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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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ABSTRACT

The purpose of the study was to establish if academic self-efficacy and locus of control correlates with pupils' mathematics performance in public primary schools in Nyandarua County, Kenya. The study was guided by socio cognitive theory developed by Bandura in 1986 and Rotters' locus of control theory developed in 1954. Correlational research design was utilized in this study. Data were collected from 8 public primary schools out of 67 schools in Kipipiri Sub-County. The study sample comprised of 320 pupils from the 8 public primary schools. The study used purposive sampling, simple random sampling and stratified sampling. The simple random sampling was used to select the class seven pupils who participated in the study. Self-efficacy for learning and performance subscale (MSLQ) and academic locus of control scale were used for data collection. Mathematics performances data were obtained from pupils' mid and end of term two 2022 examination scores. A pilot study was conducted in two public primary schools in Kipipiri Sub-County involving 35 pupils to establish the validity and reliability of the research instruments. Demographic data were analysed using appropriate descriptive statistics. Academic self-efficacy, locus of control and mathematics performance was analysed using inferential statistics. The study findings revealed a positive and significant relationship between academic self-efficacy and pupils' mathematics performance, r (314) =.61, p =.00. Further, there was a positive and significant relationship between external locus of control and pupils' mathematics performance, r (209) = .49, p = .00. The study also found a positive and significant relationship between internal locus of control and mathematics performance, r (101) = .646, p = .00. The results of one-way ANOVA test indicated that locus of control and academic self-efficacy can be used to significantly predict mathematics performance among pupils. The study recommended that parents, teachers, and other education stakeholders should work together and come up with guidance programs that will guide students in developing greater academic self-efficacy and locus of control for improved mathematics performance.

Key words: *Mathematics Performance, Academic Self-Efficacy, Locus of Control*

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INTRODUCTION

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. 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.

A number of 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.

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). 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 Nigeria, Odiri (2020) 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 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 for instance, Abukari et al., (2020) found that internal locus of control has significant contribution to academic achievement of secondary students. 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. 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 few studies on the relationship between students' mathematics performance in Nyandarua County and academic self-efficacy and locus of control. As a result, the current research aimed to assess how closely academic self-efficacy and locus of control linked to students' performance in mathematics in Nyandarua County, Kenya.

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 a period, between years 2016-2020 the mean scores were low and was the last of the seven sub-counties in Nyandarua County. Specifically the KCPE mean score in the year 2016 was 46.67, in 2017 it was 46.54, in 2018 it was 47.05, in 2019 it was 46.67 and in 2020 it was 47.03. 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 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.

REVIEW OF RELATED LITERATURE

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.

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.

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 student's 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.

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.

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.

METHODOLOGY

Research Design: Correlational research design was used to establish the relationship between the studied variables. As Creswell (2012) states, the design allowed the researcher to determine more than one attribute of the same individual, in addition, it helped the researcher to establish the significance of the relationship between variables with the use of correlational statistics. The data on studied variable in this research was gathered on official school days, therefore there was no room for any manipulation. The study design did not allow the researcher to establish cause-effect but rather the degree of association between variables.

Sampling Techniques and Sample size: This study used three types of sampling procedures namely; purposive sampling, simple random sampling and stratified sampling. Purposive sampling was used to select Kipipiri sub-county due to dismal performance in mathematics. Simple random sampling was used to select the pupils and schools where participants of the study were drawn. The simple random sampling ensured unbiased representation of schools and pupils. Further, stratified sampling procedure was used to categorize participants into boys and girls. The table by Krejcie and Morgan (1970) was used to establish the sample size of students for this study. According to the table, a population of 1,810 yielded a suitable sample size of 320. The proportionate formula $\frac{n1}{N}Xn$, where n^1 is the population size of the group, N is the entire population, and n is the size of the sample, was used to calculate the sample size by gender.

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). Also document analysis were used to gather data on pupils' mathematics performance.

Data Collection: The research permit was sought and upon receiving it, the process of data collection started by the researcher printing the required number of questionnaires. The researcher sought appointment from the principals in selected schools with an aim of collecting data. Data collection was done by the researcher administering the questionnaires to the pupils during normal class lessons. The process of answering questionnaires by the pupils took about 20- 25 minutes. The mark sheets for mid and end of term scores was sought from the class teacher of the respective class which helped in obtaining mathematics scores for each respondent. The researcher after collecting completed questionnaires from the pupils compiled them ready to start the process of analyzing the data.

Data Analysis: Data collected was coded and keyed in the computer. Before data analysis the researcher did data cleaning with an aim of detecting whether there was any omitted data and also to check any error that might have occurred during keying process. The SPSS software was used in data analysis. Descriptive statistics was used to analyse demographic data. The null hypotheses were tested using appropriate inferential statistic procedures.

FINDINGS

Demographic Information of the Respondents

The demographic information of the respondents entailed age and gender. Table 1 indicated the age of the respondents. Regarding the age of the respondents, the researcher grouped them into three categories namely; 12-13 years, 14-15 years and 16 years and above. Table 1 indicated the age of the pupils.

Table 1: Respondents Age

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

As shown in Table 1 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.

Age by Gender Cross Tabulation of the Pupils

A cross tabulation was also done to determine the gender representation in the three age categories as shown in table 2.

Table 2: 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%)

The results in Table 2 showed 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%.

Relationship between academic self-efficacy and 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.

Descriptive Statistics of Self-Efficacy

Table 3 indicated the descriptive statistics of self- efficacy scores.

Table 3: Self-efficacy Descriptive Statistics

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

Note: min-minimum, Max-Maximum, SD- Standard deviation, Sk-Skewness, Kur-Kurtosis

From Table 3 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 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.

Table 4: 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: min-minimum, Max-Maximum, SD- Standard deviation, Sk-Skewness, Kur-Kurtosis

From Table 4, 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 5 presents the results.

Table 5: Levels of Self efficacy among Students

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

The results in Table 5 showed 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.

Descriptive Statistics for Mathematics 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 6.

Table 6: Mathematic Performance Scores

	N	Range	Min	Max	Mean	*SD*	*Sk*	*Kur*
Maths Performance scores T	314	53.59	29.17	82.76	50.00	10.00	.36	-.08

Table 6: *Note: min-minimum, Max-Maximum, SD- Standard deviation Sk- Skewness, Kur-Kurtosis*

As indicated in Table 6, 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 mathematics performance by gender was also obtained to determine if there are mean differences based on gender.

Table 7: Mathematics 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: min-minimum, Max-Maximum, SD- Standard deviation, Sk-Skewness, Kur-Kurtosis

The results in Table 7 indicated 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.

Hypothesis Testing

The first objective of this research was to examine if there was a relationship between students' math's performance and their academic self-efficacy, as well as whether the sub-domains of academic self-efficacy had any bearing on this link. The Pearson product moment correlation test was run on the following three hypotheses.

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 8.

Table 8: Correlation between Academic Self-efficacy and its Sub-domains

		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 (314) =.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.

To determine if the mean differences obtained for the three levels of academic self-efficacy were statistically significant, ANOVA test was conducted and the results presented in Table 9.

Table 9: 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 9 indicated 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 10.

Table 10: 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 = SE-Self-efficacy

From Table 10, 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.

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 determined that there is a strong and positive correlation between students' math performance and their academic self-efficacy scores. This suggests that students' academic performance in mathematics will increase in direct proportion to their level of academic self-efficacy. According to Bandura's (1986) definition of self-efficacy, pupils who have confidence in their ability to succeed will work toward that accomplishment and use every available strategy. Such people will behave in a way that influences not only the environment in which they operate but also influences people's beliefs. This explains why the study found that students do better in mathematics when they have stronger self-efficacy.

These results concurred with those from Indonesia's Prabawanto (2018), Turkey's Ozkal (2019) and Zcan and Kültür (2021), Iran's Hayat et al. (2020), Norway's Zakariya (2022), Nigeria's Sinan and Ibrahim (2016), and Kenya's Mwaura et al. (2019). For instance, Prabawanto (2018) conducted research to ascertain the connection between mathematical performance and academic self-efficacy. The study indicated that high school students had low self-efficacy because most of them lacked confidence in their ability to solve mathematical puzzles and lead class discussions when studying mathematics. This suggests that by encouraging students to develop their academic self-efficacy skills, it will assist them improve their academic performance and raise their morale.

The results of Ozkal's (2019) investigation on the relationship between self-efficacy and mathematics performance in Turkey are consistent with those of the current study. It has been demonstrated that motivation to learn mathematics, self-efficacy views, and mathematical performance are all related. This suggests that developing the proper attitude toward learning mathematics is influenced by self-efficacy. The sources of self-efficacy (mastery experience, social persuasions, vicarious experience, and physiological condition) had an effect on predicting mathematics performance, according to zcan and Kültür (2021) in the same nation. This suggests that mathematics performance and self-efficacy have a relationship.

According to Hayat et al. (2020), academic emotions toward learning and learning strategies were influenced by students' self-efficacy in Iran, and this had an effect on the students' academic achievements across all topics they were studying. This suggests that the association between self-efficacy and academic outcomes of the various disciplines tested is mediated by an academic emotion toward learning and learning practices. According to Zakariya (2022) in Norway, mathematics self-efficacy is one of the most significant factors that determine a student's performance in the subject. These examples highlight the value of mathematical performance and self-efficacy. In their research at Hazara University in Pakistan, Naz and Majoka (2016) found a robust, positive, and substantial link between students' mathematics self-efficacy and achievement. This demonstrates how employing the proper tactics for student self-efficacy enhancement might aid in their academic achievement.

Sinan and Ibrahim (2016) investigated the association between math achievement and learners' academic self-efficacy in Nigeria. With the help of the current investigation, it was determined that academic self-efficacy and mathematics performance were substantially correlated. This demonstrates the necessity of teaching pupils self-efficacy abilities to enable them to enhance their mathematical performance. While conducting a study to ascertain whether there is a relationship between secondary school students' self-efficacy in mathematics and academic achievement in mathematics, Ayotola and Adedeji (2009) reported results that differ from those of the current study.. 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.

Many researches on students' academic achievement and self-efficacy have been conducted in Kenya. For instance, Mwaura et al. (2019) examined the association between academic self-efficacy and performance among secondary school students in Nairobi County who attended public schools. According to the study, academic performance and academic self-efficacy are positively and significantly correlated. Unlike the current study which focused on the connection between academic self-efficacy and students' achievement in mathematics, this study focused on the overall academic performance. These results suggest that in order to ensure that the students are well-equipped with skills to improve their academic achievement; academic self-efficacy skills must be included in the school curriculum.

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

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 11 shows the results.

Table 11: Locus of Control Descriptive Statistics

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

Note: min-minimum, Max-Maximum, SD- Standard deviation, Sk-Skewness, Kur-Kurtosis

As shown in Table 11, 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 12 shows the results.

Table 12: Locus of Control Descriptive Statistics 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: min-minimum, Max-Maximum, SD- Standard deviation, Sk-Skewness, Kur-Kurtosis

The results in Table 12 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 13. The researcher also obtained descriptive statistics on the type of locus of control.

Table 13: Type of Locus of Control Descriptive Statistics

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

Note: N=314

The results in Table 13 indicated 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 14 presents the results.

Table 14: Type of Locus of control on Mathematics Mean Score Descriptive Statistics

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

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.

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 15.

Table 15: Correlation between Locus of Control and Pupils' 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

As shown in Table 15, the results for the first hypothesis 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.

Discussion of the Results

The objective of this study was to determine the relationship between locus of control and pupils' mathematics performance. According to the study, there is a positive and significant correlation between students' mathematics performance and their internal and external locus of control. This suggests that math performance increases when the external and internal locus of control increase. These results are consistent with Rotter's locus of control theory from 1954.

According to the theory, one's beliefs give them control over the things that happen in their lives. Students who have internal locus of control and trust in themselves will perform well in mathematics will succeed. Individuals who think that their performance in mathematics is influenced by external circumstances (external locus of control), such as their teachers or the school they attend, are motivated to succeed when these external factors are in their favor. This also explains why there was a stronger correlation between internal locus of control and students' mathematics performance than there was for external locus of control. It's because each external component must contribute to students' math performance, and if one fails, the others suffer as a result,

which lowers math performance. The students themselves must develop the best plan for achievement within the internal management.

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.

In Nigeria, Chinedu and Nwizuzu, (2021), reported a positive and significant correlation between locus of control and the academic achievement of the male students. These results support the current study's findings and highlight the impact of locus of control on academic achievement. Merkine et al. (2019) investigated at whether undergraduate students' locus of control was related to their academic success. The results of the study revealed a favorable and substantial association between internal locus of control and academic achievement. Yet, the study found a negative and substantial association between external locus of control and academic achievement. According to Atibuni et al. (2017)'s study conducted in Uganda, there is a connection 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.

Atetwe et al. (2018) explored the impact of locus of control on math performance in Kenya. The researchers found that students' internal locus of control influenced their math achievement. This suggests that increasing students' locus of control is necessary to help them improve their arithmetic performance. In order to ascertain whether locus of control was associated with students' academic achievement, Jeniffer et al. (2022) conducted an analogous study in the same nation. According to the study, students who felt confident about their ability to succeed (locus of control) tended to get along better with their professors, which helped them thrive academically. These outcomes support the current study's findings and demonstrate the significance of locus of control for learning and academic achievement.

CONCLUSIONS

The first objective of this study was to ascertain the connection between students' mathematics performance and academic self-efficacy. The study found a correlation between academic self-efficacy scores and students' math

performance that is both favorable and substantial. This suggests that students' academic performance in mathematics will increase in direct proportion to their level of academic self-efficacy.

The second objective of this study was to establish the relationship between students' mathematical performance and locus of control. The study found a substantial and positive correlation between students' mathematical performance and their internal and external locus of control. This suggests that math performance increases when the external and internal locus of control increase. Performance in mathematics is better predicted by internal locus of control.

RECOMMENDATIONS

The study established that there was a positive and significant relationship among academic self-efficacy and locus of control on mathematics performance. Therefore, there is 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. 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 academic self-efficacy and locus of control for better performance in mathematics.

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