlational research design. Further studies should be carried out using samples of college and university students with other research designs to extend this knowledge.

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APPENDICES

Appendix A

Consent Form for the Respondents

My name is Bilha Muthoni, a Master's student in Kenyatta University School of Education, carrying out a research project to fulfill the requirement for the award of Master of Education in Educational Psychology. The topic of the study is Locus of control and test anxiety as predictors of physics performan\ce among form two and three students in Laikipia County, Kenya. The study findings may help teachers of physics to understand the individual differences that influence students' academic achievement. Kindly fill in this questionnaire whose information will be treated with confidentiality. The information obtained from this study will be used for academic purpose only.

I consent to participate in the research by signing the consent form. I understand that this information is confidential and my consent is on condition upon the researcher complying with her duties and obligations under the Data Protection Act of Kenya.

Respondent's signature ---------- Date ----------

APPENDIX B

QUESTIONNAIRE FOR STUDENTS

This research is meant for academic purpose. You are kindly requested to provide answers to these questions as honestly and precisely as possible. Responses to these questions will be treated as confidential. Please do not write your name or that of your school anywhere on this questionnaire. Please tick [√] where appropriate or fill in the required information on the spaces provided.

SECTION A: BACKGROUND INFORMATION

1. Gender [ ] Male [ ] Female

2. Age ……yrs

3. Class Fom 2 [ ] Form 3 [ ]

4. Class position in last term's exams

   Position …… Out of …….

5. Physics grade obtained in the last term's examination

[ ] A [ ] A- [ ] B+ [ ] B [ ] B- [ ] C+

[ ] C [ ] C- [ ] D+ [ ] D [ ] D- [ ] E

SECTION B: TEST ANXIETY SCALE

The table below presents items related to anxiety that some students may feel before or during examinations. Indicate the extent to which each experiences presented apply to your case. Use the scale below: -

1 – Never 2 – Rarely 3 – Sometimes 4 – Often 5 – Always

Statement	**1**	**2**	**3**	**4**	**5**
1. I have visible signs of nervousness such as sweaty palms, shaky hands, etc. right before a test.					
2. I have "butterflies" in my stomach.					
3. I feel nauseated before a test.					
4. I read through the test and feel that I do not know any of the answers.					
5. I panic before and during a test.					
6. My mind goes blank during a test.					
7. I remember the information that I blanked on once I get out of the testing situation.					
8. I have trouble sleeping the night before a test.					
9. I make mistakes on easy questions or put answers in the wrong places.					
10. I have trouble choosing answers.					

SECTION C : THE LOCUS OF CONTROL SCALE

This is a questionnaire to find how certain events affect different people. Each item consists of a pair of alternatives, (**A**) and (**B**). Please **circle** the one statement of each pair (only one), which you more strongly believe to the case as far as you are concerned. Note that there are no right or wrong answers and in each case you only express what you strongly feel about the event.

Statements

1. A Children get into trouble because their parents punish them too much.

   B The trouble with most children nowadays is that their parents are too easy with them.

2. A Many of unhappy things in people's lives are partly due to bad luck.

   B People's misfortunes results to the mistake they make.

3. A One of the major reasons why we have wars is because people don't take enough interest in politics.

   B There will always be wars, no matter how hard people try to prevent them.

4. A In the long run people get the respect they deserve in this world

   B Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. A The idea that teachers are unfair to students is nonsense.

   B Most students don't realize that the extent to which their grades are influenced by accidental happenings.

6. A Without the right breaks one cannot be an effective leader.

   B Capable people who fail to become leaders have not taken advantage of their opportunities.

7. A No matter how hard you try some people just don't like you.

   B People who can't get others to like them don't understand how to get along with others.

8. A Heredity plays the major role in determining ones personality.

   B It is ones experience in life that determines what one is like.

9. A I have often found that what is going to happen will happen.

   B Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. A In the case of the well-prepared student there is rarely if ever such a thing as an unfair test.

    B Many times exam questions tend to be so unrelated to course work that studying is really useless.

11. A Becoming a success is a matter of hard work; luck has little or nothing to do with it.

    B Getting a good job mainly depends on being in the right place at the right time.

12. A The average citizen can have an influence in government decisions.

    B This world is run by few people in power, and there is not much the little guy can do about it.

13. A When I make plans, I am almost certain that I can make them work.

    B It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow .

14. A There are certain people who are just no good.

    B There is some good in everybody.

15. A In my case getting what I want has little or nothing to do with luck.

    B Many times we might just as well decide what to do by flipping a coin.

16. A Who gets to be the boss often depends on who was lucky enough to be in the right place first.

    B Getting people to do the right thing depends upon ability; luck has little or nothing to do with it.

17. A As far as world affairs are concerned, most of us are the victims of forces we can neither understand nor control.

B By taking an active part in political and social affairs, the people can control world events

18. A Most people don't understand the extent to which their lives are controlled by accidental happenings.

B There really is no such thing as "luck".

19. A One should always be willing to admit mistakes.

B It is usually best to cover up ones mistakes.

20. A It is hard to know whether or not a person really likes you.

B How many friends you have depends on how nice a person you are.

21. A In the long run the bad things that happen to us are balanced by the good ones.

B Most misfortune is the result of ability, ignorance, laziness, or all three.

22. A With enough effort we can wipe out political corruption.

B It is difficult for people to have much control over the things politicians do in office.

23. A Sometimes I cannot understand how teachers arrive at the grades they give.

B There is direct connection between how hard I study and the grades I get.

24. A A good leader expects people to decide for themselves what they should do.

B A good leader makes clear to everybody what their jobs are.

25. A Many times I feel I have little influence over the things that happen to me.

B It is impossible for me to believe that chance or luck plays an important role in my life.

26. A People are lonely because they don't try to be friendly.

B There is not much use in trying too hard to please people, if they like you, they like you.

27. A There is too much emphasis of mathematic in high school.

	B	Team sport is an excellent way to build character.
28.	A	What happens to me is my own doing.
	B	Sometimes I feel that I don't have control over the direction my life is taking.
29.	A	Most of the time I can't understand why politicians behave the way theydo.
	B	In the long run the people are responsible for the bad government on a national as well as on local level.

Appendix C: Interview schedule for Physics Teachers

1. How would you rate the performance of your students in Physics in comparison to the other Science subjects (Mathematics, Chemistry and Biology)?

2. What do you consider to the main factors influencing your students' performance in Physics?

3. There are some students who do very well during class assignments and seem very promising, but when it comes to examinations they perform poorly.
    a. Are there some students like that in your class?

    b. What proportion of such students could be as a result of test anxiety?

    c. What are some of the ways in which test anxiety is manifested among the students?

4. What strategies do you use to assist students who may be affected by test anxiety?

Appendix D: Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **944001**

Date of Issue: **09/September/2019**

RESEARCH LICENSE

This is to Certify that Ms.. BILHA NGANGA of Kenyatta University, has been licensed to conduct research in Laikipia on the topic: LOCUS OF CONTROL AND TEST ANXIETY AS PREDICTORS OF PERFORMANCE IN PHYSICS AMONG FORM TWO AND THREE STUDENTS IN LAIKIPIA COUNTY KENYA for the period ending : 09/September/2020.

License No: **NACOSTI/P/19/1184**

944001

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

Appendix E: Research Authorization Letters

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 4150

Internal Memo

FROM: Dean, Graduate School

DATE: 10th July, 2019

TO: Ng'ang'a Bilhah Muthoni
C/o Educational Psychology Dept.

REF: E55/CE/24009/2013

SUBJECT: APPROVAL OF RESEARCH PROJECT PROPOSAL

This is to inform you that Graduate School Board at its meeting of 26th July, 2019 approved your Research Project Proposal for the M.Ed Degree Entitled, "Locus of control and test anxiety as predictors of performance in physics among form two and three students in Laikipia County, Kenya".

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

ANNBELL MWANIKI
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Educational Psychology Department.

Supervisors:

1. Dr. Peter Mwaura
C/o Department of Educational Psychology,
Kenyatta University

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P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: E55/CE/24009/2013

DATE: 10th July, 2019

Director General,
National Commission for Science, Technology
and Innovation
P.O. Box 30623-00100
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR NG'ANG'A BILHAH MUTHONI – REG. NO. E55/CE/24009/2013.

I write to introduce Ms. Ng'ang'a Bilhah Muthoni who is a Postgraduate Student of this University. She is registered for M.Ed degree programme in the Department of Educational Psychology.

Ms. Bilhah intends to conduct research for a M.Ed Project Proposal entitled, "Locus of control and test anxiety as predictors of performance in physics among form two and three students in Laikipia County, Kenya".

Any assistance given will be highly appreciated.

Yours faithfully,

PROF. ELISHIBA KIMANI
AG: DEAN, GRADUATE SCHOOL

AM/ik

Appendix F : Map of Laikipia County

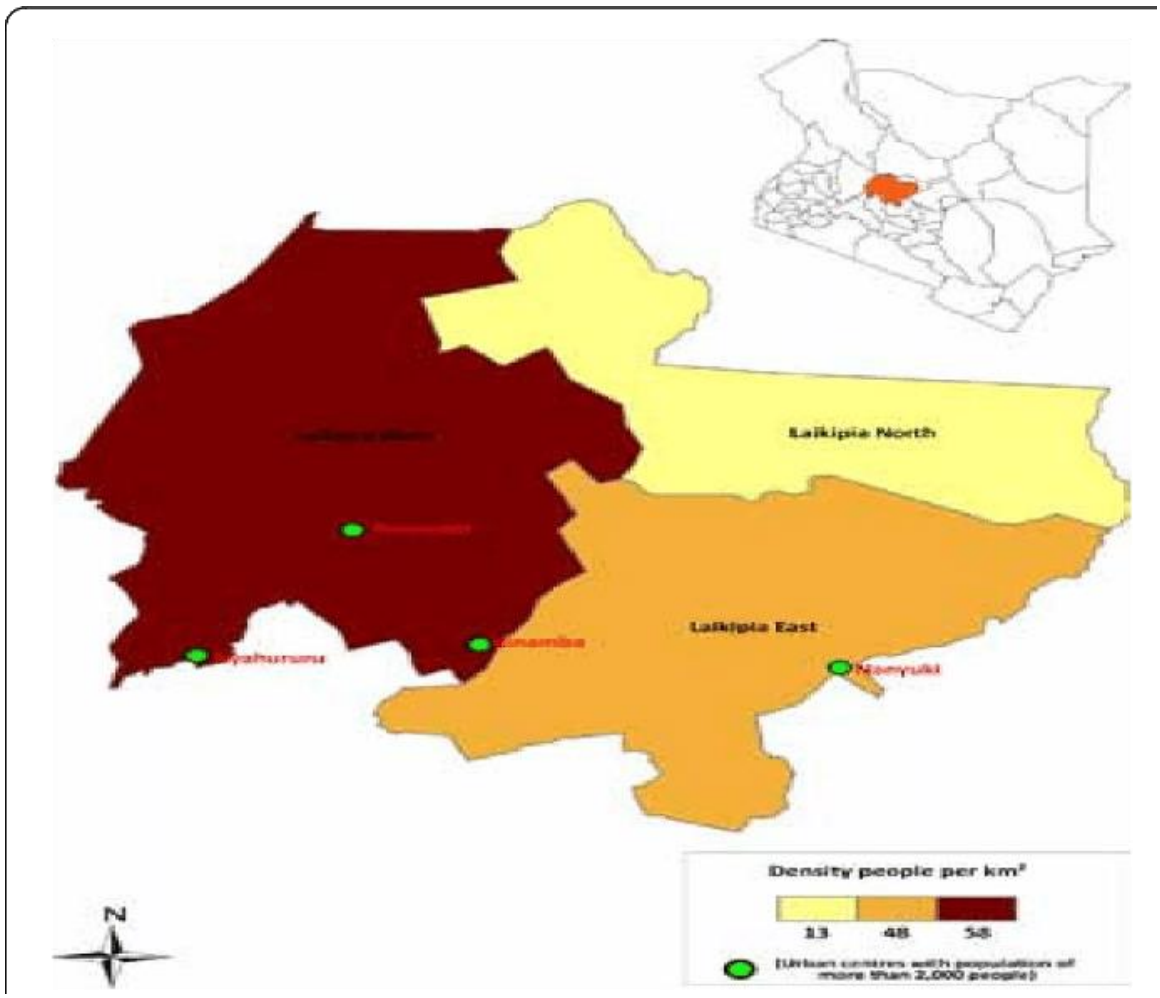

Figure F 1: Map of Laikipia County