The Predictive Validity Of KCPE Examination Mean Scores On The Secondary School Examinations Mean Scores. A Case Study Of Alliance National Secondary Schools, Kenya

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ABSTRACT

Prior achievement has been taken to be a good predictor of subsequent academic performance. This study investigated the predictive validity of end of primary school education KCPE examination mean scores in languages and mathematics on subsequent secondary school examination mean scores. The study adopted ex-post facto and correlation design and used students admitted to Alliance national high schools as a case study. Using purposive and census sampling, the entire cohort of 690 students in the schools in their third year of secondary school education was selected. Through document analysis, the students’ academic performance in languages and mathematics at KCPE examination and the first three years of secondary school education was analyzed. Simple regression analysis revealed that KCPE examination mean score explained 11.8% and 15% of the variation in the overall secondary school examination means scores among public and private primary school graduates respectively. Further, the study established that KCPE examination mean scores of students who schooled in private primary schools was a better predictor of subsequent secondary school examination performance than that of those who schooled in public primary schools. The study concluded that there was better learning in private primary schools when compared to public ones.

1. INTRODUCTION

Primary school learners in Kenya join secondary schools after eight year of primary school education that end with sitting for KCPE examination (Lucas & Mbiti, 2011). Based on their performance in KCPE examinations, the pupils are admitted to Kenyan secondary schools which are offered in three categories of public secondary schools namely national, county and sub-county secondary schools. National secondary schools are the most popular due to the outstanding performance of the students in these schools in the Kenya Secondary School Examination (KCSE) examination done at the end of secondary schools (Glennerstar, Kremer, Mbiti, Takavarasha, 2011; Lucas & Mbiti, 2011; Oketch & Somerset, 2010). Alliance boys and Alliance girls’ high schools are among the most popular national secondary schools and admission to these schools have been compared to winning a rotary (Iraki, 2017).

Due to the stiff competition for the limited vacancies in national secondary schools, selection to join the schools is based on criteria that ensure no KCPE candidate is disadvantaged on account of gender, examination centre or region where the candidate sat for KCPE examination (Ministry of Education, 2016). This government policy guiding student’s admission to national secondary schools have ensured that the use of merit does not compromise equity. Students in these schools national schools therefore come from a variety of backgrounds including category of primary schools. Due to the Ministry of Education affirmative action, learners from public primary schools are usually admitted with lower KCPE examination mean scores than their private primary school counterparts.
Since admission to secondary schools with desirable learning environment including national secondary schools is mainly on merit, the competition for the few vacancies in these reputable schools has resulted in a lot of emphasis on passing examination in the curriculum implementation. The result has been instances of skewed pedagogical practices that aim at making student pass national examinations as opposed to gaining the required competencies as revealed by the curriculum summative evaluation (KIE, 2010). Such undesirable teaching practices have been suspected to take place more in private schools. Some of these private primary schools have some of their KCPE examination candidates being ranked among the best 100 in the country (Glennerstar, Kremer, Mbiti, Takavarasha, 2011). It is for this reason that concern has been raised on whether the high KCPE examinations mean scores among KCPE candidates is a true measure of their academic ability (Ministry of Higher Education, Science and Technology, 2012). Yet, prior academic achievement has been singled out as a major factor that account for most of the variance in educational attainment (Sparks, 1999).

English and Kiswahili are focus of this study mainly because the two are national languages in Kenya which assist education in achieving one of its important goals of promoting national unity in the country. English is also the medium of instruction in schools. Mathematics on the other hand have been performed poorly at the end of secondary school education, despite being a core subject too (Kenya Institute of Education, 2010).

2. REVIEW OF RELATED LITERATURE

Sparks (1999) asserts that prior attainment explains the greatest proportion of variance in education attainment, which he estimated to be about 59%. Sparks is supported Dochy, Segers and Buehl (1999) who in their analysis of 183 studies that looked into effects of prior achievement on academic achievement. They found that almost 92% of the studies demonstrated positive effect of prior knowledge on learning. Later studies that had similar findings include the one by Rogers, Wentzel and Ndalichako cited in Rogers, Xin Ma, Klinger and Dawber (2006) which found that prior performance accounted for 40 to 50% of the variance in performance in language, Arts and Mathematics at the grade three and six levels. Likewise, using nationally representative longitudinal database of students and schools, a study by Center on Education Policy (2007) found prior academic achievement at grade eight to have had consistent influence on academic achievement at grade 12 in all the surveyed subjects. Rabiner Godwin and Dodge (2016) in their study examined how early childhood characteristics were associated with subsequent outcomes later in life. They found that achievement in mathematics after grade five was predicted by early reading and mathematics skills. Early reading skills also predicted reading skill after grade five. Mok, Zhu and Law (2017) investigated the cross-lagged associations among Hong Kong school children’s achievement in mathematics, English language and Chinese language. Among other findings, the study found that prior achievement in each of three subjects was the strongest and most significant predictor of achievement in the same subject three years later.
In mathematics, using longitudinal data from United States of America and the United Kingdom, Siegler et al found that the students’ knowledge of fraction and division uniquely predicted the students’ knowledge of algebra and overall mathematics achievement in high school five to six years later. Nguyen et al. (2016) is of the opinion that prior mathematics achievement predict subsequent achievement because grasping of more advanced concepts and skills in mathematics depends largely on the mastery of earlier concepts and skills. This is especially so if the learners are able to establish connections between new and prior knowledge. As suggested by Mok et al., the findings of these studies suggest the existence of stability in the curriculum subjects across different levels which highlight the importance of good foundation in both mathematics and languages.

Similarly in Kenya, prior academic performance at KCPE examination that is used as a basis of secondary school admission has also been found to be correlated with secondary school academic performance (Glennerstar et al., 2011).

The authors suggest a major reason that makes national secondary schools post better results in KCSE examination is the fact they are the very best of the KCPE examination. A number of studies support this as they have shown positive relationship between students’ KCPE examination mean score and KCSE examination performance at the end of the four year secondary school education (Jagero 2013; Kinyua 2012; Najakululu, 2010; Waweru, 2011).

3. PURPOSE OF THE STUDY

This study therefore aimed at finding out the extent to which KCPE examination mean scores in Languages and mathematic of a sample of the best candidates explain the variance in the overall secondary school examination mean scores for the same subjects done over a period of three consecutive years. Emphasis was placed in comparing academic performance of students who schooled in public primary schools and were admitted with lower KCPE examination mean scores with those from private primary schools admitted with higher KCPE mean scores. The study provided some insight on the contribution of the foundation of the three important subjects at the primary school level in the subjects secondary school curriculum.

4. RESEARCH METHODOLOGY

The research that was ex post facto and correlation in research design purposively sampled Alliance boys’ and Alliance girls’ national secondary schools. The two schools are among the most popular and academically selective national secondary schools in Kenya. Further purposive and census sampling selected all the 690 students admitted to the schools in 2013 and were in their third year of secondary school education. They comprised of 351 students who had schooled public primary school and 339 who had schooled in private primary schools. Through data analysis, the students’ academic performance in English, Kiswahili and mathematics at KCPE examination, end of year one, two and three secondary school examinations was
recorded. The overall KCPE examination mean score for the three core subjects was calculated. Likewise, the overall secondary school examination mean score for three subjects in the three progressive examinations sat for at form one, two and three in each of the subjects was calculated. The overall mean scores for the KCPE examination and the progressive secondary school examination mean score for the group of students who had schooled in public and private primary schools respectively was then used in the testing of the hypothesis.

5. RESULTS

Relationship of KCPE Examination Mean Scores and Subsequent Secondary School Examination Mean Scores among Public Primary School Graduates

The first objective aimed at finding out whether the overall KCPE examinations mean scores in the three core subjects among public primary school graduates had a significant relationship with the secondary examination school examination mean scores in the same core subjects. To achieve the objective, the following hypothesis was used:

Ho 1: There is no statistically significant relationship between the overall KCPE examination mean scores in English, Kiswahili and Mathematics and the subsequent overall secondary school examination mean scores in the same subjects among students who has schooled in public primary schools.

To test the truthfulness of the hypothesis, a simple linear regression was carried to test statistical significant of the relationship. In addition the hypothesis explored the percentage of variance in the overall secondary school examination mean score that could be explained by the overall KCPE examination mean score in the three core subjects. Table 1, 2 and 3 shows the regression model of the overall public primary school graduates KCPE examination mean score and overall secondary school examination mean scores for the first three years of the secondary education.

Table 1: Regression Model Summary of KCPE and Secondary School Examination means scores in the Core Subjects among Students who had schooled in Public Primary Schools.

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.343*</td>
<td>.118</td>
<td>.115</td>
<td>8.90115</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Overall KCPE Examination mean scores in core subjects.

Table 2: ANOVA Results of KCPE and Secondary School Examination Means scores in the Core Subjects among Students who had Schooled in Public Primary Schools.

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>3478.765</td>
<td>1</td>
<td>3478.765</td>
<td>43.907</td>
<td>.000*</td>
</tr>
<tr>
<td>Residual</td>
<td>26066.833</td>
<td>350</td>
<td>79.230</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>29545.598</td>
<td>351</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Overall KCPE Examination mean score in the core in the three core subjects
b. Dependent Variable: Overall Secondary School mean score in the three core subjects
The regression analysis revealed that a significant regression equation was found (F(1,350)=43.907, p=.000) with an $R^2$ of .118. Further, the KCPE examination mean score in the combined three subjects was found to have a significant effect on the overall secondary school examination mean score in the same three core subjects ($t=6.626$, $p=.000$). The regression model further reveals that KCPE examination mean score in the core subject explained about 11.8% ($R^2 = .118$) of the total variation in the students' overall secondary school examination mean score in the same core subjects. The remaining 88.2% unexplained variation was attributed to other variables outside the model. In addition, the Table 3 on relationship coefficients show that the unstandardized Beta when the overall KCPE examination mean score in the three core subjects was regressed against the overall secondary school mean score of the same three core subjects was 0.668. It had a $t$ value of 6.626 which is greater than 2.00 and significant ($t=.000$). It can thus be concluded that that overall KCPE examination mean score in the three core subject is a major predictor of their performance at secondary school examinations. An increase in 1% in the overall KCPE examination performance in English, Kiswahili and mathematics would improve the students overall performance in secondary school examination in the same three core subjects by 0.668%. Thus the null hypothesis is therefore rejected.

**Relationship of KCPE Examination Mean Scores and Subsequent Secondary School Examination Mean Scores among Private Primary School Graduates**

The second objective was to find out the whether the overall KCPE examinations mean scores in the three core subjects among private primary school graduates had a significant relationship with the secondary examination school examination mean scores in the same core subjects. To achieve the objective, the following hypothesis was used:-

$H_0$: There is no statistically significant relationship between the overall KCPE examination mean scores in English, Kiswahili and Mathematics and the subsequent overall secondary school examination mean scores in the same subjects among students who had schooled in private primary schools.

As in hypothesis one, Simple Linear Regression was carried to test statistical significant of the relationship and explored the percentage of variance in the overall secondary school examination mean score that could be explained by the overall KCPE examination mean score in the three core subjects. Table 4, 5 and 6 shows the regression model of the overall public primary school graduates KCPE examination mean score and overall
secondary school examination mean scores among students who had schooled in private primary schools for the first three year of the secondary education.

Table 4: Regression Model Summary of KCPE and Secondary School Examination means scores in the Core Subjects among Students who had schooled in Private Primary Schools

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.388</td>
<td>.150</td>
<td>.147</td>
<td>9.06950</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Overall KCPE Examination mean score in core subjects.

Table 5: ANOVA Results of KCPE and Secondary School Examination Means scores in the Core Subjects among Students who had Schooled in Public Primary Schools

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>4451.316</td>
<td>1</td>
<td>4451.316</td>
<td>54.115</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>25170.303</td>
<td>338</td>
<td>82.256</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>29621.618</td>
<td>339</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Overall KCPE Examination mean score in the core in the three core subjects

b. Dependent Variable: Overall Secondary School mean score in the three core subjects

Table 6: Relationship Coefficients of KCPE and Secondary School Examination Mean scores in the Core Subjects among Students who had schooled in Public Primary Schools

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1(Constant)</td>
<td>-5.623</td>
<td>9.383</td>
<td>-.599</td>
<td>.549</td>
</tr>
<tr>
<td>KCPE Mean Score</td>
<td>.811</td>
<td>.110</td>
<td>.388</td>
<td>7.356</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Overall Secondary school examination mean score in the three core subjects

A significant regression equation was found (F (1,306 = 54.115, p=000) with an R$^2$ of .150. Further, the KCPE examination means score in the core subjects among private primary school graduates was found to have a significant effect on secondary school examination mean score in the same core subjects(t=7.356, p-000). It explained about 15% (R$^2$ =.150) of the total variation in the students overall secondary school examination mean score in the three subjects. The remaining 85% unexplained variation was attributed to the variations in other variables outside the model. In addition, the Table 6 on relationship coefficient show that the unstandardized Beta when the overall KCPE examination mean score in the three core subjects was regressed against the overall secondary school mean score of the same three core subjects was 0.811. The t value was 7.356 which is greater than 2.00 and significant (t= .000). It can thus be concluded that that overall KCPE examination mean score in the three core subject is a major predictor of their performance at secondary school examinations. An increase in 1% in the overall KCPE examination performance in English, Kiswahili and mathematics would improve the students overall performance in secondary school examination in the same three core subjects by 0.811 %. The null hypothesis is therefore rejected.
5.1 DISCUSSION OF THE RESULTS

The association between overall KCPE examination mean scores and the subsequent overall secondary school examinations mean scores in the same subject though statistically significant was not strong as it was 0.343 and 0.388 for public and private primary school graduates respectively. However, KCPE examination mean scores for those students who had schooled in private primary school was slightly stronger than that of their public primary school counterparts. Consequently, it explained a slightly larger proportion of the variance (15%) than that of those who had attended public primary schools (11.8%). Since the overall KCPE examination mean score for private primary graduates was higher than that of public primary ones and the trend continued in secondary school, it can be concluded that there was better teaching in private primary schools than in public ones. Therefore, the widely held believe among some people that private primary schools perform better in KCPE examination as a result of drilling to pass examinations is most likely not true.

Consistent significant relationships between KCPE examination mean scores and secondary school academic achievement as measured by KCSE examination performance have been reported in a number of the studies. However, the degree of the relationship reported has varied among the studies. Najakululu (2011) in his study that involved 809 girls in national secondary school found only a moderate relationship between students’ KCPE and KCSE examination mean score. Amburo (2011) found a statistically significant relationship of 0.452 at 0.01 level (2-tailed) between KCPE examination mean score and KCSE Examination mean score among students in provincial (now county) secondary schools in the then three provinces of Kenya (Kenya currently divided into counties and not provinces).

On KCPE examination mean scores predicting secondary school examination mean scores, Odima, et al. (2013) found KCPE examination mean scores explained 44% of the variance in KCSE examination means score. This was close to Jagero (2013) who established that 31.3% of the KCSE examinations mean score variance among students in medium cost private secondary school was explained by KCPE Examination mean scores. The current study found KCPE examination to explained only 11.8%, and 15% of the overall variance in the progressive secondary school examinations mean scores in English, Kiswahili and Mathematics among students who were graduates of public and private primary schools respectively. This was way below what was explained in high stake end of secondary school education KCSE examinations among the two studies reviewed. However this study zeroed down only on English, Kiswahili and Mathematics which are key core subjects in secondary school education in Kenya. The mentioned studies that shown KCPE examination mean scores having a better prediction of KCSE examination means scores computed mean scores for all the subjects sat for in each of the two examinations.

Secondly, the reviewed studies compared examination performance at two points, prior to joining secondary school and during exit at the end of four years secondary school education. The two examinations sat for by the
candidates were high stake examinations where teachers spend plenty of time preparing students for them (Jagero, 2011, Munavu, Ogutu & Wasanga,2008). As a result, the student’s performance in this examination may to a large extent be determined by how well the students have been prepared for the examination and not necessary on how well they have learnt. This study compares student’s prior performance as the student start their secondary school education and subsequent performance at year one, two and three whose mean is obtained to get an overall mean score. This was believed to have given a more objective assessment of the student’s academic performance.

6. CONCLUSION

Prior achievement in English, Kiswahili and mathematics as measured by KCPE examination mean scores had a low prediction of subsequent academic performance in the same subjects at secondary level. This was in contrast to most studies that have shown prior academic achievement being the best predictor of subsequent academic performance. Better learning takes place in private primary schools than in public primary schools.

7. RECOMMENDATIONS

KCPE examination means scores should not be solely used as a basis of selecting KCPE candidates to join the limited vacancies in national secondary schools. This is because evidence from this study shows that KCPE examination mean scores in the three core subjects were a poor predictor of subsequent secondary school academic performance in the same subjects over the first three years of secondary school education. Therefore, other factors other than KCPE examination performance contribute more towards the academic performance of students as they progress through the secondary school education.

8. REFERENCES


