

Regression Analysis of Entry Scores (KCPE) and Final Performance (KCSE) in Kenya: A Case of Nyamira District, Nyamira County, Kenya.

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Abstract

Teacher's presence plays an important role in determining the learners' performance in Kenya certificate of secondary education. Learners' performance in Kenya certificate of primary education is very crucial in determining their final grade in Kenya certificate of secondary education. Depending on the institutions the learners get admitted to, they will improve, maintain or drop. It is known that the individual's life structure is shaped by three types of external events; the social-cultural environment, the role they play and the relationships they have and the opportunities and constraints that enable them express and develop their personality. The main purpose of the study is to investigate regression analysis of entry scores (KCPE) and final performance (KCSE) and find out the relationship. The specific objectives of the study will be to analyze the relationship between entry marks and final grade, to verify whether entry mark impact on the final performance and to find out whether entry marks determine the outcome of the final performance. The study will be carried out in Nyamira district public secondary schools which are both provincial and district. The data to be used in this study will comprise 48 schools of which a sample of 16 schools will be used to create sampling framework. Simple random sampling will be used to select a sample of the accessible schools. A sample of 572 students of which 348 girls and 224 boys were analyzed. Regression analysis will be used to analyze data which will be useful in measuring entry scores in KCPE and final performance in KCSE. Given the reliability of regression analysis of the data, the results could be used to alert the management, stakeholders and parents, the level of learners and the strategies needed for them to achieve better results. Furthermore, it will let educators know the existing situation and suggest away forward to save the situation.

Key Words: Attitude, analysis, performance, regression, stake holders and learning resources.

1.0 Introduction

The performance in National examinations today continues to be poor because the intrinsic desire to excel is lacking in many learners. There are many extrinsic factors such as availability of resources, teachers' qualifications and teaching experience, the learners' socio-economic background and teachers' motivation to learn which contribute very much to learners' performance. There is also need to address attitude, an intrinsic factor that has a big bearing on performance. A student's attitude towards a subject greatly influences performance. It affects the individual's organized manner of thinking, feelings and reacting to study subject (Evans, 1972)

According to Hamachek (1971), an individual's attitude towards a subject in African schools will influence their self concept of academic ability. The significant other, namely teachers and peers have a great impact in the development of a student's attitude towards a subject (Nash, 1976). The bulk of the studies have been on mathematics and sciences among primary and secondary school students. These subjects are regarded as hard by many students and are the cause of poor overall performance. When the subjects mentioned above are difficult in as earlier as primary, the learners will perform poorer in secondary if basically attitude will not have been changed by then.

The performance of teachers in European schools is ensured by the management through influence by providing better services which motivates them. Influence of workers in an institution has been an issue since early days of organizational theory with both Weber (1947) and Fayol (1930) prescribing highly organized structures and the most efficient use of resources.

European and world wide operations McClock (2003) are searching for more internationally coordinated standardized and justified approach to influencing teacher to maintain better standards and improve performance. According to Hargreaves (1994) when teachers feel that the school leader stands behind them, is concerned about their feelings and supports them when problems arise, they are more likely to be stimulated to adopt an innovation which will help the learner to perform.

Improving the quality of services provided by teachers in Kenyan schools therefore must include policies that use current resource creatively and more effectively. Teachers are the most critical component in determining the success of learners both at Primary and Secondary Education in Kenya. Comparing the performance of KCPE and KCSE, it is believed that the latter is performed poorly. The career of learners is based on the grade that is achieved at the end of KCSE. This career is established by imparting on learner's initiatives, innovation and skills as they start in form one. The firm foundation put in form one completely reverses the trend of performance in KCPE. Based on what has been analyzed, there is need to explore ways through which this is done by analyzing entry behavior and final performance in secondary schools in Nyamira district.

1.1 Statement of the Problem

Some students who do not score good marks in KCPE pass in KCSE. Those who score good marks end up getting low marks and some maintain. This state poses a great concern to all stakeholders because of unpredictable end results of the learners. Curriculum innovations at secondary level have not fully addressed this issue as evidenced by the continued poor performance while there have been many reports following poor performance at primary and secondary levels, little has been done to know the causes of this poor performance. There is always an assumption that once a student has been admitted to secondary, he/she can perform regardless of the marks scored. This is assumed that through interaction with course content and completion of the syllabus, there are always better results at the end. So long as the curriculum continues to emphasize the teaching of the core subjects for prospective students, it is imperative to ensure that the products of the process are well qualified to pursue their career path. Regression analysis of entry behavior and final performance in secondary schools in Nyamira district will enable us establish the cause of unpredictable performance in KCSE, so as to enable the concerned people to reverse this trend to avoid wastage in manpower training.

1.2 Purpose of the Study

This study evaluates regression analysis of entry scores (KCPE) and final performance (KCSE) in Nyamira district schools, Nyamira county. For this objective to be attained, the researcher examined the availability of the necessary resources and the teachers' and the learners' preparedness in improving the final scores. The researcher too was interested in establishing the relationship between entry marks and the final grade and involve the teachers, learners and stakeholders in improving the final performance and see how it will be different from the entry scores.

1.3 Significance of the Study

To achieve better academic results, research findings are relied upon during education decision making processes. This study is expected to contribute to the generation of helpful information that is supposed to be accurate to education decision makers by its usefulness of recognizing the nature of this analysis. Given that entry marks and final performance are taken into consideration in modeling process, there will be a change of approach in establishing determinants on the level of performance. Taking into consideration the grade learners achieved at KCPE level and other factors, educators can put policies in place to make the whole initiative achieve the desired results. This will influence policy makers to tackle education in a way that will enable them to seek viable interventions for better manpower development and performance.

2.0 Methodology

Data Collection

The data to be used in this study will be collected in Nyamira district comprised of 48 schools of which a sample of 15 schools will be used to create sampling framework. This will be part of the target population which will be used for the study. Simple random sampling will be preferred for the study because it will give every school equal chances of being picked for the study (Oso and Onen, 2005). Simple random sampling will be used to select a sample of the accessible school representing 31.25% of the population which is about 30% according to Mugenda and Mugenda (1999). Each school will be assigned numbers 1 to 48, written on small pieces of paper, folded and mixed in basket. The researcher then picks the number of papers randomly in order to give each school equal opportunity of being selected for the study. The first fifteen schools selected will be used to represent the sample

then the researcher collects data from these schools by document analysis. The researcher will use document analysis to establish entry scores (x_1) and final grade (y) which will be in the form of an equation as follows

$$Y = a + b_1x_1 + b_2x_2 + \dots + b_nx_n + \varepsilon$$

The dependent variable will be y and independent variables will be x_1, x_2, \dots, x_n .

Statistical Methods and Analysis

Data was imported into Stata version 12 (Stata Corp.,USA) for analysis from Excel file. Descriptive statistics including counts (with respective proportions) and means (with respective standard deviations) were used. For the Bivariate analysis we used students t-test to assess for difference in KCSE scores among the male and female students. Univariate analysis was done using linear regression analysis where the significant factors were included into the multivariate linear regression model. Regression coefficients, respective 95% confidence intervals and p values were reported for each of the covariates fitted in the model. Adjusted R squared values were also reported to assess the amount of variance accounted for by the covariates. Beta (standardized coefficients) were also reported for the multivariate model to assess the importance of each of the covariates. Scatter plots, histograms and pie charts and tables were used to display the analysis results.

For the model formulation the variables such as end of form three results and mock results will form the second and third variables say x_2 and x_3 respectively while x_1 will be KCPE score and x_4 will be gender. The symbol ε will represent the error term. The model will be as follows:

$$Y = c_0 + c_1 \text{ entry scores} + c_2 \text{ end of form three exams} + c_3 \text{ mocks} + c_4 \text{ gender} + \varepsilon$$

Where;

- c_0 represents regression constant
- c_1 represents model parameter for entry scores
- c_2 represents model parameter for end of form three exams
- c_3 represents model parameter for mocks
- c_4 represents model parameter for gender
- ε represents error term

The above equation is reduced to;

$$y = c_0 + c_1 x_1 + c_2 x_2 + c_3 x_3 + c_4 x_4 + \varepsilon$$

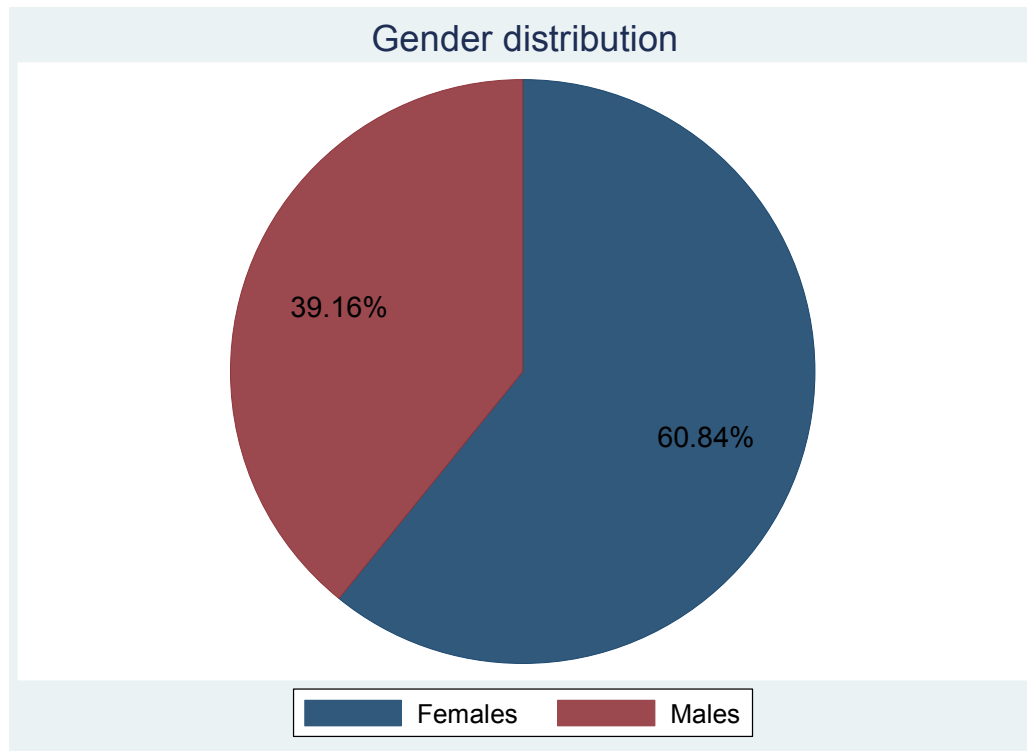
The data will be collected for a period of one year which will estimate the parameters of each level to determine the outcome of the performance.

3.0 Results

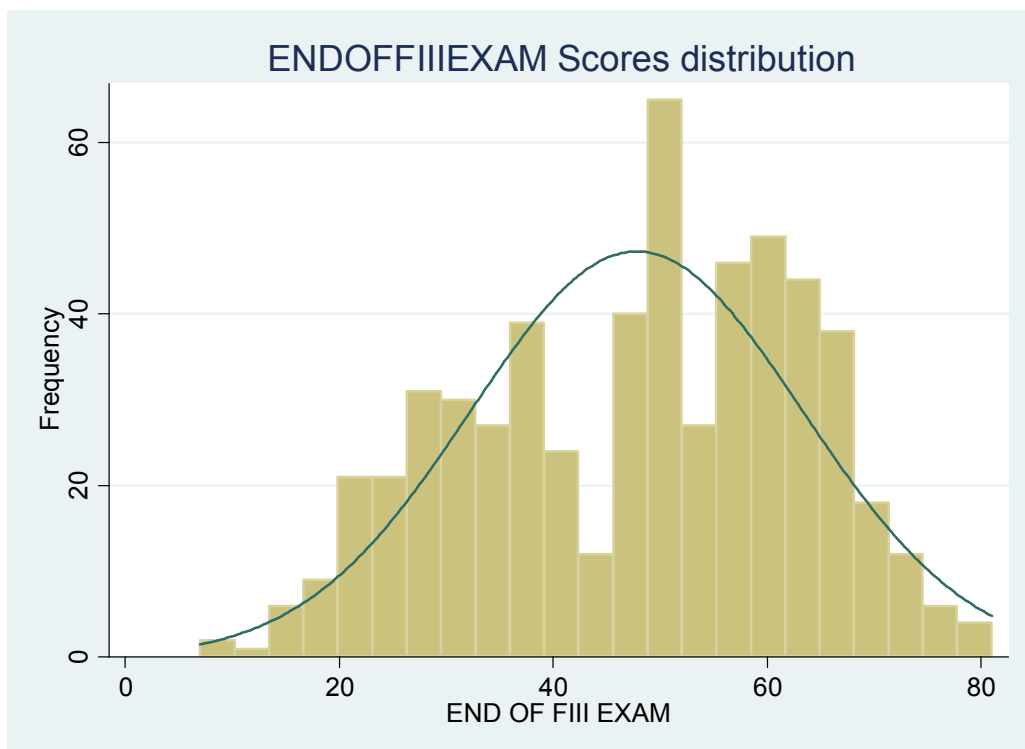
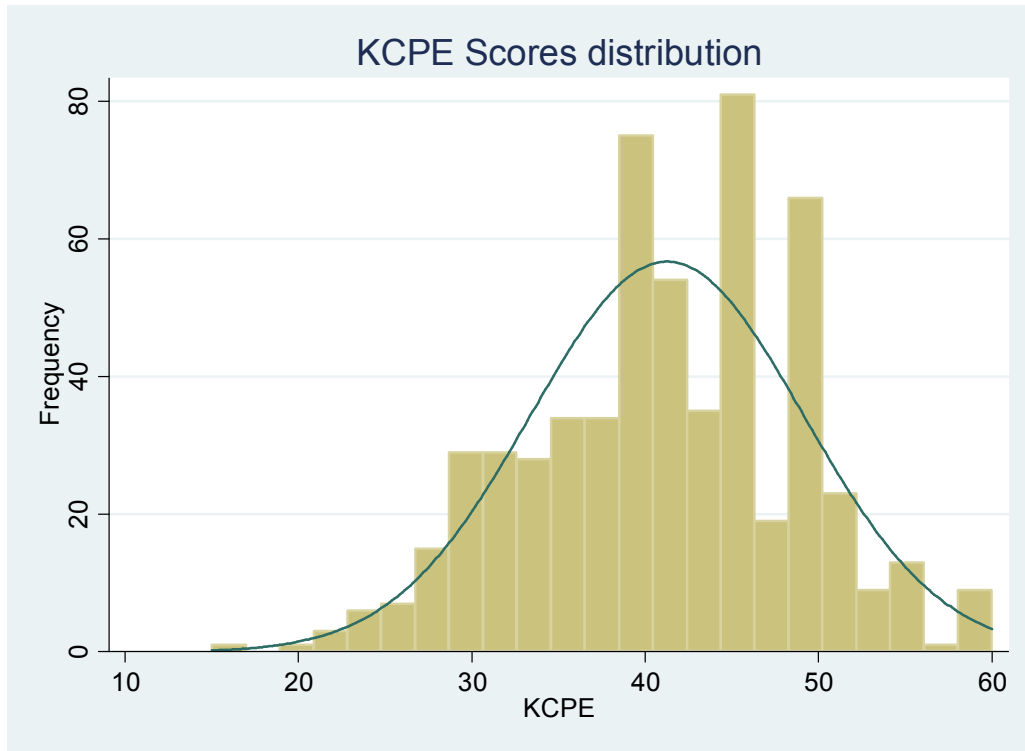
Over half of the students, 348(60.8%), was composed of females. The mean score at KCPE was 41.26 (SD= 7.87). The end of form 3 exam, 47.8(SD=15.52), had a higher mean score than the MOCK exams 40.77(SD=12.93). The mean KCSE score, 51.25 (SD=16.32) was higher than the end of form three and mock exams (Table 1).

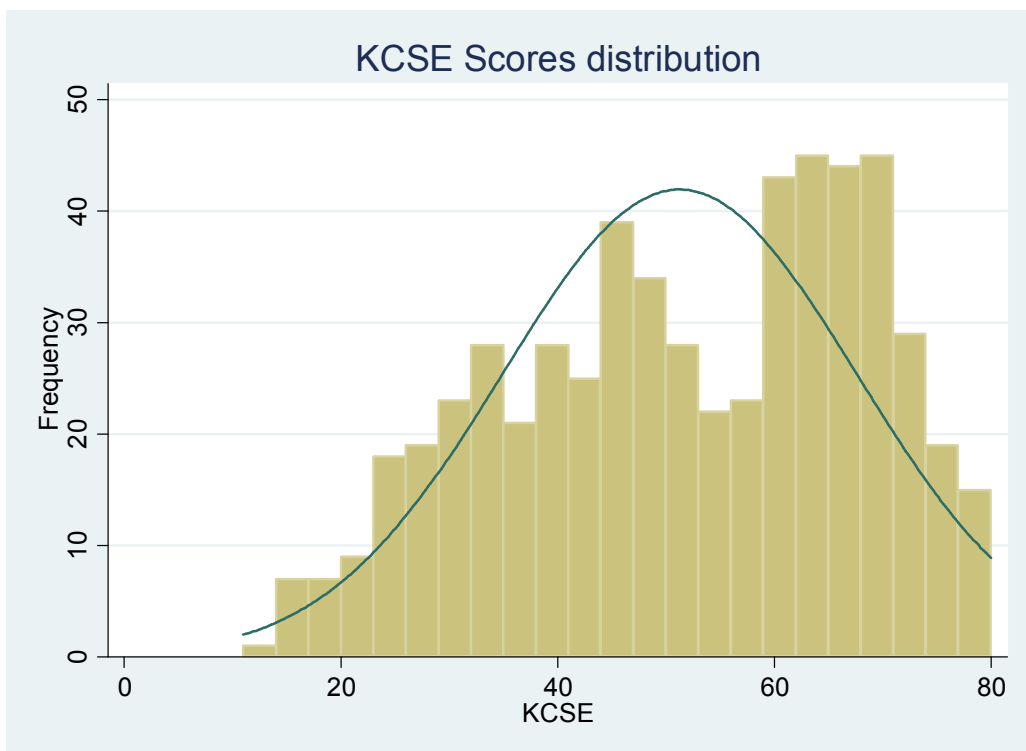
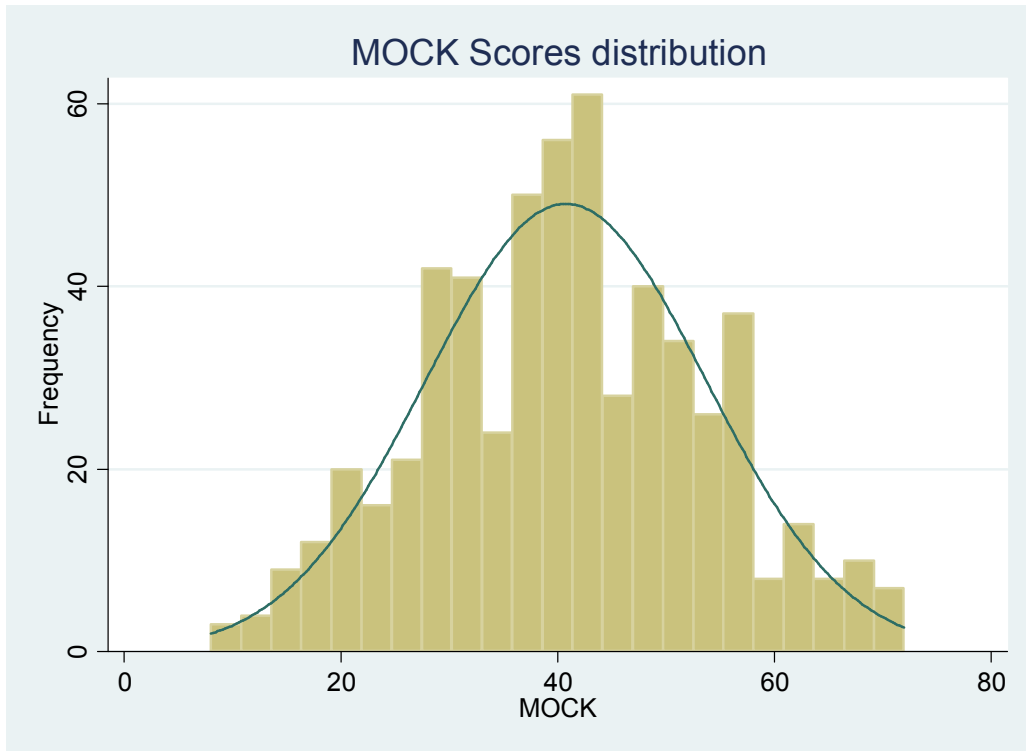
Table 1 : Summary of covariates

Variable	N=572 n(%) or Mean(SD)
Gender	
Female	348 (60.8)
Male	224 (39.2)
Scores	
KCPE	41.26 (7.87)
END OF FIII EXAM	47.8 (15.52)
MOCK	40.77 (12.93)
KCSE	51.25 (16.32)



Histograms of Score distribution





3.1 Correlation Results

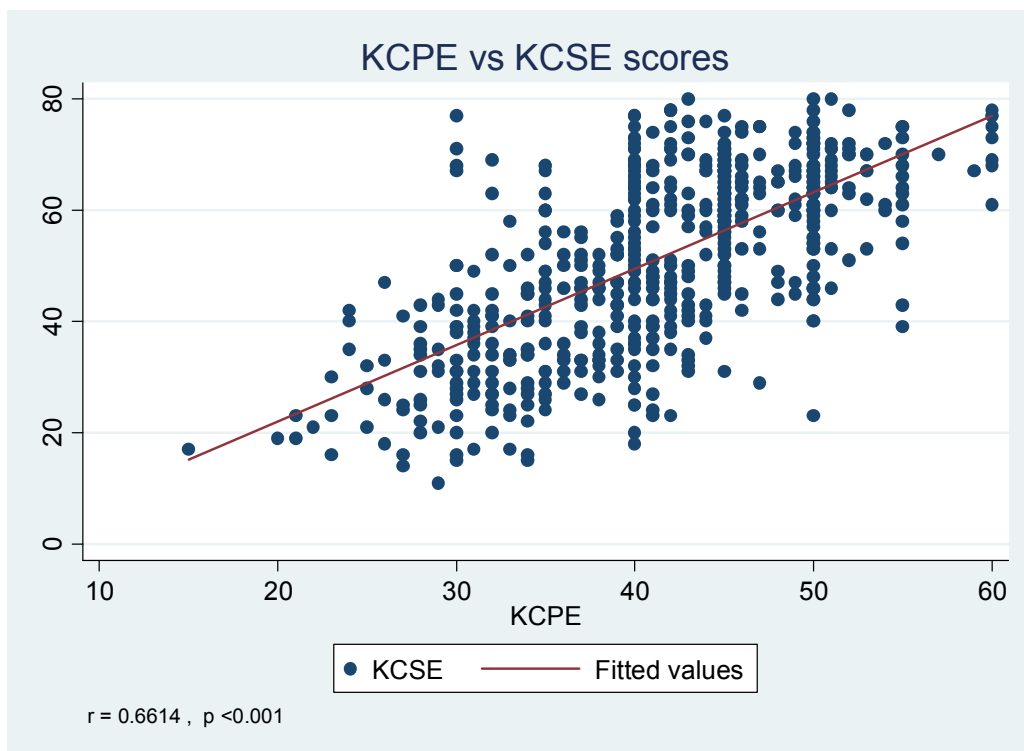
There was a significant positive linear relationship between KCPE performance and end of form three exam ($r=0.6512$), mock ($r=0.5851$) and KCSE ($r=0.6614$) scores. The highest positive correlations were between KCSE and end of form three exam ($r=0.8960$) and also between KCSE and mock scores ($r=0.7397$). The positive linear relationship between end of form three exam and mock was also high ($r=0.7309$), (Table 2). The scatter plots have been used to display this information.

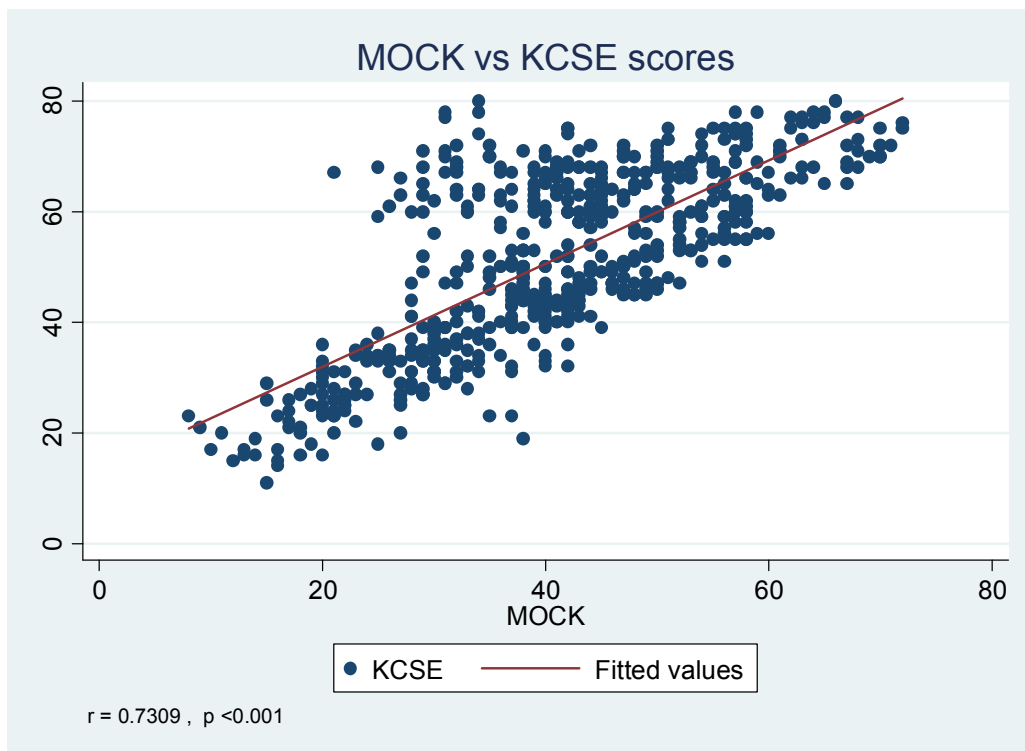
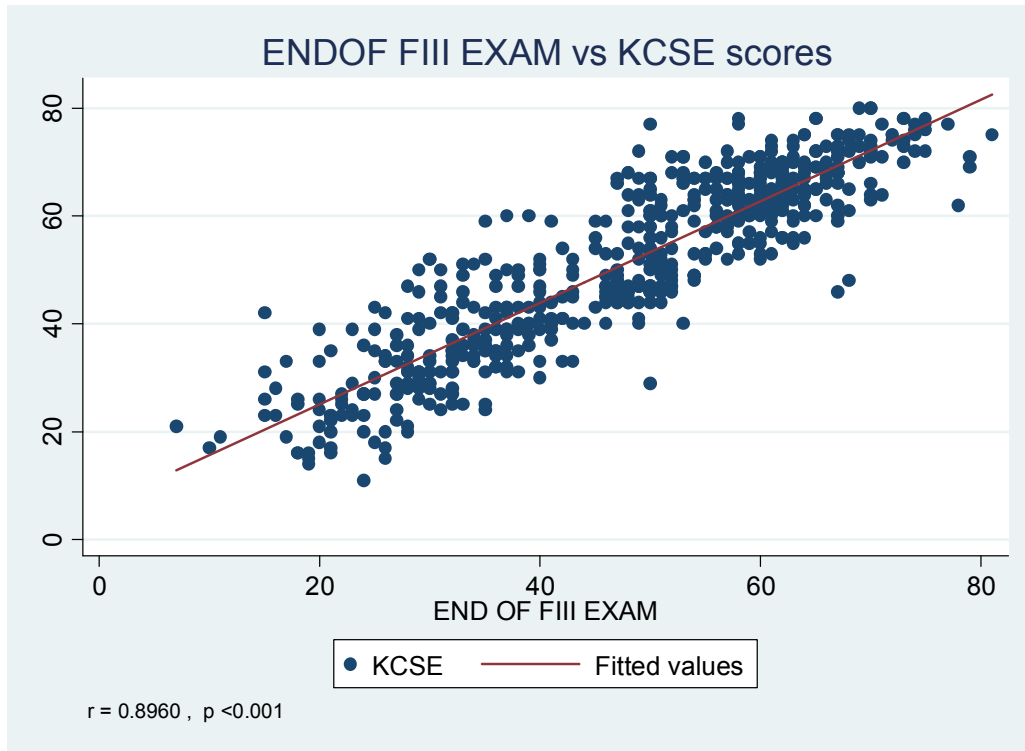
Table 2: Correlation Table

	KCPE	End of FIII Exam	MOCK	KCSE
KCPE	1			
End of FIII Exam	0.6512*	1		
MOCK	0.5851*	0.7309*	1	
KCSE	0.6614*	0.8960*	0.7397*	1

* p value <0.001

Scatter plots of Scores vs. KCSE Scores





3.2 Bivariate Analysis

There was a significantly higher mean score at KCSE among females 55(SD=16.23) than males 45.43 (SD =14.71) , P value <0.001.

Table 3: KCSE Score by Gender

Gender	n	KCSE Mean (SD)	Test Statistic	P value
Female	348	55.00 (16.23)	t-test	<0.001
Male	224	45.43 (14.71)		
Total	572	51.25 (16.32)		

* Statistically significant

3.3 Univariate Regression Analysis

The univariate regression analysis results indicated that for every score increase in KCPE there is a corresponding significant increase of 1.4 units (95% CI =1.24, 1.50) at KCSE, p <0.001. The adjusted R-squared is fairly high; approximately 44% of the variance is accounted for by KCPE in the model.

End of form three exams was the strongest predictor accounting for about 80% of the variation in the model. The results show that for every unit increase in end of form three score the students had a score increase of 0.94 units (95% CI = 0.90 ,0.98) score at KCSE, p <0.001. The mock score was an equally important predictor of the outcome, accounting for 55% of the variance. For each unit increase in mock score there was a corresponding 0.93 unit (95% CI = 0.86 - 1.00) increase in the KCSE score, p <0.001. In terms of gender, the male students compared to female had a significantly lower KCSE score of -9.57 units (95% CI: -12.21, -6.94), p<0.001.

Table 4 : Univariate Linear Regression Model

KCSE Score	Adjusted R ²	Coefficient (95% CI)	Std. Error	t Value	P Value
KCPE Score	0.44	1.37 (1.24 1.50)	0.07	21.05	<0.001*
End of FIII Exam Score	0.80	0.94 (0.90 0.98)	0.02	48.17	<0.001*
MOCK Score	0.55	0.93 (0.86 1.00)	0.04	26.22	<0.001*
Gender [Ref: Female]	0.08				
Male		-9.57 (-12.21 -6.94)	1.34	-7.14	<0.001*

* Statistically significant

3.4 Multivariate Regression Analysis

All the significant covariates in the univariate model were included into the multivariate model. The model accounted for about 84% of the variance in KCSE scores. The standardized coefficient (Beta) indicates the most important predictors (have high absolute beta scores) of KCSE score as end of form three exam, mock, gender then finally KCPE score.

The results show that for each unit increase in end of form three exam score holding other factors constant the students fared better at KCSE by 0.69 units (95% CI= 0.63, 0.75), p <0.001. Similarly for every unit increase in KCPE exam score holding the other factors constant there was a corresponding increase of 0.20 units (95%CI = 0.11 , 0.30), p<0.001. Taking mock exam score into consideration, there was a corresponding increase in KCSE exam score 0.26 units (95% CI= 0.19, 0.32) for each unit increase in mock score, p<0.001. The male students fared worse

than the female students holding other factors constant by about four unit scores, -3.99 units (95% CI = -5.17,-2.80) , $p < 0.001$.

Table 5 : Multivariate Linear Regression Model

KCSE	Adjusted R ²	Coefficient (95% CI)	Std. Error	t Value	P Value	Beta
	0.84					
KCPE		0.20 (0.11 0.30)	0.05	4.31	<0.001*	0.098675
ENDOFFIIIEXAM		0.69 (0.63 0.75)	0.03	23.05	<0.001*	0.655543
MOCK		0.26 (0.19 0.32)	0.03	7.72	<0.001*	0.203724
Gender [Ref: Female]						
Male		-3.99 (-5.17 -2.80)	0.60	-6.61	<0.001*	-0.11951
Constant		1.06 (-1.96 4.08)	1.54	0.69	0.493	

* Statistically significant

4.1 Discussion

The result showed that for every score increase in KCPE there was a corresponding significant increase of 1.4 units (95% CI=1.24, 1.50) at KCSE. About 44% of the variance was accounted for by KCPE in the model. End of form III exams was the strongest predictor accounting for about 80% of the variation in the model. Also mock exams accounted for about 55% of the variation in the model. Mock exams were equally important predictor of the outcome. For each unit score, there was a corresponding 0.93 unit increase in KCSE and for every unit increase in end of form three exams the students had a score increase of 0.94 units. Male students compared to female had a lower KCSE score of -9.57 units.

The results also showed that every increase in end of form III scores holding other factors constant students faired better by 0.69 units. For every unit increase in KCPE scores holding other factors constant there was corresponding increase of 0.20 units and Mock exam scores holding other factors constant, there was an increase of 0.26 units. Male students faired worst than female holding other factors constant by -3.99 units.

We end up with the final model which is specified as below that is able to predict the KCSE score based on gender, KCPE score, KCSE score and mock score.

$$y = c_0 + c_1 \text{ entry scores} + c_2 \text{ end of form three exams} + c_3 \text{ mocks} + c_4 \text{ gender} + \epsilon$$

$$\text{Final grade} = 1.06 + 0.20 \text{ entry scores} + 0.69 \text{ end of form three exams} + 0.26 \text{ mocks} + (-3.99) \text{ male gender} + \epsilon$$

i.e

$$y = 1.06 + 0.20 x_1 + 0.69 x_2 + 0.26x_3 + (-3.99) x_4 + \epsilon$$

5.1 Conclusion

Looking at the analysis, it shows that end of F III exams are clear reflection of KCSE because learners have spend three years learning since they did their KCPE. This means they have thoroughly been prepared for three years unlike when they do mock and the duration is shorter that is three months to KCSE. Mock exams are challenging unlike KCSE that is why learners decline in performance. KCPE exams are not a good measure of KCSE because learners are young and not yet realized their dreams.

5.2 Recommendations

Based on the findings of this study, the researcher wishes to make following recommendations:

- Teachers ought to implement strategies that would enable learners to improve performance.

- Teachers and administrators should formulate viable policies which will make learners foster positive attitudes to better their grades.
 - Areas that are challenging in secondary schools should be demystified by the teachers and parents so that learners can see and appreciate their achievement in such areas.
 - Teachers and learners can attend symposia and excursions to enhance skill development and competition to advance in creativity and better the performance.
- The researcher recommended the following areas for further research:-
- Regression analysis of end of terms exams and final grade.
 - Regression analysis of end of form two exams and final grade.
 - Regression analysis of end of form one exams and final grade.

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