ACADEMIC SELF-EFFICACY AND LOCUS OF CONTROL AS CORRELATES OF PUPILS' MATHEMATICS PERFORMANCE IN PUBLIC PRIMARY SCHOOLS IN NYANDARUA COUNTY, KENYA

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DECLARATION

I confirm that this research report is my own original work and has not been presented in any other university/institution for consideration. The research report has been complimented by referenced works duly acknowledged. Where texts, data, graphics, pictures or tables have been borrowed from other works-including the internet, the sources are specifically accredited and references cited in accordance with anti-plagiarism regulations.

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Supervisor

I confirm that this research report has been submitted for appraisal with my approval as university supervisor.

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DEDICATION

This research project is dedicated to my dear husband David Gichomo for his support and encouragement even when the journey became very tough and to our lovely children, Elvis Gichomo, Ivy Wangeci and Elsy Wanjiku. I will always cherish you.

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ABBREVIATIONS AND ACRONYMS

CAPS	-	Assessment Policy Statement
CBC	-	Competency Based Curriculum
CDE	-	County Director of Education
K.C.P.E	-	Kenya certificate of Primary Education
KICD	-	Kenya Institute of Curriculum Development
KNEC	-	Kenya National Examination Council
NACOSTI	-	National Commission for Science Technology and innovation
NCES	-	National Centre for Education Statistic
NCS	-	National Curriculum Statement
OECD	-	Organization for Economic Co-operation and development
PISA	-	Programme for International Student Assessment
SPSS	-	Statistical Package for Social Sciences
TIMSS	-	Trends in International Mathematics and Science Study

ABSTRACT

Pupils in Nyandarua County, Kenya, persistently record poor mathematics performance in KCPE examinations. Studies in Nyandarua County have concentrated more on learning environment and teacher related factors, affecting mathematics performance, while limited studies have focused on pupils' academic self-efficacy and locus of control. Therefore, this study aimed at establishing the relationship between academic self-efficacy and pupils' mathematics performance in primary schools in Nyandarua County, Kenya. The study also sought to examine the relationship between locus of control and pupils' mathematics performance. Subsequently, the prediction equation of pupils' mathematics performance from academic self-efficacy and locus of control was established. Pupils' age and gender were the intervening variables. Bandura's socio cognitive learning theory and Rotter's locus of control theory guided this study. Correlational research design was used. The study targeted all class eight pupils 1,810 (930 boys and 880 girls) in Kipipiri sub-county. Purposive sampling was applied in selecting the sub-county of the study and participating class, simple random sampling was used in selecting participating schools and participants, while stratified sampling was used to categorize participants into category of boys and girls. A total of 320 sampled participants were drawn from 8 public primary schools out of 67. The academic self-efficacy scale and locus of control scale were used to collect quantitative data. Mathematics performances were obtained from pupils' mid and end of term two 2022 examination scores. A pilot study was carried among 35 participants and instruments were adjusted accordingly to improve reliability and validity. Statistical Package for Social Science (SPSS version 21) was used in data analysis. Data was analysed using both descriptive and inferential statistics including Pearson's product moment correlation coefficient and multiple regressions. The study hypothesized that pupils' academic self-efficacy and locus of control may positively influence their mathematics performance. The results revealed a positive and significant relationship between academic self-efficacy and pupils' mathematics performance, r (312) =.61, p =.00. There was a positive and significant relationship between external locus of control and pupils' mathematics performance, r (209) = .49, p = .00. The study found a positive and significant relationship between internal locus of control and mathematics performance, r (101) = .646, p = .00. There was a moderate positive interrelationship between locus of control and self-efficacy score as predictor variables and mathematics performance as the outcome variable, R = .63. R square value showed that locus of control and self-efficacy accounted for about 39% of the total variance in mathematics performance. The study recommends that parents, teachers, and other education stakeholders should work together and come up with guidance programs to help the pupils acquire more academic self-efficacy for success and internal locus of control for better performance in mathematics.

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 Introduction

The chapter presents the information on the background to the study, statement of the problem, purpose of the study, objectives, research hypotheses, and significance of the study, delimitations, limitations, theoretical and conceptual framework, and operational definition of terms.

1.2 Background to the Study

Worldwide, mathematics is viewed to be very important. Success and performance in mathematics have a relationship to individual wellbeing, life satisfaction and income (Lipnevich et al. 2016). Pupils, therefore, are expected to perform well in mathematics despites hindrances. However, students in many nations are still struggling with performance in mathematics. According to the Programme for International Student Assessment (PISA) report, students aged 15 years from developed countries participated in mathematics assessment in the year 2015. Students from U.S.A in comparison to students from other developed countries were ranked position 38 out of 71 in mathematics performance. The mathematics scores were not impressive and as a result, a team of university researchers were employed to establish the cause of the low performance (Organization for Economic Co-operation and Development [OECD], 2018).

Similarly, in Africa mathematics performance remains a challenge to most students. This has been noted in African countries that participate in Trends in International Mathematics and Science Study [TIMSS] (Bofah and Hannula (2015). Various efforts are being made to improve mathematics performance including change of curriculum.

In South Africa for instance, National Curriculum Statement (NCS) was revised to Curriculum and Assessment Policy Statement (CAPS). This was in an effort to help fix the low mathematics performance for grade eight. Despite these reforms, mathematics performance in South Africa remains relatively low (Mabena et al., 2021).

In Kenya, substantial emphasis has been directed on industrial and technological development (Kenya Institute of Curriculum Development [KICD], 2020). The move towards advancement to the scientific and technological field largely depends on mathematics field. Despite the importance attached to mathematics and its' applicability, the subject has been consistently recording poor performance at the Kenya Certificate for Primary Education. For instance, in the last five years between 2016 and 2020 the KCPE mathematics means scores were below average and ranged between 45.4 to 49.1 as shown in Table 1.1.

Table 1. 1

K.C.P.E National versus Kipipiri Sub-county Mathematics Performance Year 2016-2020

Year	2016	2017	2018	2019	2020
K.C.P.E National mean	45.4	48.3	49.1	48.4	49.1
Kipipiri Sub-county mean	46.67	46.54	47.05	46.67	47.03

Note. Source: Directorate of Education Nyandarua County (2022)

Kipipiri sub-county in Nyandarua County is not exceptional as it has consistently recorded poor mathematics mean scores which are below national means as indicated in table 1.1.

A number of studies have been done to establish the factors associated with low mathematics performance. The factors that have been associated with low performance in mathematics include; limited teacher's assessment, students' negative attitude, poor teaching methods language barrier and inadequate resources (Wachira, 2016; Kamau et al. 2020; Mabena et al 2021). However, little has been done on academic self-efficacy and locus of control in relation to mathematics performance. This offered a basis for this study which examined academic self-efficacy and locus of control constructs that are directly related and in great extent contribute positively towards mathematics performance (Sinan & Jogur, 2016). In this study therefore, the researcher sought to determine whether academic self-efficacy (self-efficacy for learning and expectancy for success) and locus of control (internal and external) constructs correlate with pupils' mathematics performance in Kipipiri sub-county, Nyandarua County, Kenya.

Academic self-efficacy is confidence within oneself held by a student that they can attain the achievement goals and academic task easily. Learners can either have high, moderate or low academic self-efficacy and each one of them may affect mathematics performance (Vituli, 2016). Globally studies on academic self-efficacy in relation to mathematics have largely been studied. According to National Centre for Education Statistic [NCES], 2022), mathematics scores in U.S.A among grade eight students for the year 2019 was lower than the mathematic scores for the same peers in the year 2017. Also, the scores were lower in comparison to the same peers in China, England and Russia for the year 2019. Among these countries, U.S.A was reported to have invested more resources in education but still mathematics performance was low. U.S.A low mathematics performance was attributed to low academic self-efficacy.

In the African context, Odiri (2020) in Nigeria found that there was a link between high academic self-efficacy and achievements in mathematics. The study also pointed out that low academic self-efficacy contributed negatively to mathematics performance. In Kenya, several studies have been done on academic self-efficacy though in relation to academic achievement (Njenga, et al., 2019; Muiga, 2020). A study by Muiga in Kiambu County indicated that students with high academic self-efficacy performed better in academics compared to learners with low academic self-efficacy.

Locus of control has equally been linked to mathematics performance. Locus of control is the belief an individual has control over causes and result of life events (Rotter, 1954). In the educational context, locus of control represents the attribution that learners have on what causes them to achieve in academics (Abbas, 2018). In this sense, learners' performance is determined by personal effort (internal locus of control) or other factors that are beyond their control or capability (external locus of control). A study conducted in India by Bhutia and Nongtdu, (2017) points out that majority of students in colleges have moderate internal-external locus of control though internal locus of control strongly predict academic performance.

In Africa, the reviewed studies on locus of control Atibuni et al., (2017) and Abukari et al., (2020) have concentrated on related variables such as the academic self-efficacy, attitude, interest, and academic achievement for instance, Abukari et al. found that internal locus of control has significant contribution to academic achievement of secondary students. Thus, there was need for a study to be done to establish whether similar results will be obtained among pupils in primary school and on mathematics performance.

In Kenya, studies on locus of control are limited. The few available studies have looked at the related constructs such as examination anxiety and academic performance among other constructs (Mukolwe, 2015; Mutweleli & Muthui, 2020). Mukolwe's (2015) study in Kakamega County established that locus of control had a significant positive correlation with academic performance among secondary school students. Further, Mutweleli and Muthui, (2020) assert that secondary students with internal locus of control are believed to have higher mean score in terms of academic performance. However, these studies were largely conducted among secondary school students.

In Nyandarua County, studies have concentrated on teachers' factors, students' attitude, and school environmental factors in relation to students' mathematics performance (Kamau et al., 2020; Mbugua, 2016). There are limited studies on academic self-efficacy and locus of control in relation to pupils' mathematics performance in Nyandarua County. Therefore, the current study aimed at establishing the extent to which academic self-efficacy and locus of control correlate with pupils' mathematics performance in Nyandarua County, Kenya.

1.3 Statement of the Problem

Kipipiri sub-county mathematics performance in public primary schools is an issue of concern to both teachers and education stake holders. Despite teachers employing different approaches and teaching techniques, K.C.P.E mathematics means score remain low compared to other sub-counties. For instance, between years 2016-2020 the mean scores were low and was the last of the seven sub-counties in Nyandarua County as shown in appendix D. The general feeling of teachers in Kipipiri sub-county is that their effort does not yield better pupils' mathematics performance. The

same teachers who produce some best students in mathematics also get blamed for the low mean scores. From this phenomenon, pupils' mathematics performance does not entirely depend on teachers' effect but also on constructs tied to pupils themselves. Different studies on pupils' mathematics performance in Nyandarua County are yet to produce meaningful solutions and very few have focused on factors such as academic self-efficacy and locus of control. To mitigate the problem of poor mathematics performance the proposed research study sought to establish whether there is relationship between academic self-efficacy and locus of control on pupils' mathematics performance among pupils in public primary schools in Nyandarua County, Kenya.

1.4 Purpose of the Study

The purpose of this study was to examine the relationship among academic self-efficacy, locus of control and mathematics performance of primary school pupils in Nyandarua County, Kenya. Further, the study aimed at establishing a prediction equation for pupils' mathematics performance from academic self-efficacy and locus of control. The researcher was set to bring to the fore the need to consider academic self-efficacy and locus of control in promoting pupils' mathematics performance.

1.5 Objectives of the Study

This study was guided by the following three objectives:

i. To establish the relationship between academic self-efficacy and pupils' mathematic performance
ii. To examine the relationship between locus of control and pupils' mathematics performance

iii. To establish a prediction equation for pupils' mathematics performance from academic self-efficacy and locus of control

1.6 Research Hypotheses

The following hypotheses were used to guide this study:

H_{a1}: There is a significant relationship between academic self-efficacy and pupils' mathematics performance

H_{a2}: There is a significant relationship between locus of control and pupils' mathematics performance

H_{a3}: There is a significant prediction equation for pupils' mathematics performance from academic self-efficacy and locus of control

1.7 Assumptions of the Study

This study had several assumptions. Firstly, all participants were to co-operate and provide complete, reliable, and true information as they responded to the questions in the questionnaires. It was also assumed that the simple randomly selected participants would represent the total targeted population and therefore allow for generalization to the entire population. Also, the study assumed that academic self-efficacy and locus of control are very important factors that promote mathematics performance.

1.8 Limitations and Delimitations of the Study

1.8.1 Limitations of the Study

Due to time constraints all primary schools in Nyandarua County were not selected for the study. In addition, the study relied on information provided by participants who might have withheld some vital information thus denying the study some important facts. Further, the age of the participants in this study may limit

generalizability of the result findings to other age groups. However, the results could be generalized to other similar populations with caution. Lastly, only mid and end of term two 2022 examination results were used as reference to class eight pupils' mathematics performance.

1.8.2 Delimitations of the Study

The study was delimited to Kipipiri sub-county, and the participants were drawn from class eight pupils only. In addition, the study only focused on two variables in relation to mathematics performance that is, academic self-efficacy and locus of control out of many other variables that may influence mathematics performance. Finally, the study was delimited to correlational research design.

1.9 Significance of the Study

The study may provide vital information to the Ministry of Education and education policy makers among other stake holders as they implement the new Competency Based Curriculum (CBC), that emphasizes on learners' acquisition of the seven core competences among them self-efficacy. Results from this study may also inform teachers on the development of instructional approaches aimed at improving academic self-efficacy and internal locus of control. Additionally, results in this study may be important to parents in rearranging home environment in a way that academic self-efficacy and internal locus of control beliefs can be instilled which in turn can lead to proficiency in mathematics. Further, the study findings also may add knowledge that is useful in understanding academic self-efficacy and locus of control and its association to mathematics performance among pupils in primary schools in Kenya.

1.10 Theoretical and Conceptual Framework of the Study

1.10.1 Theoretical Framework of the Study

The study was anchored on two theories namely; Social cognitive learning theory (Bandura, 1986) and locus of control theory (Rotter, 1954) to examine academic self-efficacy and locus of control constructs in relation to pupils' mathematics performance.

a) Social Cognitive Learning Theory (Bandura, 1986)

Bandura (1986) defines self-efficacy as individuals' beliefs in the ability to perform a given behavior necessary to produce specific performance goals. Bandura argued that people's behavior influences environment and in turn the environment influence people's behavior. According to Bandura personal factors also influence people's behavior. The behavior or the outcome of the task in this study is pupils' mathematics performance which is as a result of interaction of environment and personal factors (academic self-efficacy and locus of control).

According to Bandura, people tend to carry out tasks that they believe they will succeed in. Further, Bandura argued that self-efficacy develops from four sources which include enactive experience where behavior is successfully performed during training; vicarious experience obtained when a pupil sees their peer modeling a behavior successfully; verbal persuasions which are promoted when pupils are motivated to work hard and attain high score in mathematics; and lastly, physiological factors which can either motivate or discourage pupils from working hard towards better mathematics performance.

In this study, high academic self-efficacy is expected to compel pupils to demonstrate their effort and ability and do well in mathematics. On the other hand, pupils who

possess low academic self-efficacy are likely to find mathematics boring and may not to put effort in mathematics, fail to be attentive during mathematics lesson and in some instances must be pushed to carry out their assignments. Empirical evidence on the use of social cognitive theory in the educational context has shown the importance of academic self-efficacy in promoting academic performance (Berou, 2016; Matovu, 2020).

b) Locus of Control (Rotter, 1954)

Locus of control is a concept that builds on Bandura's theory of reciprocal determinism. Belief that one has power over the events in their life is what is described as locus of control (Rotter 1954). Rotter (1954) also describes locus of control as what people attribute their success or drawback to in each task. In view of the general descriptions of locus of control by Rotter, internal locus of control is the extent to which a person feels that events in life are under control. On the other hand, external locus of control is the belief that events in life are under control of external factors. In the present study, pupils with internal locus of control are likely to believe that their good performance in mathematics is because of their own effort and failure is lack of effort. Conversely, pupils who have external locus of control may attribute their mathematics performance to external factors such as teachers, difficulty of examinations and good or bad lack. Studies grounded in locus of control theory by Rotter have demonstrated that external locus of control does not correlate positively with academic achievement (Choudhury & Borooah, 2017).

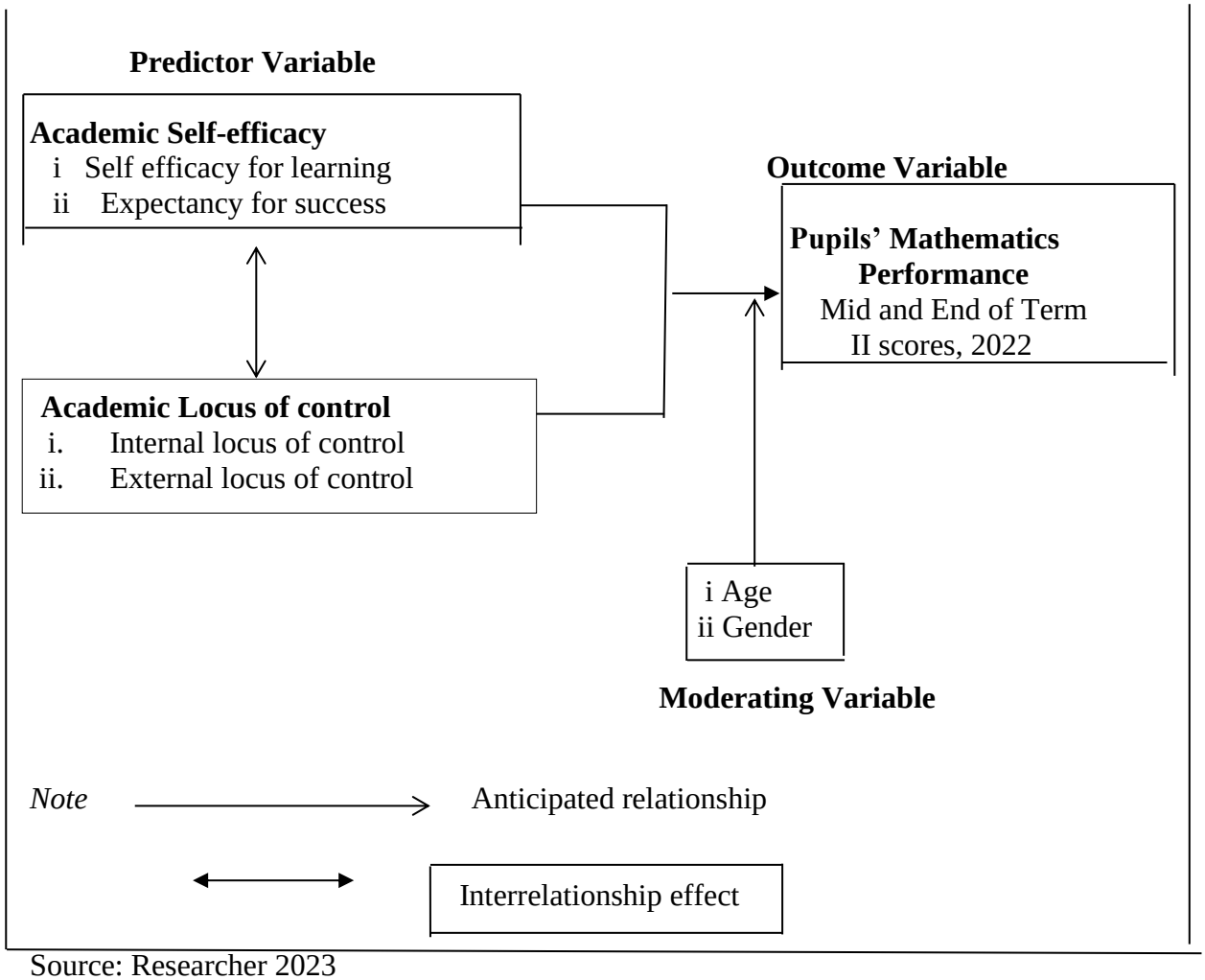
1.10.2 Conceptual Framework

The study variables and their probable interrelationships are shown in Figure 1.1. The study hypothesized that pupils' academic self-efficacy and locus of control (predictor

variables) may influence their performance in mathematics (outcome variable). Further, age and gender in this study are moderator variables.

Figure 1. 1

Conceptual Framework Showing Anticipated Relationships among Study Variables



Source: Researcher 2023

The study is based on the assumption that within the academic learning environment, pupils experience barriers and disappointments while trying to obtain good scores in mathematics. It is for this reasons that pupils need personal characteristics that will help them face the academic adversities for better performance in mathematics. In this study the personal characteristics are academic self-efficacy and locus of control.

1.11 Operational Definition of Terms

Academic self-efficacy: A measure at the interval level of a pupils' confidence in their academic ability to learn and perform specific mathematical tasks as assessed by self-efficacy for learning and performance subscale (Pintrich et al. 1991; MSLQ).

Academic locus of control: Pupils' perception of whether their learning outcome is determined by their own effort (internal locus of control) or by some other factors beyond their ability or control (external locus of control) as measured by the revised academic locus of control scale (Curtis & Trice, 2013).

Mathematics performance: Pupil's average mathematics score for mid and end of term two, year 2022 measured at the interval level. These scores were standardized using *z*-scores and *t*-scores for comparison across the sampled schools.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

The chapter discusses literature related to academic self-efficacy and locus of control as correlate of pupils' mathematics performance. It particularly discusses academic self-efficacy and locus of control on pupils' mathematics performance. Additionally, studies on prediction of mathematics performance from academic self-efficacy and locus of control and summary of literature review and gap identification are presented in this chapter

.2.2 Relationship between Academic Self-Efficacy and Pupils' Mathematics Performance

Different researchers have explored the relationship between academic self-efficacy and mathematics performance using different methodologies and varying samples. For instance, Putri and Prabawanto (2018) conducted a study that sought to analyze academic self-efficacy in relation to learning mathematics in Bandung, Indonesia. The study used descriptive research design. The sample comprised of 106 high school students in the 10^{th} grade. Information was obtained using questionnaires, observation, and document analysis. The outcome of the study revealed that students in high school had low academic self-efficacy as majority had less confidence in solving mathematical problems and holding class discussion during mathematics learning. Further, learners with high level of cognitive ability did not necessarily have high academic self-efficacy as evidenced in this study. However, this study had a limitation. The descriptive method used to analyze data may have resulted to biased

data due to lack of statistical tests. Therefore, to avoid this biasness the current study utilized both descriptive and inferential statistics.

Zakariya (2021) conducted a study in Norway that sought to establish whether academic self-efficacy related with previous and current mathematics performance among first year undergraduate students. Convenient sampling method was used to select 189 engineering students enrolled in mathematics course. Data were collected using questionnaires, student's previous mathematics tests and final examination scores. Data were analyzed using structural equation modeling. The findings revealed that students' previous knowledge in mathematics and academic self-efficacy had a positive significant relationship with performance in mathematics tests. Further, the study findings indicated that students with high academic self-efficacy had high scores in mathematics. However, the convenient sampling technique used in the reviewed study is prone to biasness when selecting participants. The current study used simple random sampling technique to select participants.

Ugwuanyi et al. (2020) in a study conducted in South Africa sought to establish whether academic self-efficacy, emotional intelligence and self-esteem predicted mathematics achievement in secondary schools. .The researcher used survey correlational design and quantitative methodology. Simple random and purposive sampling techniques were used to select participants. The target population was 2,937 students with the sample size of 400 students drawn from 16 secondary schools. To collect data on self-efficacy, general self efficacy scale was used. Linear regression and analysis of variance were employed to analyze data. The outcome of result was positive mathematics performance among students with high academic self-efficacy beside self-esteem and emotional intelligence. However, the reviewed study

combined academic self-efficacy with other variables that is emotional intelligence and self-esteem. The current study sought to establish the relationship between academic self-efficacy and locus of control on pupils' mathematics performance.

In yet another study, carried out in secondary schools in Adamawa state, Nigeria (Sinan & Jongur, 2016), investigated if a relationship existed between learners' academic self-efficacy and mathematics performance. Collection of qualitative and quantitative data was guided by cross sectional survey design. Data were collected using likert scale items, administering a standard mathematics test and open-ended questionnaires. Pearson product moment correlation coefficient was used for data analysis. The study utilized purposive, stratified and simple random technique for sample selection. The respondent sample size was 380 form three students (53.3% boys and 46.8% girls) drawn from 21 secondary schools. The findings revealed a strong positive significant relationship between academic self-efficacy and performance in mathematics. Notably, the survey method used was inflexible and therefore did not allow modification of the questionnaire. The current study used correlational research design that allows modification of questionnaire to suit the target population.

Similarly, Mwaura et. al., (2019) carried out a study among public secondary school students in Nairobi county, Kenya. The researchers investigated whether academic self-efficacy has a relationship with academic performance. The correlational study was guided by social cognitive theory. Simple random sampling, stratified and purposive sampling methods were used to select the respondents for this study. Data from the students were collected using questionnaires and document analysis. A sample of 397 form four students drawn from 12 public secondary schools

participated in the study. Data were analyzed qualitatively and quantitatively. Pearson product moment correlation coefficient was used to analyze quantitative data. The findings revealed a positive significant relationship between academic self-efficacy and performance in academics. However, the reviewed study was delimited to general academic performance whereas the current study focused on a specific subject.

In Nyamira County (Kaburi,2019), carried out a study with the goal of finding out whether Mathematics and English performance are related with student's academic self-efficacy in secondary schools. The study population comprised 77 public secondary schools out of which 24 schools were sampled with the researcher involving form four candidates. The 240 students were drawn from the sampled schools to participate in the study. This represented 30 percent of total sampled participants. The study was guided by ex post facto and correlational research design. Self-efficacy questionnaire and document analysis were used in data collection. The researcher analysed data using descriptive and inferential statistical method. The outcome of the study related high academic self-efficacy with good score in mathematics among candidates in fourth class in secondary schools of Nyamira County. Further, the finding based on this study did not find high magnitude level of relationship between student's academic self-efficacy on gender and type of school. However, this study involved the use of ex post facto research design and was carried in Nyamira County. The current study used correlational research design only and was conducted in Nyandarua County.

2.3 Relationship between Locus of Control and Pupils' Mathematics Performance

Various researchers have explored on whether locus of control predicts mathematics performance. For instance, Kumaravelu (2018) did a study that investigated secondary school students' locus of control in relation to achievement in academics on perspective of Math, English, and Science subject in Puducherry region in India. The study sample comprised of 380 students sampled from 470 students. Normative survey method was used in the study while data collection was carried out using Levenson (1973) scale of locus of control. Data analysis was done using Pearson's product moment correlation coefficient, one-way analyses of variance, multiple regression and post hoc test. The findings showed that external locus of control did not significantly positively relate to performance in mathematics whereas a positive correlation was established among learners with internal locus of control. The reviewed study looked at locus of control in relation to other subjects besides mathematics whereas the present study delimited itself to mathematics performance.

Villa and Sebastian (2021) conducted a study that sought to find out whether mathematics achievement is related to students achievement motivation, study habits and locus of control in Phillipines. Purposive sampling method was used to select 258 college students to participate in the study. The study used descriptive correlational research design. Locus of control scale, mathematics achievement motivation scale, mathematics study habits inventory and teacher-made mathematics achievement test were the tools used to collect data. The study outcome related achievement motivation and desirable study habits with good performance in mathematics. Further, the study findings revealed that most students had internal locus of control and therefore, performed well in mathematics. The reviewed study was done in Phillipines and the

sample involved was mature college students. The current study was carried out in Kenya and made use of primary school pupils who were different in terms of age.

Similarly, Choudhury and Indranee (2017) conducted a study in India among students in a city of Guwahati at undergraduate level of academics. Study concentrated in examining achievement in academics which was related to students' locus of control. Ex-post facto design was utilized to guide the study. The sample size comprised of 240 students grouped into student taking science related courses and ARTS related courses. Both male and female students within an age bracket of 18-21 years participated in the study. Data were collected through adapted Rotter's locus of control scale. Inferential and descriptive techniques were used in analyzing data. Analysed data revealed that gender and type of course that is, Science or ART did not significantly correlate with locus of control. It was also revealed that students' achievement in academics did not significantly relate with external locus of control. The participants were undergraduate students who may have developed fully understanding of the concept locus of control. The present study utilized primary school pupils to find out whether similar results will be found.

Merkine et al. (2019) did a research among Woloita University students in Ethiopia with the intent of establishing whether locus of control correlated with achievement in academics. The study adopted a correlational design and hypothesized a positive relationship between external locus of control and internal locus of control and achievement in academics. Using simple random sampling, a sample size of 313 students was selected. A questionnaire was used to gather data which was analyzed using T-test, analysis of variance and Pearson product moment correlation coefficient. The aim was to find out the difference and relationship between students' academic

achievement and locus of control. Study findings established that students' external locus of control and achievement in academic were significantly negatively correlated whereas a positive correlation was established among students with internal locus of control. However, the reviewed study concentrated on students at the university level who may have different educational experiences. The current study focused on primary school pupils who may have same educational experiences.

In a related study Mohamed et al. (2018) investigated whether locus of control relate with academic achievement among nursing student at Damanhour university of Egypt. One of the study hypotheses was that students who possessed internal locus of control did better academically than those with external locus of control. This quasi experimental study comprised of all the 4^{th} year students who complete course of community health nursing. Specifically a sample of 250 students was divided into control and experimental group. Prior to the program training, 75.2% of the group in the experimental category had internal locus of control. This percentage rose to 79.2% after training. The study concluded that among the experimental group, internal locus of control positively and significantly related to academic achievement among the students. However, the reviewed study used quasi experimental design while the current study used correlational research design to establish the relationship between locus of control and mathematics performance.

Issah and Olatunji (2018) did a study among secondary school students in Metropolis, Nigeria. The aim of the study was to establish whether locus of control predicted academic performance. Correlational research design was utilized to guide the study. Purposive and proportionate sampling techniques were used to select schools and population sample respectively. The sample size comprised of 346 students drawn

from six secondary schools. Data on locus of control were collected using self-other motivation scale. Further, data on academic performance in English and Mathematics were collected using academic performance test. Pearson product moment correlation coefficient was utilized to analyze data. Results revealed a positive significant relationship between internal locus of control and academic performance. Also, a low positive significant relationship was established among students with external locus of control. The reviewed study was conducted in secondary schools unlike the current similar study that was conducted in primary school to establish whether similar results could be held in a different geographical setting.

In another study Atetwe et al. (2018), using mixed methods approach, sequential explanatory design and Deci and Ryan theory of self–determination of 1971, investigated performance of students' mathematics in secondary schools in Vihiga sub-county, Kenya. The researcher sought to find out influence of locus of control on mathematics performance. The study targeted a population of 1483 form four students and 35 mathematics teachers. The sample size was 445 students and 11 mathematics teachers. Using questionnaires, the researcher gathered numerical data whereas interview was used to collect descriptive data. Inferential techniques were applied to analyse data. The study revealed that internal locus of control predicted mathematics achievement among students. However, the reviewed study used interview as a data collection method and its prune to subjectivity and biasness. Questionnaires were used in the current study.

2.4 Prediction Equation for Pupils' Mathematics Performance from Academic Self-efficacy and Locus of Control

From the literature reviewed, it is evident that there is dearth of studies that correlate academic self-efficacy, locus of control and mathematics performance variables in one study. However, inferences can still be made. For instance, Gosh (2015) conducted a study among a group of primary school students on correlates of academic achievement in Kolkata, India. The objective was to explore achievement in mathematics in relation to how it is affected by locus of control, internal motivation, academic self-efficacy and teacher's perception. The study utilized a sample of 116 class four students. Data were collected using different measurement scales for respective variables. Result revealed that mathematics performance was predicted by academic self-efficacy, within self-motivation for studies and perception of teachers. Further, a positive relationship was realized in relation to mathematics performance and internal locus of control. Although the current foregone reviewed study utilized participants of almost similar age, the cultural context was different. The current study was conducted in Kenya with the intention of bringing out cross-cultural comparison of results.

Another study was conducted among students who were regarded and grouped as gifted and non-gifted by Korkmaz et al. (2018). The researchers investigated locus of control, procrastination in academic and academic self -efficacy and how they predicted achievements in academics. The researcher adopted self-efficacy scale meant for children, procrastination academic scale and locus of control scale to collect quantitative data. Data were collected from 6^{th}, 7th and 8^{th} grade in Turkey's middle state schools. Data were analyzed using linear multiple regression in conjunction with

Pearson product-moment correlation coefficient and independent sample t-test. Using relational screening model and a sample of 167(90 males, 77 females) diagnosed as gifted students and 329 (167 females, 162 males) diagnosed as not gifted students, the study revealed out that academic procrastination significantly predicted academic achievement. Further, the study revealed that for non-gifted students, procrastination, academic self-efficacy and locus of control predicted achievements in academics. Also, research findings indicated that score on academic self-efficacy was not significant when related to gifted students' academic achievement. The reviewed study targeted respondents from different grades while the current study was conducted among class eight pupils to find out whether similar findings will be obtained.

Maizam et al. (2016) did a research among engineering students in two technical universities in Malysia. The aim of the study was to establish whether locus of control, academic self-efficacy and efforts related to academic achievement among first year students. Survey method was used and the study sample comprised of 410 students. Data on learning efforts and academic self-efficacy were collected using tools developed based on Carbonaro's model while Trice academic locus of control was used to collect data on locus of control. Pearson product moment correlation coefficient was used to analyze data. The study findings established that female engineering students had higher academic self-efficacy than male students. Further, both male and female engineering students had internal locus of control which had positive significant relationship to academic achievement. The above reviewed study looked into contribution of academic self-efficacy, locus of control on academic achievement among engineering students who are quite different from primary school in terms of educational experience.

In yet another study, Olumuyiwa and Akinsola (2019) found out that mathematics performance was predicted by academic self-efficacy and locus of control variables. The study used ex-post facto design and a sample size of 147 students aspiring to be teachers drawn from two colleges in Nigeria. Self-report questionnaires were used in data collection and multiple regression technique was utilized in data analysis. The researcher established that these variables are important in promoting mathematics performance. However, the reviewed study was carried among college students therefore, limiting results generalizability. The proposed study was carried out among pupils' in primary schools to find out whether similar results would be obtained.

Attamah and Okoli (2021) conducted a correlational survey study on academic self-efficacy and locus of control in relation to academic achievement on biology perspective among senior secondary students drawn from Ebonyi state, Nigeria. Multistage sampling technique was applied in sample selection. The study sample comprised 420 students drawn from a population of 2885 students in 65 secondary schools. Rotter's locus of control scale and general self-efficacy belief scale by Chen were instruments used in data collection. Pearson product moment correlation coefficient, t-test and multiple regressions were used in data analysis. The results revealed that there was a low significant relationship between academic self-efficacy and scores obtained in biology. Further, a low significant relationship between locus of control and achievement in biology was established. In addition, the authors concluded that academic achievement in biology could not be attributed to locus of control and academic self-efficacy. The reviewed study however, focused on academic achievement in biology perspective while the current study focused on mathematics performance to establish whether similar results would be obtained.

A research study carried out in Nyamira county Kenya, (Onkundi, 2014) among form three students sought to establish whether locus of control and academic self-efficacy relates with academic performance in Mathematics, Kiswahili and English. The correlational study utilized a sample of 150 students drawn from three secondary schools. Using questionnaires and document analysis the researcher gathered numerical data which was analysed using appropriate inferential and descriptive statistics. Multiple regression and F-test were used to determine the relationship among the variables. The findings showed that academic self-efficacy and locus of control predicted high performance. However the reviewed study utilized a smaller sample of 150 students which could result to biasness. The current study utilized a relatively larger sample to fill the gap in the reviewed literature.

2.5 Summary of Literature Review and Gap Identification

The chapter reviewed literature related to academic self-efficacy and locus of control on pupils' mathematics performance. The studies reviewed on academic self-efficacy and mathematics performance showed a positive significant relationship. Literature reviewed on locus of control and mathematics performance established that internal locus of control positively relates to learners mathematics performance. Further, external locus of control and pupils mathematics performance revealed relationships that were not significant. Despite these, there was need to carry out another study due to some reasons. Firstly, it was evident from the reviewed literature that most of the studies were conducted in universities and secondary schools. Few studies focused on primary school pupils. This created a gap for the current study to be carried out on primary school pupils to establish whether similar results would be obtained.

Further, most of the studies were carried out in other countries therefore limiting the scope to which results may be generalized. Thus, there was need to conduct a similar study in Kenya in order to widen the scope to which results may be generalized. In addition, some studies reviewed used a relatively smaller sample. This offered a basis for the current study to be conducted among learners in primary schools using a relatively larger sample. Lastly, the reviewed literature on prediction of mathematics performance from academic self-efficacy and locus of control showed that the two variables may be good predictors of mathematics performance. Thus, there was need to carry out the current study to establish whether good performance in mathematics may be attributed to academic self-efficacy and locus of control.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter focuses on research design, research methodology and variables of the study, location of the study, target population, sampling procedure and sample size. The chapter also presents the research instruments, reliability and validity of the research instruments, data collection procedures and data analysis techniques. This section also addresses logistical and ethical issues connected with the study.

3.2 Research Design

Correlational research design was used to establish the relationship between academic self-efficacy, locus of control and performance in mathematics. This design is appropriate for studies seeking to establish the significance of the relationship between variables with the use of correlational statistics (Creswell, 2012). Further, researchers using this design study the variables and measure correlations between them without attempting to manipulate them. This design was considered appropriate in this study because the researcher did not aim at explaining the cause-and-effect relationships, but rather the degree of association likely to be present in relation to academic self-efficacy, locus of control and mathematics performance.

3.3 Research Methodology

The current study used quantitative research techniques. This involved the use of simple random sampling, self-report questionnaires and analysis of existing documents in the collection of quantitative data. Statistical analysis and interpretation

of quantitative data was applied. The quantitative techniques produce results that are easy to summarize, compare, and generalize (Muhammad, 2016).

3.4 Variables of the Study

The study comprised two predictor variables namely; academic self-efficacy and locus of control measured at interval level. Academic self-efficacy consisted of two indicators (self-efficacy for learning and expectancy for success). Locus of control had two dimensions that are internal locus of control and external locus of control at interval level. The moderating variables were chronological age of participants at ratio level and gender (determined as either male or female) at nominal scale. The outcome variable was the pupils' mathematics performance at interval level of measurement.

3.5 Location of the Study

The current research was based in Kipiriri sub-county, Nyandarua County, Kenya. Out of the seven sub-counties Kipipiri sub-county was the focus of the current study. The KCPE mathematics performance in Kipipiri sub-county has been consistently low compared to other sub-counties in the county.

Table 3. 1

Mathematics K.C.P.E Performance in Nyandarua County, Year 2016-2020

Sub-counties	Mean Scores				
Year	2016	2017	2018	2019	2020
NYANDARUA NORTH	48.9	49.02	49.60	48.9	49.02
NYANDARUA WEST	51.9	52.20	52.70	51.99	52.58
NYANDARUA CENTRAL	47.30	47.64	48.41	47.30	49.37
KIPIPIRI	**46.67**	**46.54**	**47.05**	**46.67**	**47.03**
NYANDARUA SOUTH	49.5	48.76	47.73	49.05	49.95
KINANGOP	49.98	50.04	50.78	49.98	49.94
MIRANGINE	48.7	48.42	48.41	48.57	48.87
AVERAGE	**48.41**	**48.93**	**49.075**	**48.94**	**49.54**

Note. Source: Directorate of Education Nyandarua County (2022)

Statistics obtained from the Nyandarua County Director of Education office shows in the past five years (2016, 2017, 2018, 2019 and 2020) the K.C.P.E. mathematics means scores were below average. This is evident in table 3.2. The below average mean scores in mathematics performance necessitated the choice of the location of this study in Kipipiri sub-county. There are limited studies if any that correlate academic self-efficacy and locus of control with pupils' mathematics performance in Nyandarua County.

3.6 Target Population

The study targeted 1,810 class eight pupils in all 67 public primary schools in Kipipiri sub-county. The data from CDE's office in Nyandarua County year 2022 indicated that there were 880 girls and 930 boys in class eight. The class eight pupils were

selected because of their maturity and level of understanding as they responded to questionnaires.

3.7 Sampling Techniques and Sample Size Determination

3.7.1 Sampling Techniques

The current proposed research used three types of sampling procedures that is purposive sampling, simple random sampling and stratified sampling. Out of the seven sub-counties, Kipipiri Sub-county was purposively sampled. Simple random sampling was used to select pupils and schools where participants of the study were drawn. Further, stratified sampling procedure was used to categorize participants into boys and girls. All public primary schools in Kipipiri sub-county are co-educational (mixed day primary schools) and therefore, schools were not categorized in any form. The number of participants in class eight in each school was proportionally obtained as per the population of boys and girls. The researcher then used simple random sampling procedures to ensure fair chance of participation by every pupil in class eight. Names of the 67 public primary schools were written on pieces of papers and then folded. The papers were mixed thoroughly in a container. Eight schools were then picked randomly and used as the representative sample in the study.

3.7.2 Sample Size

The sample size of pupils in this study was determined by Krejcie and Morgan (1970) table as indicated in appendix H. As per the table, population of 1,810 produces an appropriate sample size of 320. Sample size by gender was determined using proportionate formula $n_{\frac{1}{N}*n}$ where n_1 is the population size of the group, N is the

total population and n is the size of the sample. Using this formula, the sample size of boys were 164 and girls were 156. The information is detailed in Table 3.2.

Table 3. 2

Sampling Frame

Target Population				Sample size		
No of Public Pry schools	No. of Pupils.	No. of Pupils by Gender		No. of Schools	No. of Pupils	No. of Pupils by Gender
		Boys	Girls			Boys Girls
67	1810	930	880	8	320	164 156
100%	100%	51%	49%	12%	18%	51% 49%

Note. Source: County Director of Education, Nyandarua County (2022)

Data in Table 3.2 indicates that Kipipiri Sub-County has 67 public primary schools which are mixed day primary schools and therefore, schools were not categorized. The population in this schools comprised of 1810 (930 boys and 880 girls) class eight pupils. The 8 schools were randomly selected which represented 12% of the schools total population. According to Gorard (2003) a sample size of between 10-20 percent is ideal for the study. Based on this recommendation, the proposed sample size of the schools in this study was justifiable. Boys comprised 51% and girls 49% of the total sample size as indicated.

3.8 Research Instruments

The study adapted two questionnaires namely; the self-efficacy for learning and performance subscale (Pintrich et al. 1991; MSLQ) and the revised academic locus of control scale (Curtis & Trice, 2013). Questionnaires were used in this study as they help save on time and are appropriate when collecting data from a large sample. Both instruments are in the public domain and their use for academic research is authorized, with appropriate acknowledgement of the authors. Pro-forma summary of pupils' examination results was also used. The instruments are shown in Appendix B.

3.8.1 Academic Self-Efficacy Scale

The self-efficacy for learning and performance subscale (Pintrich et al. 1991; MSLQ) was adapted to measure academic self-efficacy. The subscale has an internal reliability of .93. This subscale comprises two dimensions: expectancy for success and self-efficacy for learning. The subscale has 8 items rated on a five-point likert scale, ranging from 1= *not at all true of me* to 5= *very true of me*. The scores ranged from 8 to 40. A score of 8-13 indicates low academic self-efficacy, 14-27 moderate academic self-efficacy while 28-40 indicates high academic self-efficacy. Pupils indicated the degree to which each statement represents their beliefs about learning and performance in mathematics. The individual's score in each dimension was obtained by summing the 8 items.

3.8.2 Academic Locus of Control Scale

To determine pupils' locus of control the researcher adapted the revised academic locus of control scale comprising 22- items in True / False format. The scale assesses students' internal and external locus of control (Curtis & Trice, 2013). The scores ranged between 0 and 22 where scores ranging between 0 -10 indicates internal locus

of control and scores ranging between 11-22 indicates external locus of control. Each true and false score by the students was awarded one point. The original scale had an internal reliability of .70 (Curtis & Trice, 2013). The scale targets university students and therefore, some items in the scale were restructured and the language simplified to suit pupils in primary school as shown in appendix B.

3.8.3 Mathematics Performance Pro Forma

The researcher obtained class eight pupils' mid and end of term two, year 2022 mathematics examination results from schools' records where participants were drawn. The average mathematics score from the two examinations were calculated for each participant and filled in a pro forma table shown in appendix C. Each pupil's mean mathematics score was transformed into *z*-score. Further, to get actual pupils' score in whole numbers each pupil's *z*-score was transformed to *t*-score. This process was done to all sampled participants to standardize score in every school.

3.9 Pilot Study

A pilot study was carried out prior to the main study. This was done among 35 (20 boys and 15 girls) class eight pupils drawn from two randomly selected public primary school. This is in line with Connelly (2008) recommendation of a 10% pilot sample. According to Irlene (2010) it is important to carry piloting because it helps the researcher to carry out pre-test of the research instruments with the aim of ensuring clarity of items and identifying before the main study what might work and what might not work. The respondents randomly sampled to participate in the pilot study were assembled in one class with the help of a class teacher to fill the self-report questionnaires. The head teacher on behalf of the parents gave the permission to the researcher to allow the pupils carry out the pilot study. This activity was done during

lunch time which extended for about 15 minutes meant for the first lesson. To overcome such inconveniences during main data collection, the researcher collected data at 3:10 p.m. during games time. This allowed the pupils to have enough time to fill the questionnaires. The pilot study helped the researcher to discover various issues that would affect the main data collection for instance, inappropriate phrasing of items in the questionnaires, time evaluation, estimation of cost and finally inadequate spaces provided to fill the feedback. The researcher did not include the schools that were involved during pilot study in the actual data collection. The areas that needed correction of the items were done as necessary to improve the reliability and the validity.

3.9.1 Validity of Research Instruments

According to Taherdoost (2016), there is a need to subject the research instrument to the relevant experts in the study area for assessment to ensure content validity. Therefore, the research tools were presented to the expert (supervisor) for scrutiny. Further, the researcher sought suggestions from class eight mathematics teachers due to their knowledge of what is appropriate for pupils at that level. Any flaw noticed was corrected before actual data collection.

3.9.2 Reliability of the Research Instruments

In the current study, the researcher used Cronbach's alpha coefficient (α) to determine reliability of the research tools .The self-efficacy for learning and performance subscale (Pintrich et al., 1991; MSLQ) and the revised academic locus of control scale (Curtis & Trice, 2013) were pre-tested during piloting in order to help ascertain their reliability. The results are shown in Table 3.3.

Table 3. 3

Reliability Results

Scale	No. of Items	α (Authors)	α (Pilot)
Academic Self-Efficacy	8	.93	.81
Academic Locus of Control	22	.70	.76

Note: α - Reliability Coefficient

The results in Table 3.3 show that the reliability coefficient of academic self-efficacy scale for the pilot study was .81. The authors obtained a reliability coefficient of .93. The reliability coefficient of academic locus of control scale obtained during the pilot study was .76. The authors obtained a reliability coefficient of .70 during validation of the scale. The results show that academic self-efficacy and locus of control scales were acceptable for use in this study since the reliability coefficients were greater than 0.7 as recommended by Beyaztas and Şahin (2018).

3.10 Data Collection Procedure

Data collection procedure involved the researcher first visiting the sampled schools. This allowed the researcher to introduce self to the head teachers and inform them of the intention to carry out the study in their schools. The researcher also sought to familiarize and build cooperation with class eight mathematics teachers in the respective schools. In addition, the researcher informed the school administrators on the planned day and time for the administration of questionnaires.

During data collection, the participants were briefed on the importance of their participation. The questionnaires were then administered by the researcher and with

the assistance of the mathematics teacher. The researcher then requested the participants to complete the questionnaires. The researcher personally collected the completed questionnaires with the purpose of maintaining confidentiality. Data on pupils' mathematics performance was obtained from the existing school examination records for mid and end of term two, year 2022. The scores were then transformed to *z*-scores and later converted to *t*-scores and filled in the pro forma table shown in appendix C.

3.11 Data Analysis

Data in the current study was coded and analysed using SPSS software. Demographic data including age and gender was summarized through relevant descriptive techniques such as percentages and represented in tables and graphs. The following null hypotheses were tested using appropriate inferential statistic procedures at $\alpha = .05$ significant level.

H_{01} : There is no significant relationship between academic self-efficacy and pupils' mathematics performance. Statistical test: Pearson's Product Moment correlation Coefficient.

H_{02}: There is no significant relationship between locus of control and pupils' mathematics performance. Statistical test: Pearson's Product Moment correlation coefficient.

H_{03}: There is no significant equation for predicting pupils' mathematics performance from academic self-efficacy and locus of control. Statistical test: Multiple regressions analysis will be used.

3.12 Logistical and Ethical Considerations

3.12.1 Logistical Considerations

The researcher sought authorization to carry out this study from Kenyatta University Graduate School. Secondly, the researcher sought authorization and a permit for carrying out the study from National Commission for Science, Technology and Innovation (NACOSTI). In addition, the permission to do research was obtained from County Director of Education, Nyandarua County and then Kipipiri sub-county Director of Education's office. Further, the researcher visited the sampled schools to familiarize with the school head teachers and later sought permission to carry out the study. Finally, the appropriate days for collecting data were organized.

3.12.2 Ethical Considerations

The researcher explained to the respondents the intention of the study and its' anticipated benefits to them. The researcher then gave the consent form to the participants to put their sign upon agreeing to participate in the study. The consent form is shown in appendix A. In addition, confidentiality of the respondents was assured. In connection with confidentiality, codes that are anonymous were given to the respondents in order for their identity to be concealed. Lastly, participation was voluntary and the respondents were informed that there was freedom of withdrawal if the respondent felt undecided.

CHAPTER FOUR

PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter presents the findings of the study as per the study objectives. The chapter consists of four major sections that include general and demographic information, relationship between academic self-efficacy and pupils' mathematics performance, relationship between locus of control and pupils' mathematics performance, prediction equation for pupils' mathematics performance from academic self-efficacy and locus of control.

4.2 General and Demographic Information

In this subsection, questionnaire return rate, respondents' background information and cross-tabulations of the background information are presented.

4.2.1 Questionnaire Return Rate

The sample size for this study was 320 pupils who were proportionately sampled. All these pupils were issued with questionnaires as indicated in Table 4.1

Table 4. 1

Return Rate

	Questionnaires Administered		Return Rate	
Schools	Male	Female	Male	Female
Sub Total	164	156	160 (97%)	154(99%)
Total	320		314 (98%)	

Note: *N*=314; % = Percentage

Table 4.1, the total number of respondents issued with questionnaires were 320, 164 being male while 156 being female. The response rate for the male respondents was 97% while that for the female pupils was 99%. The overall response rate was 98%, which was adequate for data analysis as recommended by Mugenda and Mugenda (2003).

4.2.2 Age of the Respondents

The age of the respondents was grouped into three categories that include; 12-13, 14-15, and 16 and above. The results are presented in Table 4.2.

Table 4. 2

Age Bracket of the Pupils

Age bracket	Frequency	Percent
12-13	123	39.2
14-15	157	50.0
16 and above	34	10.8
Total	314	100.0

Note: *N*=314

As shown in Table 4.2, majority of the respondents were those in the age bracket of 14-15 which represented 50%, followed by those between 12-13, represented by 39.2%, and the minority group were from 16 years and above who represented 10.8% of the respondents.

4.2.3 Age by Gender Cross Tabulation

A cross tabulation was also done to determine the gender representation in the three age categories as shown in Table 4.3

Table 4. 3

Age by Gender Cross Tabulation

		Gender		Total
		Male	Female	
Age	12-13	48 (15%)	75 (61%)	123 (39%)
	14-15	84 (27%)	73 (23%)	157 (50%)
	16 and above	28 (9%)	6 (2%)	34 (11%)
Total		160 (51%)	154(49%)	314 (100%)

Note. *N*=314; % = Percentages

The results in Table 4.3 show that 27% of the boys were between 14-15 years followed by those in the category of 12-13 years represented by 15%, and the rest (9%) were those of 16 years and above. For the girls, the majority (61%) were aged between 12-13, followed by those with 14-15 years at 23%. The minorities were those of age 16 and above represented by 2%.

4.3 Relationship between Academic Self-efficacy and Pupils' Mathematics Performance

The first objective of this study was to determine the relationship between academic self-efficacy and pupils' mathematics performance. This objective was achieved by carrying out the following analysis.

4.3.1 Descriptive Statistics of Self-Efficacy

The researcher obtained descriptive statistics of self-efficacy to determine the minimum score, the maximum score, the mean score, the standard deviation, the coefficient of skewness and the kurtosis coefficient. Table 4.4 shows the results.

Table 4. 4

Descriptive Statistics of Self-Efficacy

	N	Min	Max	Mean	*SD*	*Sk*	*Kur*
Self-Efficacy	314	12.00	38.00	24.96	3.29	-.41	1.14

Note. *N*=314; Min – Minimum; Max – Maximum; SD – Standard deviation; Sk – Skewness; Kur- Kurtosis

From Table 4.4, the minimum score obtained was 12 while the maximum score was 38. The mean score was 24.96 with standard deviation of 3.29 indicating that the self-efficacy scores was above average. The coefficient of skewness was -.41 indicating that the distribution was approximately symmetric. The kurtosis coefficient was 1.14 implying that the distribution was platykurtic. The results indicate that academic self-efficacy scores were near normal distribution.

The descriptive statistics was also obtained by gender. The results are presented in Table 4.5.

Table 4. 5

Descriptive Statistics of SE by Gender

Gender	*N*	Min	Max	Range	Mean	*SD*
Male	160	12.00	38.00	26.00	24.71	3.55
Female	154	14.00	36.00	22.00	25.22	2.99
Total	314	12.00	38.00	26.00	24.96	3.29

Note. *N*=314; Min – Minimum; Max – Maximum; SD – Standard deviation

The results in table 4.5 indicate that the female pupils obtained the highest mean score of 25.22 with a standard deviation of 2.99. The minimum score was 14 while the maximum score was 36. The male pupils obtained a mean score of 24.71 with a standard deviation of 3.55, their minimum score was 12 while the maximum score was 38.

The descriptive statistics of self-efficacy was also obtained by the respondent age category. The findings are presented in Table 4.6.

Table 4. 6

Descriptive Statistics of SE by Age Category

Age	*N*	Min	Max	Range	*M*	*SD*
12-13	123	14.00	36.00	22.00	24.69	3.44
14-15	157	12.00	38.00	26.00	25.18	3.27
16 and above	34	19.00	29.00	10.00	24.88	2.80
Total	314	12.00	38.00	26.00	24.96	3.29

Note. *N*=314; Min – Minimum; Max – Maximum; SD – Standard deviation

From Table 4.6, the respondents of age category 14-15 had the highest mean of 25.18 (*SD* = 3.27), their minimum score being 12 while maximum was 38, the range being 26. This was followed by the age category of 16 and above with the mean score of 24.88 (*SD* = 2.80), their minimum score being 19 while their maximum score was 29 and their range being 10. The respondents of age between 12-13 obtained the lowest mean score of 24.69 (*SD* = 3.44), their minimum score being 14 while maximum score being 36 giving a range of 22.

The descriptive statistics of the sub scale of self-efficacy for learning and self-efficacy for success were also obtained to determine their minimum and maximum scores, mean scores, standard deviation and the range. The results are shown in Table 4.7.

Table 4. 7

Descriptive Statistics of SE Sub Scales

	N	Range	Min	Max	Mean	*SD*
Self-efficacy for Learning	314	16.00	4.00	20.00	11.01	2.21
SE Expectancy for Success	314	20.00	5.00	25.00	13.96	3.11

Note. *N*=314; Min – Minimum; Max – Maximum; SD – Standard deviation

From Table 4.7, the self-efficacy for success sub scale obtained the highest mean score of 13.96 (*SD* = 3.11) and its minimum score was 5 while the maximum was 25 giving a range of 20. The self-efficacy for learning obtained a mean score of 11.01 (*SD* = 2.21) with the minimum score of 4 while the maximum was 20, giving a range of 16.

The frequency of the levels of self-efficacy such as low self-efficacy, moderate self-efficacy and high self-efficacy among the students was also obtained. Table 4.8 presents the results.

Table 4. 8

Levels of SE Among the Students

SE Level	Frequency	Percent
Low SE	125	39.8
Moderate SE	181	57.6
High SE	8	2.5
Total	314	100.0

Note. N=314; SE – Self Efficacy

The results in Table 4.8 shows that moderate self-efficacy recorded the highest frequency of 181 representing 57.6%, followed by low self-efficacy which recorded 125 representing 39.8% while High self-efficacy record the lowest frequency of 8 representing 2.5% of the total respondents. The results suggest that a majority of the students had moderate levels of self-efficacy.

The levels of self-efficacy (low, moderate and high) among the pupils by gender were also carried out to determine if there exist mean differences based on these levels. The results are shown in Table 4.9.

Table 4. 9

Levels of SE by Gender

		Gender		Total
		Male	Female	
SE Levels	Low SE	68 (22%)	57(18%)	125 (39%)
	Moderate SE	89 (28%)	92 (29%)	181 (58%)
	High SE	3 (1%)	5 (2%)	8 (3%)
Total		160 (51%)	154 (49%)	314 (100%)

Note. N=314; SE – Self Efficacy

The results in Table 4.9 indicate that female pupils were the majority in the moderate level of self-efficacy with 89 representing 29% of the total, low self-efficacy recorded 57 respondents representing 18%, and high self-efficacy had the highest number of respondents of 5 representing 2%. The males recorded highest number of low self-efficacy level with 68 respondents representing 22% followed by moderate self - efficacy with 89 respondents representing 28% and high self- efficacy recorded the lowest number with 3 pupils representing 2% of the total respondents.

4.3.2 Descriptive Statistics of Mathematics Performance

The descriptive statistics of mathematics performance raw scores were obtained to determine the minimum score, maximum score, the range, the mean score and standard deviation, coefficient of skewness and kurtosis coefficient. The results are shown in Table 4.10.

Table 4. 10

Descriptive Statistics of Mathematics Performance

	N	Range	Min	Max	Mean	*SD*	*Sk*	*Kur*
Maths Performance	314	66	14	80	39.65	12.32	.36	-.08

Note. N=314; Min – Minimum; Max – Maximum; SD – Standard deviation; Sk – Skewness; Kur- Kurtosis

As shown in Table 4.10, the lowest mathematics score obtained was 14 while the highest was 80. The mean score was 39.65 with a standard deviation of 12.32 indicating that mathematics performance scores of majority of the pupils were below average. The coefficient of skewness was 0.36 indicating that the distribution was fairly symmetrical. The kurtosis coefficient was -.08 implying that the distribution was platykurtic.

4.3.3 Descriptive Statistics of Academic Performance

The descriptive statistics of academic performance in mathematics standardized scores were obtained to determine the minimum scores, maximum scores, the mean score and standard deviation, skewness and kurtosis coefficients. The standardized scores are shown in the Table 4.11.

Table 4. 11

Descriptive Statistics of Mathematics Performance

	N	Range	Min	Max	Mean	*SD*	*Sk*	*Kur*
Maths Performance scores	T314	53.59	29.17	82.76	50.00	10.00	.36	-.08

Note. *N*=314; Min – Minimum; Max – Maximum; SD – Standard deviation; Sk – Skewness; Kur- Kurtosis

As indicated in Table 4.11, the maximum score recorded was 82.76 while the minimum score was 29.17 giving a range of 53.59. The mean score was 50.00 with a standard deviation of 10.00. The coefficient of skewness was .36 indicating that the distribution was fairly symmetrical. The kurtosis coefficient was -.08 implying that the distribution was platykurtic.

The descriptive statistics of academic performance by gender was also obtained to determine if there are mean differences based on gender.

Table 4. 12

Descriptive Statistics of Academic Performance by Gender

Gender	*N*	Min	Max	Range	Mean	*SD*
Male	160	29.17	82.76	53.59	49.52	10.32
Female	154	29.17	76.27	47.09	50.49	9.66
Total	314	29.17	82.76	53.59	50.00	10.00

Note. *N*=314; Min – Minimum; Max – Maximum; SD – Standard deviation

The results in Table 4.12 indicate that female respondents had the highest mean score of 50.49 with a standard deviation of 9.66. They had a maximum score of 76.27 and a minimum of 29.17 resulting in a range of 47.09. The male respondents obtained a lower mean score of 49.52 with a standard deviation of 10.32. They had a maximum score of 82.76 and a minimum of 29.17 resulting in a range of 53.59.

The descriptive statistics of academic performance score in mathematics was also obtained by age category to determine if there exist mean differences. The results are presented in Table 4.13.

Table 4. 13

Descriptive Statistics of Academic Performance by Age

Age	*N*	Min	Max	Range	Mean	*SD*
12-13	123	29.17	76.27	47.09	48.95	10.13
14-15	157	29.17	82.76	53.59	50.98	9.86
16 and above	34	30.80	71.40	40.60	49.23	9.99
Total	314	29.17	82.76	53.59	50.00	10.00

Note. *N*=314; Min – Minimum; Max – Maximum; SD – Standard deviation

The results in Table 4.13 indicate that the age category of 14-15 had the highest mean score of 50.98 (*SD* = 9.86) with the maximum score being 82.7, minimum score of 29.17 giving a range of 53.50. Those aged 16 years and above followed with a mean score of 49.23 (*SD* = 9.99). Their maximum score was 71.40 while the minimum score was 30.80 resulting in a range of 40.60. Those of age 12-13 years obtained the lowest mean score of 48.95 (*SD* = 10.13). They had a minimum score of 29.17 and a

maximum of 76.27 giving a range of 47.09. The results indicate that there was no specific trend in mathematics performance based on age.

4.3.4 Hypothesis Testing

The first objective of this study was to determine if there exist a relationship between academic self-efficacy and pupils' mathematics performance and whether the sub domains of academic self-efficacy were related to pupils' mathematics performance. The following three hypotheses were subjected to Pearson product moment correlation test.

H_{01}: There is no significant relationship between academic self-efficacy scores and pupils' mathematics performance.

H_{02}: There is no significant relationship between academic self-efficacy for learning scores and pupils' mathematics performance.

H_{03}: There is no significant relationship between academic self-efficacy expectancy for success scores and pupils' mathematics performance.

The hypotheses test results are shown in Table 4.14.

Table 4. 14

Correlation between Academic Self-Efficacy and Mathematics Performance

		Maths Performance
Academic Self-Efficacy	Pearson Correlation	.61**
	Sig. (2-tailed)	.00
	N	314
Academic Self-Efficacy for Learning	Pearson Correlation	.03
	Sig. (2-tailed)	.57
	N	314
Academic Self-Efficacy for Expectancy for Success	Pearson Correlation	.62**
	Sig. (2-tailed)	.00
	N	314

Note. *N*=314

The results for the first hypothesis (H_{01}) reveal a positive and significant relationship between academic self-efficacy scores and pupils' mathematics performance, *r* (312) =.61, *p* =.00. Therefore, the null hypothesis was rejected and the alternative one adopted. The outcomes imply that the higher the academic self-efficacy among the pupils, the higher the academic performance in mathematics. For the second hypothesis (supplementary), the results reveal a non-significant relationship between academic self-efficacy for learning scores and pupils' mathematics performance, *r*

(314) =.03, p =.57). Therefore, the null hypothesis was retained. The outcomes imply that the higher or the lower the academic self-efficacy for learning score has no significant influence on pupils' mathematics performance. For the third hypothesis (supplementary), the results reveal a positive and significant relationship between academic self-efficacy for expectancy for success scores and pupils' mathematics performance, r (314) =.62, p =.00. Therefore, the null hypothesis (supplementary) is rejected and the alternative one adopted. The outcomes imply that the higher the academic self-efficacy for expectancy for success scores the higher the pupils' mathematics performance.

The researcher conducted further analysis on the prediction of mathematics performance from SE sub domains and the results are presented.

Table 4. 15

Model Summary Prediction of Mathematics Performance from SE Sub Domains

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.65[a]	.42	.41	7.66

Note: N=314; Predictors: (Constant), Self-Efficacy for Learning, Self-Efficacy Expectancy for Success

The results in Table 4.15 indicate that there is a moderate positive interrelationship between self-efficacy for learning and self-efficacy expectancy for success as predictor variables and pupil's mathematics performance as the outcome variable (*R*=.65). The R Square value illustrates that the self-efficacy for learning and self-efficacy for success accounted for 42% of the total variance in pupils' mathematics

performance. This shows that the two variables could be used to predict pupils' mathematics performance.

To confirm if the predictive values for self -efficacy for learning and self-efficacy expectancy for success were significant, ANOVA test was conducted. The results are presented in Table 4.16.

Table 4. 16

ANOVA Test for the Prediction of Mathematics Performance from SE Sub Scales

Model		Sum of Squares	Df	Mean Square	*F*	Sig.
1	Regression	13073.00	2	6536.50	111.53	.00[b]
	Residual	18227.00	311	58.61		
	Total	31300.00	313			

Note. N=31; Dependent Variable: Maths Performance

b. Predictors: (Constant), Self Efficacy for Learning, SE Expectancy for Success

The results in Table 4.16 reveal that the two predictor variables (self-efficacy for learning and self-efficacy expectancy for success) significantly predict mathematics performance, $F(2, 311) = 111.53$, $p < .05$. This implies that self-efficacy for learning and self-efficacy expectancy for success can be used to significantly predict pupils' mathematics performance.

The researcher carried out regression analysis to determine the predictive values of self-efficacy for learning and self-efficacy expectancy for success on pupils' mathematics performance. The results are presented in Table 4.17.

Table 4. 17

Regression Coefficients for SE Sub Scales

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.26	3.32		3.39	.00
	SE Expectancy for Success	2.13	.14	.66	14.92	.00
	SE for Learning	.82	.20	.18	4.07	.00

Note. *N*=314; Dependent Variable: Maths Performance

From Table 4.17 self-efficacy expectancy for success had a regression coefficient of β=2.13, *p* =.00, self-efficacy for learning had a regression of β=.82, *p* =.00.

From the standardized coefficients, the prediction equation for the model is;

$\hat{Y} = 11.26 + 2.13X_1 + 0.82X_2 + \acute{\varepsilon}$

Where $\hat{y}$ = predicated mathematics score, X_1=self-efficacy expectancy for success X_2= self-efficacy for learning and $\acute{\varepsilon}$ =standard error.

The results indicate that a unit change in self-efficacy expectancy for success leads to a 2.13 change in pupils' mathematics performance. A unit change in self-efficacy for learning leads to 0.82 change in pupils' mathematics performance. These findings show that self-efficacy expectancy for success and self-efficacy for learning can be used to significantly predict mathematics performance among the pupils.

The researcher obtained the mean scores of mathematics performance for the different levels of self-efficacy. The results are presented in table 4.18.

Table 4. 18

Mathematics Performance for the Different Levels of Self-Efficacy

SE Levels	*N*	Maths Mean Score	Std. Deviation
Low SE	125	43.15	3.54
Moderate SE	181	54.43	9.56
High SE	8	56.58	22.48
Total	314	50.00	10.00

Note. ; *N*=314; SE – Self efficacy

The results in Table 4.18 show that pupils with high self-efficacy level obtained the highest mean score of 56.58 with standard deviation of 22.46, followed by those with moderate self-efficacy level with a mean score of 54.43 with standard deviation of 9.56. The low self-efficacy level had the lowest mean score of 43.15 with standard deviation of 3.54.

To determine if the mean differences obtained were statistically significant, ANOVA test was conducted and the results presented in Table 4.19.

Table 4. 19

ANOVA Test Maths Performance and SE Levels

	Sum of Squares	Df	Mean Square	*F*	Sig.
Between Groups	9773.03	2	4886.51	70.59	.00
Within Groups	21526.97	311	69.22		
Total	31300.00	313			

Note. N=314

The results in Table 4.19 indicate that the mean differences obtained for the different levels of self-efficacy were statistically significant, F (2, 311) = 70.59, $p < .05$. This implies that the different levels of self-efficacy had a significant impact on pupils' mathematics performance.

To determine which group among the different levels of self-efficacy had significant impact on pupils' mathematics performance, Tukey HSD was conducted. The results are presented in Table 4.20.

Table 4. 20

Tukey HSD for Maths Performance and SE Levels

(I) SE Levels	(J) SE Levels	Mean Difference (I-J)	Std. Error	Sig.
Low SE	Moderate SE	-11.28*	.97	.00
	High SE	-13.42*	3.03	.00
Moderate SE	Low SE	11.29*	.97	.00
	High SE	-2.14	3.01	.76
High SE	Low SE	13.42*	3.03	.00
	Moderate SE	2.14	3.01	.76

Note. *N*=314; SE – Self efficacy

From Table 4.20, the mean differences between low self-efficacy level and moderate level was statistically significant (x = -11.28, *p* =.00), low and high self-efficacy was also statistically significant (x = -13.42, *p* =.00), and moderate level and low level (x=11.29, *p* =.00) were significant. The mean differences between moderate level and high level (x=-2.14, *p* =.76) were not significant.

4.3.5 Discussion of the Results

The first objective of the study was to determine the relationship between academic self-efficacy and pupils' mathematics performance. It was established that there exists a positive and significant relationship between academic self-efficacy scores and pupils' mathematics performance. This implies that the higher the academic self-

efficacy among the pupils, the higher the academic performance in mathematics. From the definition of self-efficacy according to Bandura (1986), the students who belief in their abilities that they will pass will work towards that success and employ every tactic within their reach. Such individuals will act in a way that even the environment they operate in will be influenced to facilitate what individuals believe in. This explains why the study established that the higher the self-efficacy, the higher the pupils' performance in mathematics.

These findings are in tandem with those reported by Prabawanto (2018) in Indonesia, Ozkal (2019) and Özcan and Kültür (2021) in Turkey, Hayat et al. (2020) in Iran, Zakariya (2022) in Norway, Sinan and Ibrahim (2016) in Nigeria, and Mwaura et. al. (2019) in Kenya. For instance, Prabawanto (2018) carried out a study to determine the relationship between academic self-efficacy and mathematics performance. The researcher found that students in high school had low self-efficacy as majority had less confidence in solving mathematical problems and holding class discussion during mathematics learning. This implies that by nurturing academic self-efficacy skills among students, it will help them boost their morale and perform better in academics.

Ozkal (2019) investigated the association between self-efficacy and mathematics performance in Turkey and reported results that are similar to the findings of the current study. It was established that there exists a relationship between self-efficacy beliefs and motivation to learn mathematics and mathematics performance. This indicates that self-efficacy has an influence in the creation of the right attitude towards learning mathematics. In the same country, Özcan and Kültür (2021) reported that the sources of self-efficacy (mastery experience, social persuasions, vicarious experience, and physiological state) had an impact in determining mathematics

performance. This indicates the existence of a relationship between self-efficacy and mathematics performance.

In Iran, Hayat et al. (2020) established that the students' self-efficacy influenced academic emotions towards learning and learning strategies which had an impact on the students' academic outcomes in all the subjects being studied. This implies that an academic emotion towards learning and learning strategies mediates the relationship between self-efficacy and academic outcomes of the various subjects studied. In Norway, Zakariya (2022) reported that mathematics self-efficacy is one of the most important variables that plays a key role in determining student's success in mathematics. These demonstrations reveal the importance of self-efficacy and mathematics performance. Naz and Majoka (2016) in their study in Hazara University, Pakistan established that there was a strong, positive and significant relationship between mathematics self-efficacy among the students and mathematics performance. This shows that having the right strategies towards improvement of self-efficacy among the students can help them to succeed in academics.

In Nigeria, Sinan and Ibrahim (2016) investigated if a relationship existed between learners' academic self-efficacy and mathematics performance. It was established that mathematics performance related significantly with academic self-efficacy, results which were supported by those of the current study. This indicates the need to equip students with self-efficacy skills to help them improve on their mathematics performance. From the same country, Ayotola and Adedeji (2009) reported results contrary to those of the current study while carrying out a study to determine if there exist a relationship between self-efficacy in mathematics and academic performance in mathematics among secondary school students. The researcher found no significant

relationship between the two variables that were studied. This implies that more studies should be done in similar areas to arrive at a conclusive outcome.

In Kenya, several studies have been carried out on self-efficacy and students' academic performance. For instance, Mwaura et. al. (2019) investigated whether there was an association between academic self-efficacy and academic performance among public secondary school students in Nairobi County. The study reported that there exists a positive significant relationship between academic self-efficacy and performance in academics. This study focused on the general academic performance unlike the current study which focused on the relationship between academic self-efficacy and pupils' performance in mathematics. These findings imply that there is a need to include academic self-efficacy skills in the school curriculum to ensure that the pupils are well equipped with skills to enhance their academic achievement.

4.4 Relationship between Locus of Control and Pupils' Mathematics Performance

The second objective of this study was to determine the relationship between locus of control and pupils' mathematics performance. This was achieved by carrying out the following analyses.

4.4.1 Descriptive Statistics of Locus of Control

The researcher obtained the descriptive statistics of locus of control to determine the minimum score, maximum score, the range, the mean score and standard deviation, coefficient of skewness and kurtosis coefficient. Table 4.21 shows the results.

Table 4. 21

Descriptive Statistics of Locus of Control

	N	Range	Min	Max	Mean	*SD*	*Sk*	*Kur*
LOC	314	20.00	2.00	22.00	11.49	2.60	-.24	1.92

Note. N=314 ; LOC – Locus of Control; Min – Minimum; Max – Maximum; SD – Standard deviation; Sk – Skewness; Kur- Kurtosis

As shown in Table 4.21, the minimum score obtained was 2 while the maximum score was 22. The mean score stood at 11.49 with a standard deviation of 2.60. The coefficient of skewness was -.24 indicating that the distribution was approximately symmetric. The kurtosis coefficient was 1.92 indicating that the distribution was platykurtic.

The descriptive statistics of locus of control were also obtained by gender to determine if there exists gender differences and Table 4.22 shows the results.

Table 4. 22

Descriptive Statistics of LOC by Gender

Gender	*N*	Min	Max	Range	Mean	SD
Male	160	3.00	18.00	15.00	11.49	2.57
Female	154	2.00	22.00	20.00	11.50	2.64
Total	314	2.00	22.00	20.00	11.49	2.60

Note. N=314; Min – Minimum; Max – Maximum; SD – Standard deviation

The results in Table 4.22 indicate that female pupils obtained a slightly higher mean score of 11.50 (*SD*=2.64) than the male pupils who obtained a mean of 11.49 (*SD* = 2.57). The descriptive statistics of locus of control were also obtained by age to determine if there exist differences across the age categories. The results are presented in Table 4.23

Table 4. 23

Descriptive statistics of LOC by Age

Age	*N*	Min	Max	Range	Mean	*SD*
12-13	123	2.00	22.00	20.00	11.39	3.02
14-15	157	7.00	18.00	11.00	11.49	2.20
16 and above	34	3.00	17.00	14.00	11.88	2.73
Total	314	2.00	22.00	20.00	11.49	2.60

Note.; *N*=314; Min – Minimum; Max – Maximum; SD – Standard deviationIn Table 4.23, the age category of 16 years and above obtained the highest mean score of 11.88 with standard deviation of 2.73, the age category of 14-15 followed with a mean score of 11.49 and a standard deviation of 2.20. The age category of 12-13 had the lowest mean score of 11.39 with standard deviation of 3.02.

The researcher also obtained descriptive statistics on the type of locus of control. The findings are presented in Table 4.24.

Table 4. 24

Types of LOC

	Type of LOC	Frequency	Percent
	Internal	103	32.8
	External	211	67.2
	Total	314	100.0

Note. N=314; LOC – Locus of Control

The results in Table 4.24 indicate that the external locus of control recorded the highest frequency of 211 representing 67.2% while internal had 103 pupils representing 32.8%.

The descriptive statistics of mathematics mean score were also obtained based on the types of locus of control. Table 4.25 presents the results.

Table 4. 25

Type of LOC and Math's Mean Score

Type of LOC	*N*	Mean	*SD*
Internal	103	59.05	9.11
External	211	45.58	6.99
Total	314	50.00	10.00

Note. *N*=314 ; LOC – Locus of control; SD – Standard deviation

The internal locus of control obtained a higher mean score of 59.05 with a standard deviation of 9.11 while the external locus of control obtained a lower mean of 45.58 with standard deviation of 6.99.

4.4.2 Hypothesis Testing

The second objective of this study was to determine whether there exists a relationship between locus of control and pupils' mathematics performance. This was achieved by testing the following hypotheses:

H_{04}: There is no significant relationship between external locus of control and pupils' mathematics performance.

H_{05}: There is no significant relationship between internal locus of control and pupils' mathematics performance.

The results of the hypotheses test are presented in Table 4.26.

Table 4. 26

Correlation Between LOC and Mathematics Performance

		Maths Performance
External LOC	Pearson Correlation	.49**
	Sig. (2-tailed)	.00
	N	211
Internal LOC	Pearson Correlation	.65**
	Sig. (2-tailed)	.00
	N	103

Note. *N*=314; LOC– Locus *of Control*

As shown in Table 4.26, the results for the first hypothesis (H_{04}) reveal a positive and significant relationship between external locus of control and pupils' mathematics performance, r (209) = .49, p = .00. Therefore, the null hypothesis was rejected and the alternative one adopted. The outcomes imply that the higher the External locus of control the higher the pupil's mathematics performance. For the second hypothesis, a positive and significant relationship was established between internal locus of control and mathematics performance, r (101) = .646, p = .00. Therefore, the null hypothesis was rejected and the alternative adopted. The results imply that the higher the internal locus of control the higher the mathematics performance.

To determine whether the performance of the pupils in mathematics differed significantly from one another based on the type of locus of control, independent samples *t* test was conducted. The results are presented in Table 4.27.

Table 4. 27

Independent Samples T Tests

		T	*df*	Sig. (2-tailed)
Maths Performance	Equal variances assumed	14.46	312	.00
	Equal variances not assumed	13.23	162.76	.00

Note. *N*=314

The results show that the differences in the mean scores obtained in mathematics performance based on the type of locus of control was statistically significant, t (312) = 14.46, p <.05. This implies that the type of locus had a substantial effect on the pupils' mathematics performance.

The researcher carried out regression analysis to determine the predictive effect of both external and internal locus of control on the pupils' mathematics performance. The results are presented in Table 4.28.

Table 4. 28

Model Summary for the Prediction of Maths performance from Type of LOC

Model	R	R Square	Adjusted R Square	Std. Error of then Estimate
1	.67[a]	.44	.43	3.07

Note. a- Predictors: (Constant), External LOC , Internal LOC

The results in Table 4.28 indicate that there is a moderate positive interrelationship between internal, external locus of control and pupil's mathematics performance as the outcome variable (R=.67). The R Square value indicates that the predictor variables accounted for about 44% of the total variance in pupils' mathematics performance. This shows that the two variables can be used to predict pupils' mathematics performance.

To determine if internal and external locus of control significantly predict pupils' mathematics performance, ANOVA test was conducted. The results are presented in Table 4.29.

Table 4. 29

ANOVA for the Prediction of Maths performance from Type of LOC

Model		Sum of Squares	*Df*	Mean Square	*F*	Sig.
	Regression	744.88	2	372.44	39.54	.00[b]
1	Residual	941.95	100	9.42		
	Total	1686.84	102			

Note. N=314; Dependent Variable: Maths Performance

Predictors: (Constant), External LOC, Internal LOC

The results in Table 4.29 reveal that the two predictor variables (internal and external locus of control) significantly predict pupils' mathematics performance, *F* (2, 100) =

39.54, $p < .05$. This implies that internal and external locus of control can be used to significantly predict pupils' mathematics performance.

Having established that both internal and external locus of control were significant predictors of pupils' mathematics performance, their predictive values were obtained by carrying out regression analysis. The results are presented in Table 4.30.

Table 4. 30

Regression Coefficients for the Prediction of Mathematics Performance from Type of LOC

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.69	3.47		2.79	.01
	Internal LOC	1.99	.17	.56	3.53	.00
	External LOC	.61	.27	.27	7.31	.00

Note. N=314; Dependent Variable: Maths Performance

As shown in Table 4.30, the internal locus of control had a regression coefficient of $\beta = 1.99$, $p = .00$ while external locus of control had a regression coefficient of $\beta = .61$, $p = .00$.

From the unstandardized coefficients, the prediction equation for the model is;

$\hat{Y} = 9.69 + 1.99 X_1 + 0.61 X_2$

Where $\hat{Y}$ = predicated internal locus of control, X_1=internal locus of control, X_2= external locus of control and $\acute{\varepsilon}$ = standard error.

The results indicate that a unit change in internal locus of control leads to a 1.99 change in pupils' mathematics performance. A unit change in external locus of control leads to 0.61 change in pupils' mathematics performance. These findings show that the internal locus of control and external locus of control can be used to significantly predict mathematics performance among the pupils. Internal locus of control is a better predictor of mathematics achievement than external locus of control.

4.4.3 Discussion of the Results

The second objective of this study was to determine the relationship between locus of control and pupils' mathematics performance. The study found that there exists a positive and significant relationship between external and internal locus of control and pupils' mathematics performance. This implies that the higher the external and internal locus of control the higher the mathematics performance. These findings are in line with Rotter's (1954) locus of control theory. The theory argues that the belief that one has provides the power over the events in their lives. The pupils who believe in their personal self (internal locus of control) that they will perform in mathematics will achieve their goals. Those who believe that external factors (external locus of control) such as teachers or the school they are in can get propelled to achieve when these external factors favors them and jointly work towards better performance in mathematics. This also explains why the relationship between internal locus of control and pupils' mathematics performance was strongly than that for external. It is because each of the external factors has to contribute towards pupils' mathematics performance, and in case one fails, the others are affected lowering mathematics

performance. The internal control solely relies on the pupils themselves to come up with the right strategy towards success.

These findings are congruent with the results of Kumaravelu (2018) in India, Merkine et al. (2019) in Ethiopia, and Atetwe et al. (2018) in Kenya. For instance, Kumaravelu (2018) investigated whether locus of control could be used to predict mathematics, English, and science subjects' performance among secondary school students. This study found that there was no relationship between external locus of control and performance in mathematics. However, internal locus of control was strongly correlated to the mathematics performance. Nongtdu and Bhutia, (2017) carried out another study in the same country among college students to determine whether there exists a relationship between locus of control and academic performance. This study also established that external locus of control had a positive and significant relationship with academic performance, results that are consistent with those of the current study. The results indicate that locus of control is an important factor in academic achievement of learners.

Similarly, Ciftci (2019) carried out a study in Turkey to determine how the teachers' locus of control influenced students' nervousness to mathematics. The researcher established that the teacher's locus of control had a positive impact on the level of nervousness among the students in mathematics test. This indicates that there is a need to ensure that the teachers have the right locus of control to positively influence the performance of the students. Abid et al. (2016) in their study on effects of locus of control reported that those students with internal locus of control performed better than those who did not, and that they were active and effective when learning was going on. This finding agrees with those of the current study, and indicates the need to

equip students with the right mentality in terms of control of their learning in order to improve their academic achievement. In Israel, Bishara and Kaplan (2018) conducted a study to determine the association between locus of control and performance in mathematics. The researcher established that the lower the level of internal locus of control, the lower the performance in mathematics, results that are congruent with those of the current study.

Chinedu and Nwizuzu, (2021) in their study in Nigeria established a positive and significant relationship between locus of control and the male students' academic performance. These findings are consistent with those of the current study, indicating the importance of locus of control on academic performance. Merkine et al. (2019) investigated whether locus of control is associated with academic achievement among the undergraduates. The study found that internal locus of control had a positive and significant relationship with academic achievement. However, the researcher established that external locus of control had a negative and significant correlation with academic achievement. In Uganda, Atibuni et al. (2017) reported in their study that there exists a relationship between locus of control and academic attitudes. The students who had internal locus of control had good academic attitudes which positively influenced their academic achievement while those with external locus of control focused on other things aside from academics which negatively influenced their academic achievement.

In Kenya, Atetwe et al. (2018) investigated the influence of locus of control on performance in mathematics. The researchers established that internal locus of control predicted mathematics achievement among students. This indicates the need to boost locus of control among the pupils to help them achieve better results in mathematics.

Jeniffer et al. (2022) carried out another similar study in the same country to determine whether locus of control was related to pupil's academic performance. The study reported that those students who had confidence that they will succeed (locus of control) related well with their teachers which contributed to their academic success. These results agree with the findings of the current study, confirming the importance of locus of control in learning and academic achievement.

4.5 Prediction Equation for Pupils' Mathematics Performance from Academic Self-Efficacy and Locus of Control

The third objective of this study was to determine whether academic self-efficacy and locus of control can be used to predict pupils' mathematics performance. This was achieved by carrying out regression analysis. This was done by testing the assumptions of regression analysis followed by hypothesis testing.

4.5.1 Test for Assumptions of Regression Analysis

The researcher obtained the coefficient of skewness and kurtosis coefficient to determine the distribution of scores of both locus of control and academic self-efficacy scores. The results are presented in Table 4.31.

Table 4. 31

Normality Test Results

	N	Skewness	Kurtosis
LOC	314	-.24	1.92
SE	314	-.41	1.14

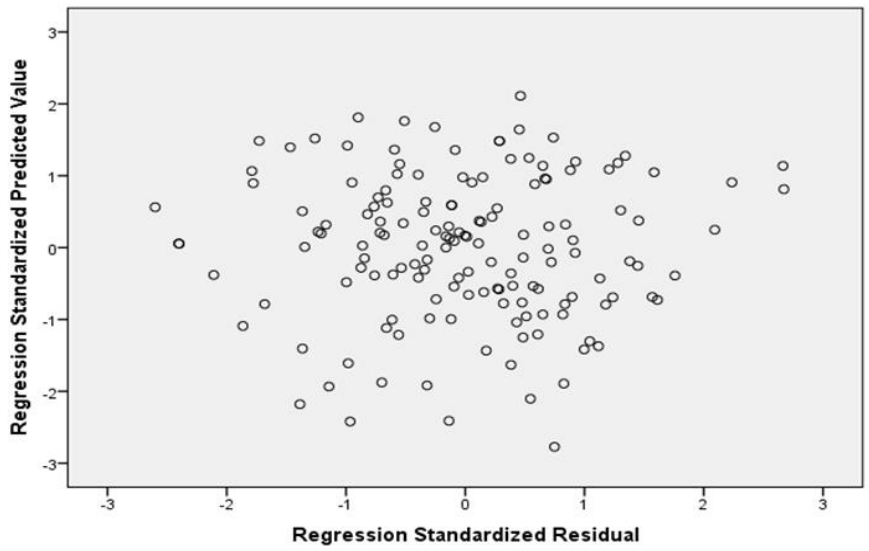
Note. *N*=314; LOC – Locus of control; SE – Self efficacy

The results in Table 4.31 indicate that locus of control scores had a coefficient of skewness of -.24 indicating that the distribution was approximately symmetric. The kurtosis coefficient was 1.92 indicating a platykurtic distribution. The self-efficacy scores recorded a coefficient of skewness of -.41 showing that the distribution of the scores was approximately symmetric. The kurtosis coefficient was 1.14 indicating a platykurtic distribution. The results indicate that the data did not violate the assumption of normal distribution of the data.

The scatter plot was generated to establish if the locus of control and academic self-efficacy scores satisfied the assumption of heteroscedasticity and homoscedasticity. The results are shown in Figure 4.1.

Figure 4. 1

Heteroscedasticity and Homoscedasticity Scatterplot



The scatter plot in Figure 4.1 shows that the pattern of the scores is not definite. This indicates that the error was uniformly spread between locus of control and self-efficacy scores (predictor variables). This confirms that the variables satisfied the assumption of heteroscedasticity and homoscedasticity.

The researcher carried out tests for assumptions of multi-collinearity and singularity to determine whether its rules were violated or not as indicated by VIF values. The findings are shown in Table 3.2.

Table 4. 32

Tolerance and VIF

Model		Collinearity Statistics	
		Tolerance	VIF
	(Constant)		
1	SE	.83	1.21
	LOC	.83	1.21

Note. *N*=314; SE – Self efficacy; LOC – Locus of control; VIF – Variance Inflation Factor

The results in Table 4.32 shows that the VIF values for locus of control and self-efficacy score were less than 10 (1.21 each) indicating that the assumptions of multi-collinearity and singularity were not violated. Since the data satisfied all the assumptions of regression analysis, it was subjected to hypothesis testing.

4.5.2 Hypothesis Testing

The third objective of this study was to determine whether academic self-efficacy and locus of control can be used to predict pupils' mathematics performance. To achieve this objective, the researcher tested the following null hypothesis:

H_{06}: There are no significant predictive equation of pupils' mathematics performance from the locus of control and academic self-efficacy.

The results of the hypotheses test are presented in Table 4.33 below.

Table 4. 33

Model Summary for Prediction of Mathematics Performance from LOC and Self-Efficacy

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.63[a]	.39	.39	7.80	.20

Note. N=314; Predictors: (Constant), LOC, SE

- Dependent Variable: Maths Performance

The results in Table 4.33 indicates that there is moderate positive interrelationship between locus of control and self-efficacy score as predictor variables and mathematics performance as the outcome variable, R = .63. R square value illustrates that locus of control and self-efficacy accounted for about 39% of the total variance in math's performance. Therefore, the null hypothesis was rejected and the alternative one adopted. This shows that locus of control and self-efficacy score can be used to predict mathematics performance among the pupils.

To ascertain if the predictive values for locus of control and self-efficacy were significant in predicting mathematics performance, ANOVA test was conducted. The results are presented in Table 4.34.

Table 4. 34

ANOVA for the Prediction of Mathematics Performance from LOC and SE

Model	Sum of Squares	*Df*	Mean Square	*F*	Sig.
Regression	12364.02	2	6182.01	101.53	.00[b]
Residual	18935.98	311	60.89		
Total	31300.00	313			

Note. N=314; a. Dependent Variable: Maths Performance

b. Predictors: (Constant), LOC, SE

The results in Table 4.34 reveal that the difference in the mean scores obtained for the two predictor variables (locus of control total and self- efficacy score) based on math's performance were statistically significant, F (2,311) =101.53, p <.00. This implies that locus of control total and self-efficacy score can be used to significantly predict math's performance among the pupils.

The researcher carried out regression analysis to come up with predictive values of pupils' mathematics performance from self-efficacy score and locus of control total. The results are shown in Table 4.35.

Table 4. 35

Regression Coefficients for the Prediction of Mathematics

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	-4.95	4.97		-.99	.32
	SE	2.02	.15	.66	13.72	.00
	LOC	.40	.19	.10	2.15	.03

Note. *N*=314; Dependent Variable: Maths Performance

The results in Table 4.35 indicate that the locus of control had a regression coefficient β=.40, p =.00 while self-efficacy had a regression coefficient of β= 2.02, *p* =.03.

The prediction equation for the model is:

$\hat{Y} = -4.95 + 2.02X_1 + 0.4X_2$

When $\hat{y}$ = predicted self-efficacy score, X_1 = self-efficacy score, X_2 = locus of control total and ε=standard error.

The results indicate that a unit change in self-efficacy score leads to 0.66 change in pupils' mathematics achievement. Also, a unit change in locus of control leads to 0.10 change in the pupils' mathematics achievement. These findings show that the locus of control and self-efficacy can be used to significantly predict mathematics achievement among the pupils.

4.5.3 Discussion of the Results

The third objective of this study was to determine whether academic self-efficacy and locus of control can be used to predict pupils' mathematics performance. It was established that there exists a positive interrelationship between locus of control total and self-efficacy score (predictor variables) and math's performance (outcome variable) (R = .63). The R square value revealed that locus of control and self-efficacy scores accounted for about 39% of the total variance in pupils' mathematics performance. This indicated that locus of control and self-efficacy score can be used to predict mathematics performance among the pupils. Locus of control had a predictive value of 0.1 while that for the self-efficacy was 0.66, implying that a unit change in self-efficacy leads to a 0.66 change in pupils' mathematics performance and a unit change in locus of control leads to 0.10 change in the pupils' mathematics performance.

These findings agree with Bandura (1986) social cognitive theory which argues that those students who belief in their abilities to succeed will work hard to achieve success. Their actions will even change the environment they operate in to work towards the set goals. This explains why academic self-efficacy is a strong predictor of pupils' mathematics performance. On the other hand, Rotter' (1954) theory of locus of control argues that pupils who belief that they will succeed in something will achieve it. Those who believe in external factors to contribute towards their success will only do so if those factors favor them to succeed. This also explains why locus of control had a lower predictive value than self-efficacy because both internal and external factors must agree to success to be achieved.

The establishment that locus of control and academic self-efficacy could be used to predict pupils' mathematics performance agrees and disagrees in equal measure to the studies done previously. For instance, Gosh (2015) conducted a study in India to investigate whether academic self-efficacy and locus of control correlates mathematics performance. The study reported that academic self-efficacy predicted mathematics performance among the students. In Turkey, Ozkal (2019) established that academic self-efficacy in mathematics predicted mathematics performance among students in the 6^{th}, 7^{th} and 8^{th} grades, results that agree with the findings of the present study. In the same country, Özcan and Kültür (2021) established in another study that academic self-efficacy predicted mathematics performance among the students which explained about 27% in the variance on the students' mathematics performance.

In Norway, Zakariya (2022) carried out a study to determine what contributes to improvement in mathematics performance. The researcher established that self-efficacy among the students was a positive and significant predictor of performance in mathematics. These findings are in tandem to those of the current study. In Hazara University in Pakistan, Naz and Majoka (2016) investigated the influence of self-efficacy on mathematics performance among students pursuing various courses. The study established that self-efficacy among the students was a strong predictor of mathematics performance, results that are congruent with those of the current study.

In Nigeria, Olumuyiwa and Akinsola (2019) found out that mathematics performance was predicted by academic self-efficacy and locus of control variables. In the same country, Ogunmakin and Akomolafe (2013) in their study established that self-efficacy and locus of control predicted academic performance among secondary

school students. However, the predictive value of locus of control was very small. These findings agree with those of the current study. Furthermore, Ugwuanyi et al. (2020) established that self-efficacy, emotional intelligence, and self-esteem could be used to predict mathematics performance. This study was carried out in Anambra State. In Kenya, Onkundi (2014) carried out a study in Nyamira County, Kenya to determine whether locus of control and academic self-efficacy could be used to predict academic performance among secondary school students. The researcher established that academic self-efficacy and locus of control predicted high performance, results that agree with the findings of this study.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter, we present the summary of the findings, conclusions and recommendations.

5.2 Summary of the Findings

The sample size for this study was 320 students who were proportionately sampled from public primary schools in Kipiriri sub-county, Nyandarua County. A total of 164 male pupils and 156 females were involved in this study. The researcher was able to collect 314 questionnaires representing a response rate of 98%. On the relationship between academic self-efficacy and pupils' mathematics performance, the descriptive statistics for self-efficacy recorded a minimum score of 12 and a maximum of 38. The mean score was 24.96 (*SD* = 3.29) indicating that the scores were average. The female pupils obtained the highest mean score of 25.22 with a standard deviation of 2.99 on self-efficacy while the males obtained a lower mean score of 24.71 with a standard deviation of 3.55. When self-efficacy was examined by age, the respondents of age category 14-15 had the highest mean of 25.18 (*SD* = 3.27), followed by the age category of 16 and above with the mean score of 24.88 (*SD* = 2.80), then those of age 12-13 years with a mean score of 24.69 (*SD* = 3.44). On the subscales of self-efficacy, the self-efficacy for success scores had the highest mean score of 13.96 (*SD* = 3.11) while the self-efficacy for learning obtained a mean score of 11.01 (*SD* = 2.21). On the frequencies for the three levels of self-efficacy, the moderate self-efficacy recorded the highest frequency of 181 representing 57.6%, followed by low self-

efficacy which recorded 125 representing 39.8% while high self-efficacy recorded the lowest frequency of 8 representing 2.5% of the total respondents.

On descriptive statistics of academic performance scores the maximum score recorded was 82.76 while the minimum was 29.17. The mean score was 50 (*SD* = 10) indicating that the mathematics performance leaned towards the minimum score of 29.17 implying that the score was below average. When examined by gender, the female respondents had the highest mean score of 50.49 with a standard deviation of 9.66 while the male pupils had a lower mean score of 49.52 with a standard deviation of 10.32. The pupils in the age category of 14-15 had the highest mean score of 50.98 (*SD* = 9.86) in mathematics, followed by those of age 16 years and above with a mean score of 49.23 (*SD* = 9.99), then those of age 12-13 years who had the lowest mean score of 48.95 (*SD* = 10.13).

On the relationship between academic self-efficacy scores and pupils' mathematics performance, three hypotheses were tested. The first hypothesis revealed that there exists a positive and significant relationship between academic self-efficacy scores and pupils' mathematics performance, r (312) = .61, p =.00. For the supplementary hypothesis, the results revealed a non-significant relationship between academic self-efficacy for learning scores and pupils' mathematics performance, r(312) =.03, p =.57. The other supplementary hypothesis revealed a positive and significant relationship between academic self-efficacy for expectancy for success scores and pupils' mathematics performance, r (314) =.62, p =.00. On whether the subdomains of self-efficacy could be used to predict pupils' mathematics performance, it was established that there is a positive interrelation between self-efficacy for learning and self-efficacy expectancy for success (predictor variables) and pupil's mathematics

performance (outcome variable) (R=.65). The R square value illustrated that self-efficacy for learning and self-efficacy for success accounted for 42% of the total variance in pupils' mathematics performance. This indicated that the two variables could be used to predict pupils' mathematics performance. The ANOVA test conducted to ascertain whether self-efficacy for learning and self-efficacy for success were significant predictors revealed that the two variables were significant predictors of pupils' mathematics performance, $F(2, 311) = 111.53$, $p < .05$. The self-efficacy expectancy for success had a predictive value of 0.66 while the self-efficacy for learning had a predictive value of 0.18. This implies that a unit change in self-efficacy expectancy for success leads to a 0.66 change in pupils' mathematics performance and a unit change in self-efficacy for learning leads to 0.18 change in pupils' mathematics performance.

The descriptive statistics for the levels of self-efficacy revealed that high self-efficacy level had the highest mean score of 56.58 (SD = 22.46) in mathematics performance, followed by the moderate self-efficacy level with a mean score of 54.43 (SD = 9.56) then low self-efficacy with a mean score of 43.15 (SD = 3.54). The ANOVA test conducted revealed that these mean differences were statistically significant, F (2, 311) = 70.59, $p < .05$. The Tukey HSD conducted to determine which category of SE levels had significant impact on pupils' mathematics performance revealed that the mean differences between low self-efficacy level and moderate level was -11.28, p =.00, low and high self-efficacy, x = -13.42, p =.00, and moderate level and low level, x =11.29, p = .00 were significant while the mean differences between moderate level and high level was -2.14, p =.76.

On the relationship between locus of control and pupils' mathematics performance, the descriptive statistics of locus of control recorded a minimum score of 2 and the maximum score was 22. The mean score stood at 11.49 (*SD* = 2.60). The female pupils had a slightly higher mean score of 11.50 (*SD*=2.64) in locus of control than the male pupils who obtained a mean of 11.49 (*SD*=2.57). Regarding locus of control by age category, those at the age category of 16 years and above obtained the highest mean score of 11.88 (*SD* = 2.73), the age category of 14-15 followed with a mean score of 11.49 (*SD* = 2.20). The age category of 12-13 had the lowest mean score of 11.39 (*SD* = 3.02). When the frequencies of the pupils on the subdomains of locus of control were obtained, the external locus of control recorded the highest frequency of 211 representing 67.2% while internal locus of control had 103 representing 32.8%. The descriptive statistics of the types of locus of control revealed that the internal locus of control had a higher mean score of 59.05 (*SD* = 9.11) while the external locus of control had a lower mean score of 45.58 (*SD* = 6.99). To determine whether there exists a relationship between locus of control and pupils' mathematics performance, two hypotheses were tested based on the subdomains of locus of control.

On the first hypothesis, a positive and significant relationship was established between external locus of control and pupils' mathematics performance (r (209) = .497, p = .00). For the second hypothesis, a positive and significant relationship was established between internal locus of control and mathematics performance (r (101) = .646, p = .00). When the ANOVA test was conducted to determine the predictive effect of both external and internal locus of control on the pupils' mathematics performance, it was established that there exists a positive interrelationship between internal and external locus of control and pupil's mathematics performance(R=.67). R Square value indicated that the predictor variables accounted for about 44% of the

total variance in pupils' mathematics performance. It was further established that the predictive values for external and internal locus of control were statistically significant, F (2, 100) = 39.54, $p < .05$. This implies that the internal and external locus of control can be used to significantly predict pupils' mathematics performance. The predictive value for internal locus of control was established to be 0.56 while that for the external locus of control was 0.27. This implies that a unit change in internal locus of control results in 0.56 change in pupils' mathematics performance while a unit change in external locus of control results in 0.27 change in pupils' mathematics performance.

On whether academic self-efficacy and locus of control can be used to predict pupils' mathematics performance, it was established that there exists a positive interrelationship between locus of control and self-efficacy score (predictor variables) and math's performance (outcome variable) (R=.63). The R square value revealed that locus of control and self-efficacy scores accounted for about 39% of the total variance in pupils' mathematics performance. This shows that the locus of control and self-efficacy score can be used to predict maths performance among the pupils. The ANOVA test carried out to determine whether the predictive values for locus of control and self-efficacy score were significant established that they were statistically significant, $F(2,311) = 101.53$, $p < .00$. The regression analysis established that locus of control had a predictive value of 0.1 while that for the self-efficacy was 0.66. This implies that a unit change in self-efficacy leads to a 0.66 change in pupils' mathematics performance and a unit change in locus of control leads to 0.10 change in the pupils' mathematics performance. These findings show that locus of control and self-efficacy can be used to significantly predict math's achievement among the pupils.

5.3 Conclusions

The first objective of this study was to determine the relationship between academic self-efficacy and pupils' mathematics performance. The study concludes that there exists a positive and significant relationship between academic self-efficacy scores and pupils' mathematics performance. This implies that the higher the academic self-efficacy among the pupils, the higher the academic performance in mathematics.

The second objective of this study was to determine the relationship between locus of control and pupils' mathematics performance. The study concludes that there exists a positive and significant relationship between external and internal locus of control and pupils' mathematics performance. This implies that the higher the external and internal locus of control the higher the mathematics performance. Internal locus of control is a better predictor of mathematics performance.

The third objective of this study was to determine whether academic self-efficacy and locus of control can be used to predict pupils' mathematics performance. The study concludes that there exists a positive interrelationship between locus of control and self-efficacy and mathematics performance. R square value revealed that locus of control and self-efficacy scores accounted for about 39% of the total variance in pupils' mathematics performance. Therefore, the study concludes that locus of control and self-efficacy score can be used to predict mathematics performance among the pupils. The locus of control had a predictive value of 0.4 while that for the self-efficacy was 2.02. This implies that a unit change in self-efficacy leads to 2.02 change in pupils' mathematics performance and a unit change in locus of control leads to 0.4 change in the pupils' mathematics performance.

5.4 Recommendations

Based on the results obtained, the following recommendations were made:

5.4.1 Practice Recommendations

i. There is a need for education stakeholders to come up with guidelines on how to improve the pupils' academic self-efficacy and locus of control to help them improve on their mathematics performance. These guidelines should be incorporated into the learning content of the pupils.

ii. Teachers and parents should help pupils to understand that their academic destiny is under their control, and that they are only there to facilitate them in achieving their academic dreams in mathematics. This will go a long way to enhance their self-efficacy and locus of control for better performance in mathematics.

iii. There is a need for the parents, teachers, and other education stakeholders to work together and come up with guidance programs to help the pupils acquire more academic self-efficacy skills, locus of control and understand that their academic performance in mathematics solely depends on their individual input.

5.4.2 Recommendations for Further Research

i. Having established that there exists an insignificant relationship between academic self-efficacy for learning scores and pupils' mathematics performance in Kipiriri sub-county, Nyandarua County, further studies should be done in other counties to confirm these findings to enhance generalization.

ii. The study involved primary school pupils and therefore there is need for further research among secondary school students and college students to enhance generalization of the results.

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APPENDICES

Appendix A: Consent to Participate in the Study

Dear participant,

I hereby request you to kindly participate in filling the questionnaires. The aim of the study is to establish whether academic self-efficacy and locus of control correlates with pupils' mathematics performance. The results from this study will be important because it will help educators and counselors, develop intervention programs and counseling practices that are aimed at promoting personal attributes that enhance mathematics performance. You have been selected to participate in this study because it is believed that you will give informed responses. Kindly respond to the questions honestly.

The information given will be treated with the highest confidentiality. Decision to participate in this study is voluntary and you can withdraw from participation without any penalty at wish. Sign in the provided spaces if you agree to participate.

Sign……. date……. (I agree to this study)

Thank you for your cooperation.

Thank you

Kamau Dorcas Njeri,

E55/CE/NKU/34265/2017. Masters student,

(Educational Psychology) Kenyatta University.

Appendix B: Students' Questionnaire

Part one: Instructions

The questionnaire below contains questions that will help me to carry out a study and on the same assist the school in ensuring better provision of services to you and other pupils. It is my humble request that you go through keenly and give your answers honestly. Please ensure that you only have one answer for each question. You are free to ask any question in case you are not sure about a specific question. Ensure the questionnaires are handed to me after you are through with the work.

Sub-Section I: Demographic Data

Please fill the blank spaces or put a tick (✓) in the brackets where appropriate.

1. What is the name of your school? .....

2. How old are you? (Indicate your age bracket)

13-14 years ( )

14-15 years ( )

More than 16 years ( )

3. Are you a girl or a boy? Boy ( ) Girl ( )

Sub-section II: Self-efficacy for Learning and Performance Subscale

The following statements represent your beliefs about learning and performance in mathematics. Remember there is no right or wrong answers just answer as accurately as possible. Using the scale provided circle number **5** if you think the statement is very true of you. If you think the statement is not at all true circle number 1**.** If the statement is more or less true of you circle the number between 1 and 5 that best describes you

Not at all true of me 1	Moderately untrue of me 2	Neutral 3	Moderately true of me 4	Very true of me 5

Items	Statements	1	2	3	4	5
	Self-Efficacy for Learning.					
1	I'm sure I can understand the most difficult material presented in mathematics textbooks for this class.					
2	I'm confident I can understand the basic concepts taught in mathematics.					
3	I'm confident I can understand the most difficult content presented by the teacher in mathematics.					
4	I'm certain I can master the mathematical skills being taught in this class.					
	Expectancy for Success					
5	I believe I will receive an excellent grade in this class.					
6	I'm confident I can do an excellent job on the assignment and tests in mathematics.					
7	I expect to do well in this class.					
8	Considering the difficulty of mathematics, the teacher, and my mathematical skills, I think I will do well in this class.					

Sub-section III: Revised Academic Locus of Control Scale.

This section entails statements on your perception about learning and performance in mathematics. For each statement you are required to either tick true or false.

Item	Statements	True	False
1	I am in school to meet what others expect of me.		
2	My study is guided by the school and subject need and not my free will.		
3	Some people easily write well while others find it difficult no matter how hard they try.		
4	It adds no value to attend to some lessons for some subject.		
5	I sometimes lose hope on improving my studies.		
6	I am hopeful that I can improve on my studies.		
7	I don't give a chance for social activities to affect my studies.		
8	I can be easily distracted.		
9	I can be easily withdrawn from studying.		
10	I'm determined to complete my studies in primary school, but I feel there are more important things in my life.		
11	My academic performance has once been interfered with by social activity.		
12	There are some subjects which I have never performed well.		

13	I can write well.		
14	I feel motivated towards succeeding in life.		
15	When I'm depressed, I find it hard to accomplish task in my studies.		
16	I have a feeling of becoming a failure in my future.		
17	I will positively contribute towards change of the world if I work hard.		
18	Daily studies are important.		
19	I have determined my own academic goals.		
20	I keep shifting my academic goal.		
21	I always do my academic assignment on time.		
22	I plan well and stick to my plans.		

Scoring: The scores ranged from 0-22. The items numbered 6, 7,13,14,17,18,19,21 and 22 were reverse scored. High score of between 11 - 22 indicated external locus of control while low score of between 0-10 indicated internal locus of control.

Appendix C : Pro Forma Summary of Standardized Pupils, Mathematics Performance

Participants' school code number…….

Coded Identity of students	Mid-term score	End-term score	Average score	z-score	t-score

Appendix D: K.C.P.E National versus Kipipiri Sub-county Mathematics

Performance Year 2016-2020

Year	2016	2017	2018	2019	2020
K.C.P.E National mean	45.4	48.3	49.1	48.4	48.8
Kipipiri Sub-county mean	46.67	46.54	47.05	46.67	47.03

Note. Source: Directorate of Education Nyandarua County (2022)

Appendix E: Mathematics K.C.P.E Performance in Nyandarua County, Year 2016-2020

Sub-counties	**Mean Scores**				
Year	2016	2017	2018	2019	2020
NYANDARUA NORTH	48.9	49.02	49.60	48.9	49.02
NYANDARUA WEST	51.9	52.20	52.70	51.99	52.58
NYANDARUA CENTRAL	47.3	47.64	48.41	47.3	49.37
KIPIPIRI	46.67	46.54	47.05	46.67	47.03
NYANDARUA SOUTH	49.5	48.76	47.73	49.05	49.95
KINANGOP	49.98	50.04	50.78	49.98	49.94
MIRANGINE	48.7	48.42	48.41	48.57	48.87
AVERAGE	**48.41**	**48.9**	**49.075**	**48.94**	**49.54**

Appendix F: Research Permit

PUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

f No: **197852**

Date of Issue: **23/December/2022**

RESEARCH LICENSE

is is to Certify that Ms.. DORCAS NJERI KAMAU of Kenyatta University, has been licensed to conduct research as per the ovision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nyandarua on the topic: ACADEMIC SELF-FICACY AND LOCUS OF CONTROL AS CORRELATES OF PUPILS' MATHEMATICS PERFORMANCE IN PUBLIC IMARY SCHOOLS IN NYANDARUA COUNTY, KENYA for the period ending : 23/December/2023.

License No: **NACOSTI/P/22/22909**

197852

Applicant Identification Number

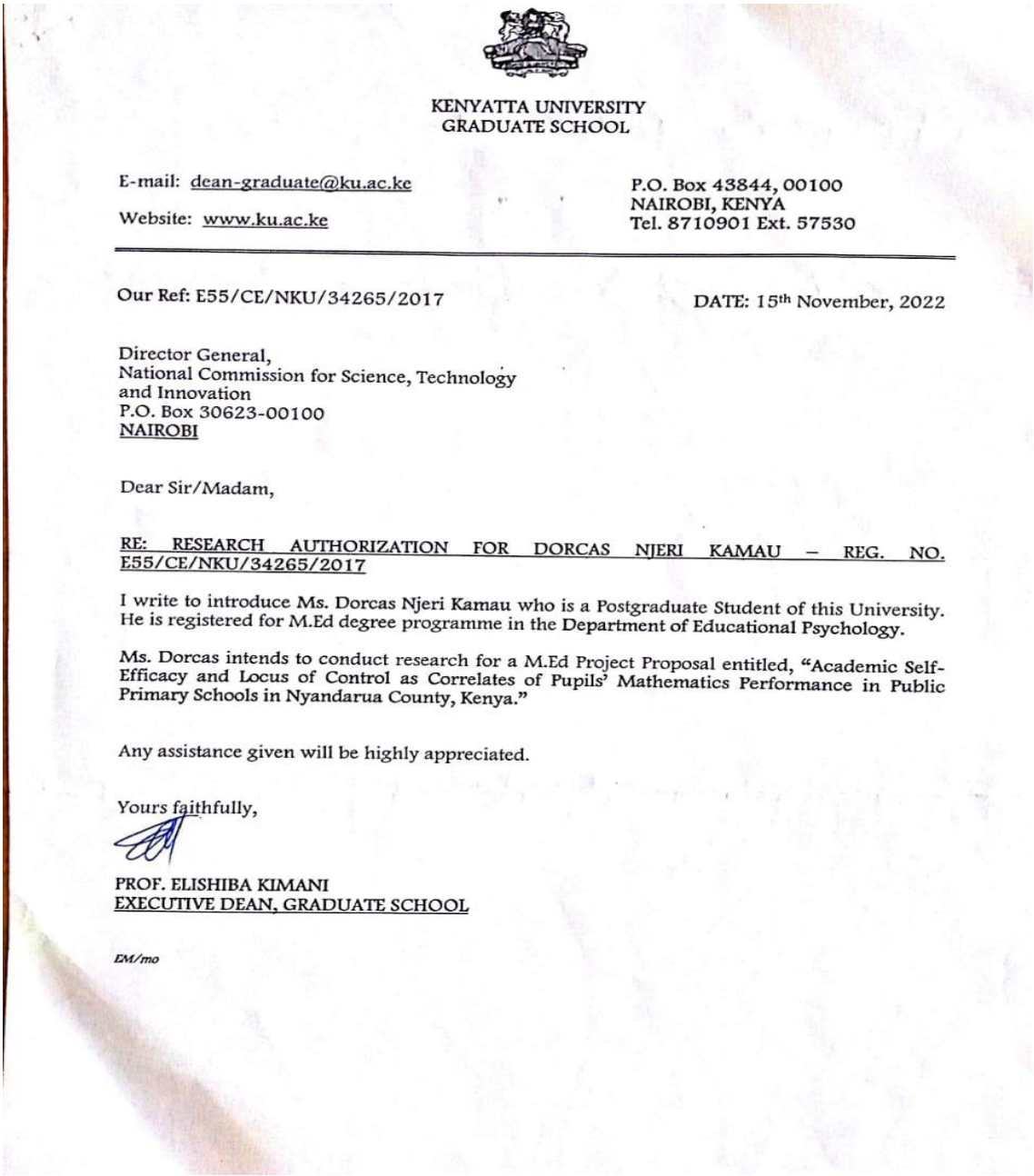
Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

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.

See overleaf for conditions

Appendix G : Research Authorization Letter



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

Our Ref: E55/CE/NKU/34265/2017

DATE: 15th November, 2022

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

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR DORCAS NJERI KAMAU – REG. NO. E55/CE/NKU/34265/2017

I write to introduce Ms. Dorcas Njeri Kamau who is a Postgraduate Student of this University. He is registered for M.Ed degree programme in the Department of Educational Psychology.

Ms. Dorcas intends to conduct research for a M.Ed Project Proposal entitled, "Academic Self-Efficacy and Locus of Control as Correlates of Pupils' Mathematics Performance in Public Primary Schools in Nyandarua County, Kenya."

Any assistance given will be highly appreciated.

Yours faithfully,

PROF. ELISHIBA KIMANI
EXECUTIVE DEAN, GRADUATE SCHOOL

EM/mo

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: 15th November, 2022

TO: Dorcas Njeri Kamau
C/o Educational Psychology Dept.

REF: E55/CE/NKU/34265/2017

SUBJECT: APPROVAL OF RESEARCH PROJECT PROPOSAL

This is to inform you that Graduate School Board at its meeting of 19th October, 2022 approved your Research Project Proposal for the M.Ed Degree Entitled, "Academic Self-Efficacy and Locus of Control as Correlates of Pupils' Mathematics Performance in Public Primary Schools in Nyandarua 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 and progress report forms per semester. The forms are available at the university's website under Graduate School webpage downloads.

Also, please ensure that you publish article(s) from your thesis before submitting it to Graduate School for examination as per the Commission for University Education and Kenyatta University guidelines.

Thank you.

ELIJAH MUTUA
FOR: EXECUTIVE DEAN, GRADUATE SCHOOL

c.c. Chairman, Educational Psychology Department.

Supervisors:

1. Dr. Lucy Mawang
   C/o Department of Educational Psychology,
   Kenyatta University

EM/mo

Appendix H: Morgan and Krejcie Sample Size Determination Table

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970

Appendix I: Map of Nyandarua County

Source: www.googlemaps.com