Statistical Analysis of Primary School Enrolment and FPE Funds in Kenya

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Abstract
Statistical analyses play a vital role in informing policy makers in making sound decisions. In Kenya public primary school enrollments rose significantly with the implementation of the FPE programme. This programme was launched with the aim of increasing access to primary education and reducing school dropout rates. This was one of the interventions the Kenyan government launched in its determination to achieving Education For All (Education For All) by 2015. Despite of the launch and implementation, questions still arise as to whether the funds allocated are commensurate with the enrollment and the cost attached to the enrollment not forgetting the inconsistency and reliability. The aim of this paper was to establish whether there is a linear relationship between the funds allocated and the enrollments in schools and, to determine whether there is a significant difference between the funds allocated and the enrollment. The study used secondary data obtained from Education for All End Decade Assessment (2001-2010) Report. Regression and correlation analysis was employed in this paper. Also t-test was used to confirm or reject one of the hypotheses. It was established that there is no linear relationship between FPE funds disbursed and the enrolment in Kenyan primary schools. Also, it was evident that there is a significant difference between the FPE amount disbursed to schools and the enrolment in primary schools in Kenya. From the study it is clear that funding free education only does not significantly improve access and hence reduce the dropout rates. Therefore, in order to achieve EFA goals and increase access, funding of free education should be done alongside other strategies such as hiring of additional teachers, investing in education infrastructure, providing adequate learning materials, educating and sensitizing Kenyan parents and children about the importance of education. FPE alone may not help much from the analysis presented in this paper.

Keywords: EFA, FPE, Linear relationship, Correlation, t-test

1.0 INTRODUCTION
Education is widely valued as a central factor in economic, social, and political development of any country. The eight Millennium Development Goals originated from United Nations Millennium Declaration, in 2000, which was presented during the United Nations Millennium Summit. The Summit was held from 6th to 8th September 2000 in New York, UN Headquarters (United Nations, 2014). MDG 2 requires member states to achieve education for all by 2015. Kenya being a member state is determined to achieve the goal among other goals. In the endeavor to achieve the goal, the government of Kenya launched Free Primary Education (FPE), in 2003, which resulted to high primary schools enrolment.

Even though there was an increment in enrolment in both primary and secondary schools, as a result of FPE and Free Day Secondary Education (FDSE), the net impact as far as school dropout is concerned was not significant. Despite of the high numbers of enrolment, dropout rates in subsequent years nearly remained the same (Mose et al, 2014).
A study on financing lifelong learning in the global knowledge economy by Lewin and Caillods (2001), concluded that with the optimism for achieving Universal Primary Education (UPE), Sub-Sahara Africa countries, Kenya included, required sevenfold increase in foreign assistance for primary education, nearly 4% of GNP (Gross National Product) to secondary schooling in order to achieve 60% gross enrolment. Achieving 100% secondary gross enrolment would require a budgetary allocation of more than 6% GNP.

Primary school repetition, dropout and survival rates were expected to improve due to the implementation of various programmes that were likely to yield higher retention rates. Specific initiatives included provision of teaching and learning materials under the FPE programme and primary education physical infrastructure under the Kenya Education Support Programme in its determination to achieve EFA by 2015 not with-standing countable decreases (Government of Kenya, 2009b). Since, the initiation of FPE, there is need to analyze what is currently being financed and what the future needs in the country will be and to assess the scale and existing nature of primary education.

However, it should be noted that pupils’ enrolment in schools is influenced by a number of factors which include;

i. Household factors e.g. child age and sex, the value placed to the child’s time by parents among others,

ii. School based factors e.g. capacity of the schools, curriculums, school fees and other expenses, teacher experience, student-teacher ratio among many others, and

iii. Environmental factors e.g. rural and urban setting, the distance to school from the household, among others.

As noted by the World Bank (2005) provision of good quality secondary education is a critical tool in generating the opportunities and benefits of social and economic development. Educating people means putting opportunities into their hands and is recognized as one of the best anti-poverty strategies.

Several studies have been done to determine the net impact of FPE to school enrolments and dropouts in Kenya and several findings published. Despite of that, this paper aims at establishing the statistical relationships between primary school enrolment and the FPE funds. In this paper the significance of the FPE funds will also be established through tests of hypotheses. Little has been done as far as statistical analysis such as the one in this paper is concerned.

1.1 Objectives
The main objective is to determine whether there is a statistical relationship between primary school enrolment and the FPE funds. Other objectives include;

i. To determine whether there is a linear relationship between primary school enrolment and FPE funds disbursed per year

ii. To establish whether there is a significant difference between FPE funds allocated and primary school enrolment in Kenya

1.2 Hypothesis
a. \( H_0 \): There is no relationship between primary school enrolment and the FPE funds in Kenya

b. \( H_a \): There is significant difference between FPE funds allocated and primary school enrolment in Kenya

2.0 LITERATURE REVIEW

Education is a basic right as stipulated in the Constitution of Kenya, 2010 and Basic Education Act, 2013. Article 53 1(b) of the Kenyan Constitution, free and mandatory basic education is provided as a basic human right for all Kenyan children. Article 43 1(f) education is recognized as a social economic right for all Kenyans education (National Council for Law Reporting, 2010). In Kenya, it is mandatory for all eligible girls and boys to attend school; children aged 6-13 years should attend primary school education and those aged 14-17 years should attend secondary school (National
Council for Law Reporting, 2013). It is worth noting that, secondary school attendance depends on the age of the child at primary school entry and completion.

Since independence, in 1963, the Kenyan government has been dedicated to expansion of the education system to accommodate all children. This dedication is based on the aspiration of the government to combat poverty, disease and ignorance and the conviction that every individual has right to education as stipulated in the constitution. Since the adoption of the eight MDGs, member states Kenya included have been striving to achieve these MDGs by 2015. MDG 2 and MDG 3 aims at achieving universal primary education and eliminating gender inequality. In 2003, the Kenyan government introduced the Free Primary Education with core objective of achieving universal primary education and gender parity in primary education. From 1980s up to 2002, primary education was financed through the cost sharing system, where parents and the government shared costs of running primary schools education. However, many children were locked out of the primary education system due to lack of tuition fees. Despite the introduction of FPE, there are various challenges being experienced in the primary education system and stakeholders are concerned about the likelihood of declining quality of education due to high primary school enrolment rate (UNICEF Kenya, 2009).

Increased access to primary education is a key concern to various governments’ development strategy. For instance, Universal Primary Education forms the basis of implementing Poverty Reduction Strategy by the government through the acquisition of basic literacy skills, which increases opportunities for employment (World Bank, 2009). Therefore, empirical evidence confirms that with the introduction of FPE, Primary School enrolments grew from approximately six million to approximately 7.2 million pupils in 2003 with a GER of 104% compared to 87.6% in 2002 (Riddell, 2003).

The increment in the primary school enrolments since 2003 is attributed to the introduction of FPE. To promote FPE, the government demonstrated its commitment through increased funding for the education sector. Since 2003, the educational expenditure by the government is estimated to constitute at least 29% of the country’s recurrent expenditure from which 55% was meant for primary education. Moreover, empirical research on the impact of FPE on Primary School enrolments show that there are other existing set of indicators that affect the government’s effort towards providing better educational access (Riddell, 2003).

Government’s budgetary allocation for primary education requires public funds in supporting recurrent expenditure. As a result, recurrent expenditure within the education sector takes up at least 90% of the funds allocated whose significant effect slows down or hinders education infrastructure development. For instance, gross enrollment rate would reduce in the end due to more allocation of funds without proper targeting (Mukudi, 2004). Further, the primary education sector continues to face myriad of other challenges whose contribution is significant in affecting the enrolment rate in the end. For instance, the increased funding for FPE has resulted in shortage of teachers, overcrowding at schools and inadequate learning materials. These quandaries are comparable to the previous strategies used by government in trying to boost enrolment in primary education such as the defunct school milk program meant to promote enrolment (Mukudi, 2004). According to Oketch and Somerset (2010), primary school enrolment rose to 7.16 million from 6.13 million in 2002. On the contrary, when the national estimates on pupil enrolment are disaggregated to the individual school levels up from the district level, the response to free primary education varies significantly due to various socio economic factors (Oketch & Somerset, 2010).

The late allocation of FPE funds by the government of Kenya has a significant effect on the enrolment rates leading to delays in the implementation of the planned activities. The existing disparities between donor commitments in providing financial aid and doing actual disbursements plays a critical role in meeting the set out objectives of FPE. In 2004 /05, only 29% of the funds promised by donors were actually disbursed due to the unmet conditions set (International Monetary Fund, 2012). Despite the government exploring the sector wide approach to mitigate delays in funds for FPE, school enrolments will continue to be affected by the varying School based and environmental factors (Oketch & Somerset, 2010).
In addition, the improvement experienced in the primary school enrolments has posed a new challenge in sustainability of the programme. According to Cockburn (2010), the GOK increased its education budget up by 17 per cent in 2004. In 2003, donors such as the World Bank and British government offered Ksh. 3.7 billion and Ksh. 1.6 billion respectively to GOK in support of FPE. However, with the upward trend in primary School enrolments, the present cost of education has concurrently risen. Thus, the government would soon face the challenge of sustaining the FPE programme if the donor community withdraws its support (Cockburn, 2010). The above studies are relevant because they support our study, which seeks to establish if there is a linear relationship between the primary school enrolment and the FPE funds allocated to the education sector and if there exists a significant difference in the amounts allocated to primary education sector and the total enrollment in Kenya.

3.0 METHODOLOGY

This paper used secondary data obtained from Education for All End Decade Assessment (2001-2010) Report, a publication of Republic of Kenya, Ministry of Education and United Nations Educational, Scientific and Cultural Organization (UNESCO). The target population was the entire primary school enrolment from the year 2003 to 2011 that was purposively selected. Regression and correlation analysis was done to establish whether a linear relationship existed between the primary school enrolment and the FPE funds allocated to the sector in Kenya. Also, t-test was carried out to establish whether there was a significant difference in the amounts allocated to primary education sector and the total primary school enrolment in Kenya. The data used is in Table 1.


<table>
<thead>
<tr>
<th>Financial Year</th>
<th>FPE Funds Disbursed</th>
<th>Enrolment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002/2003</td>
<td>4,507,084,071</td>
<td>6,954,123</td>
</tr>
<tr>
<td>2003/2004</td>
<td>7,928,714,899</td>
<td>6,971,198</td>
</tr>
<tr>
<td>2004/2005</td>
<td>7,441,200,894</td>
<td>7,337,495</td>
</tr>
<tr>
<td>2005/2006</td>
<td>7,566,093,991</td>
<td>7,495,244</td>
</tr>
<tr>
<td>2006/2007</td>
<td>7,814,008,289</td>
<td>7,538,167</td>
</tr>
<tr>
<td>2007/2008</td>
<td>7,618,127,191</td>
<td>7,954,221</td>
</tr>
<tr>
<td>2008/2009</td>
<td>5,569,948,200</td>
<td>8,096,325</td>
</tr>
<tr>
<td>2009/2010</td>
<td>7,724,472,127</td>
<td>8,226,363</td>
</tr>
<tr>
<td>2010/2011</td>
<td>7,295,228,363</td>
<td>8,462,942</td>
</tr>
</tbody>
</table>

Source: Education for All End Decade Assessment (2001-2010) Report

4.0 RESULTS AND DISCUSSION

From the analysis the findings were segmented into two namely;

a. The linear relationship between the FPE funds and enrolment
b. The difference between the FPE funds and enrolment

4.1 The linear relationship between the FPE and enrolment

To establish this, a regression analysis was carried out and the findings are as in Table 2;

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>7054007.909</td>
</tr>
<tr>
<td>Funds</td>
<td>8.745E-5</td>
<td>.000</td>
</tr>
</tbody>
</table>

Dependent Variable: Enrolment
From Table 2.0 above, the linear relationship between FPE funds and primary enrolment can be stated to be;

$$\text{Enrollment}=7054007.909+8.745\times10^{-5}\text{ (FPE funds)}.$$  

However, this relationship is not significant since its significance level holds at 0.622. The equation shows that there is very little effect brought by the FPE funds allocated for Primary Education ($8.745\times10^{-5}$) on the primary school net enrolment (7054007.909).

Further, correlation analysis was done to establish the strength of the relationship. The result from the correlation analysis is presented in the Table 3 below;

### Table 3: Correlation between FPE funds and Enrolment

<table>
<thead>
<tr>
<th></th>
<th>FPE Funds</th>
<th>Enrolment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>0.191</td>
<td>0.622</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

From Table 3.0, the Pearson Correlation coefficient between FPE funds and Enrolment in Kenya is 0.191. This clearly shows that the relationship between the two variables is weak.

Lastly the hypothesis that there is no relationship between FPE funds and Enrolment in Kenya was tested. The findings are presented in table 4 below;

### Table 4: ANOVA

<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>1</td>
<td>Regression</td>
<td>1</td>
<td>8.619E10</td>
<td>265</td>
<td>.622a</td>
</tr>
<tr>
<td>Residual</td>
<td>2.274E12</td>
<td>7</td>
<td>3.248E11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2.360E12</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), FPE Funds  
b. Dependent Variable: Enrolment

From Table 4, the test reveals that the relationship not significant (Sig. 0.622). This therefore, implies that the hypothesis that there is no relationship between FPE funds and Enrolment in Kenya is not rejected/significant.

4.2 The mean difference between FPE Funds and Enrolment in Kenya. There is need also to establish whether there is a difference in the means of FPE funds and Enrolment in Kenya. This test determines whether the mean of the amount/quantity of the two variables is the same or not. To establish this independent t-test is done. The result from the analysis is presented in the table 5 below;

### Table 5: Means

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td>FPE Funds</td>
<td>7.05E9</td>
<td>9</td>
<td>1.187E9</td>
</tr>
<tr>
<td>Enrolment</td>
<td>7670675.33</td>
<td>9</td>
<td>543151.748</td>
<td>181050.583</td>
</tr>
</tbody>
</table>

It can be revealed that the mean for the FPE funds is $7.05\times10^9$ while that of the enrolment is 7,670,657.
A test to establish whether there is a statistical difference between the two was done and the result is as below;

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>95% Confidence Interval of the Difference</th>
<th>T</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1 FPE Funds - Enrolment</td>
<td>7.044E9</td>
<td>1.187E9</td>
<td>3.956E8</td>
<td>6.132E9 - 7.956E9</td>
<td>17.806</td>
<td>8</td>
<td>0.000</td>
</tr>
</tbody>
</table>

From Table 6.0, it is evident that the mean difference between FPE funds and the Enrolment is significant. Hence the hypothesis that there is no difference between the amount allocated to FPE and enrolment is significant and therefore not accepted.

5.0 CONCLUSION
From the above analysis the following conclusions were made;
1. There is no relationship between FPE funds disbursed and the enrolment in Kenyan primary schools
2. There is a significant difference between the FPE amount disbursed to schools and the enrolment in primary schools in Kenya.

6.0 RECOMMENDATION
The study findings indicate that there is no linear relationship between primary school enrolment and FPE funds. This is a clear indication that funding free education only does not significantly reduce the dropout rates. Therefore, in order to improve quality of primary education and reduce dropout rates, funding of free education should be done alongside other strategies such as hiring of additional teachers, investing in education infrastructure, providing adequate learning materials, and educating and sensitizing Kenyan parents and children about the importance of education among others. Further research may be conducted to determine various factors that influence primary school enrolment.

7.0 REFERENCES

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