

Full Length Research Paper

Cost effectiveness analysis of educating girls in day and boarding secondary schools in Kenya: a case study of Kericho District

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Abstract

Girl child education at secondary school level is highly valued by parents in Kericho District in the present time than before. This is because most parents have realized that educating a girl child is as good as educating a boy child as it leads to eradication of poverty, ignorance and diseases. However, with limited financial resources parents are forced to choose between educating their girls in day or boarding secondary schools. Thus, parents and guardians lack guiding principles on making informed decisions on the choice of schools amid limited financial resources. Girls in boarding secondary schools usually perform better in Kenya Certificate of Secondary Education Examinations than girls in day secondary schools in Kericho District. For example in the year 2007 the mean score for girls in boarding secondary schools was 7.48 while in day secondary schools it was 4.69 and in 2008 and 2009 the mean scores for girls in boarding secondary schools was 7.93 and 8.24 respectively while girls in day secondary schools the mean scores were 4.88 and 4.05 respectively. Whichever the case, the debate on cost effectiveness of educating the girl child in boarding or day secondary school has not been concluded. Therefore, the purpose of this study was to establish cost effectiveness of educating the girl child in boarding and day secondary school in Kericho District. Descriptive survey research design was used in the study. The study population consisted of 6 head teachers, 82 teachers and 150 form four girls of 2010 from 6 secondary schools. The study found that boarders performed better than day scholars. The day scholars had a mean of 3.38 while the boarders had 3.59 in the five schools in the year 2010. The study also found that it was more cost effective to educate girls in day schools compared to boarding schools. This was because parents and the government used on average Kshs. 14,804.55 to achieve the greatest level of output of a day scholar girl and Kshs 17,997.49 to achieve the greatest level of output of a girl child in boarding school. The study concluded that it was more cost effective to educate girls in day secondary schools compared to boarding secondary schools. The findings of this study are significant to parents, school administrators, planners and policy makers in the Ministry of Education in decision making on financing of education with regard to the girl child education in Kericho District.

Keywords: Cost Effectiveness Analysis, Educating Girls, Boarding, Day, Secondary Schools, Kericho District, Kenya.

INTRODUCTION

Cost effectiveness analysis is a very important concept in planning and economics of education. Woodhall (2004) defines Cost effectiveness analysis as a tool that is

designed to assist in choosing among alternative courses of action when resources are limited. According to Levin (2009), most educational decisions face constraints in the availability of budgetary and other resource allocation. However, limiting evaluation to the educational consequences of alternatives alone without considering their cost effectiveness provides inadequate basis for

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decision-making. Some alternatives may be more costly than others for the same results. This means that society must sacrifice more resources to obtain a given end. It is desirable to choose those alternatives that are least costly for achieving a particular objective or that have the largest impact per unit of cost. This is intuitively obvious because the most cost-effective solution can free resources for other uses or allow a greater impact for any given investment in comparison to a less cost-effective solution.

The direct private costs are cost that parents incur for their children's schooling. These costs include boarding fees, lunch fees and tuition fees. When this concept is applied to educational interventions, there are a lot of options from which stakeholders in education can choose to improve educational outcomes. Many options have shown at least some evidence of effectiveness, although the standards of evidence vary considerably. Thus, at the very least, consistent standards of evidence are needed to compare the competing alternatives. The estimates of the costs of the alternatives are needed as well. Even if one alternative is 10 percent more effective than another, it will not be preferred if it is twice as costly. Thus, both costs and effectiveness must be known in order to make good public policy choices. The secondary school expenditure per student for household in Kenya represents 65.4% of the average per capita consumption expenditure (Ministry of Education Science and Technology, 2003). The cost of providing secondary school education for most Kenyan households has remained prohibitive at Kshs. 10,500 for day secondary schools and on the other hand the cost of providing secondary education for most Kenyan household has remained prohibitive at Kshs. 25,000 for boarding schools (Ayodo, 2006). After the introduction of Free Secondary Education in 2008 the government pays Kshs. 10,265 for each child in a year (Ministry of Education, 2008). Academic performances differ between day and boarding secondary schools each year. According to the Standard Newspaper (2009, September 16th), the trend continues whereby performance in the Kenya Certificate of Secondary Education is dominated by boarding students. Ranking indices from the Kenya National Examinations Council show year after year, 75 per cent of the 150 top schools in Kenya Certificate of Secondary Education are boarding schools. Furthermore, academic performance of girls in boarding secondary schools has been better than those in day schools over the years. In Kericho District the trend has been the same over the years. The girls in boarding secondary schools score better grades compared to those in day secondary schools. The analysis for girls' Kenya Certificate of Secondary Education performance in 15 secondary schools in Kericho district, both day and boarding secondary schools for the past three years 2007-2009 was as indicated in Table 1. From Table 1 it is clear that the girls are doing generally poor in Kericho district in both day

and boarding schools except for a few schools. In the three categories of schools; day, boarding and mixed boarding day secondary schools most parents desire to have their girls in boarding schools where the results are generally better. However, in many cases girls end up dropping out from boarding schools without their parents realizing that they can perform better also in day schools with the limited resources they have. The solution to this challenge may be through determination of cost effectiveness of educating the girls in day and boarding secondary schools. Studies carried out elsewhere like that of Jagero (2010) on cost effectiveness of educating students in day and boarding secondary schools reveal that it was more cost effective to educate a student in day secondary school than boarding secondary school in Kisumu district. Cost effectiveness of educating girls in day and boarding secondary schools can be determined by use of mixed day/boarding secondary schools whereby all factors are held constant except costs of educating girls, which vary. From the foregoing, it is necessary to conduct a study on cost effective analysis of educating a girl in both mixed day and boarding secondary schools in Kericho District. The objectives of the study were to; determine the direct private and social costs of educating girls in day secondary schools; determine the direct private and social costs of educating girls in boarding secondary schools; find out the performance of girls in Kenya Certificate of Secondary Education in day and boarding secondary schools and establish the cost effectiveness ratios of educating girls in day and boarding secondary schools.

Research Questions

In order to investigate effectively this problem, the following research questions were derived from the above objectives.

1. What are the direct private and social costs of educating girls in day secondary schools?
2. What are the direct private and social costs of educating girls in boarding secondary schools?
3. What is the cost effectiveness ratios of educating girls in day and boarding secondary school?

Theoretical Framework

The theory that was used in this study is the Cost Effectiveness Analysis Theory. This is an efficiency theory. It compares the inputs used and the outputs achieved. The Cost Effectiveness Analysis Theory was developed in the 1950s by the United States Department of Defense as a device for adjusting among the demands of the various branches for the armed services for increasing costly weapons systems with different levels of performance and overlapping missions (Hitch and

Table 1. Analysis of Kenya Certificate of Secondary Examination Performance for Girls in Kericho District Secondary Schools

| Category of Schools | Mean Scores | | |
|---------------------------------|-------------|-------|-------|
| | 2007 | 2008 | 2009 |
| Boarding | | | |
| A | 4.897 | 4.609 | 9.729 |
| B | 8.602 | 9.115 | 9.729 |
| C | 7.71 | 6.684 | 6.953 |
| D | 7.479 | 7.843 | 7.959 |
| E | 6.125 | 8.059 | 8.305 |
| F | 3.353 | 4.625 | 2.92 |
| Day | | | |
| G | 4.2 | 3.539 | 3.541 |
| H | 3.8 | 3.063 | 3.25 |
| I | 5.12 | 4.43 | 4.275 |
| J | 3.94 | 2.978 | 3.737 |
| K | 4.778 | 4.05 | 4.5 |
| L | 6.125 | 4.557 | 3.926 |
| M | 4.684 | 4.333 | 4.762 |
| Mixed day & Boarding | | | |
| N | 3.942 | 3.881 | 4.091 |
| O | 4.588 | 6.000 | 4.601 |
| P | 4.265 | 3.271 | 3.227 |
| Q | 3.91 | 4.091 | 3.552 |
| R | 3.512 | 3.448 | 4.333 |
| T | 3.215 | 4.125 | 4.456 |

Note: Schools were coded using alphabetical letters **A** to **T** in this study because of ethical considerations.

McKean, 1960). Cost-effectiveness analysis emerged in the 1960s as an important method for choosing among costly weapons systems. Gradually the tools of cost-effectiveness analysis made their way from the Pentagon to other government agencies with President Lyndon Johnson's requirement that all budgetary requests be supported by a program-planning-budgeting system that tied mission and goals to costs. Over subsequent decades, advances were made in refining the techniques and improving their user-friendliness (Levin, 1995, 2001). Levin was the first economist of education to use cost effectiveness analysis in early 1970s. He wanted to establish cost effectiveness analysis as a useful evaluative tool in the field of education and other areas of human service. Therefore, he used data from Coleman (1966) to compare the cost effectiveness of two alternative strategies for teacher selection; hiring of more teachers that are experienced or those with higher verbal test scores (Levin, 2001). Other researchers like Levin (1995), Woodhall (2004) and Cellini (2010), have applied cost effectiveness theory to education. Cellini (2010) used this theory and he defined that Cost - effectiveness analysis seeks to identify and place dollars on the costs of a program. It then relates these costs to specific

measures of program effectiveness. Analysts can obtain a program's cost - effectiveness ratio by dividing costs by units of effectiveness. That is:

$$\text{Cost-Effectiveness Ratio} = \frac{\text{Total Cost}}{\text{Units of Effectiveness}}$$

Jagero, (2010) used Cost Effectiveness Analysis Theory to determine the cost effectiveness of educating students in day and boarding secondary schools in Kisumu District, Kenya. The study revealed that it was more cost effective to educate a student in day schools than in boarding schools in Kisumu District. This study adapted the Cost Effectiveness Analysis Theory to determine cost effectiveness of educating girls in day and boarding secondary schools. It adapted the formula used by Cellini, (2010). It used direct private and social costs and the performance of girls in Kenya Certificate of Secondary Education in terms of mean scores. That is:

Cost Effectiveness Ratio =

$$\frac{\text{Cost of Educating a Secondary School Girl}}{\text{Performance in KCSE examinations}}$$

Table 2. Headteachers demographic Characteristics as indicated by the Head teachers (n=5)

| Demographic Characteristics | Frequency (f) | Percentage (%) |
|---|--------------------------|---------------------------|
| Gender | | |
| Male | 5 | 100 |
| Female | 0 | 0 |
| Headship experience | | |
| Below 3 years | 4 | 80 |
| Above 7 years | 1 | 20 |
| Headship experience in different categories of schools | | |
| Mixed day & boarding | 5 | 100 |
| Day school | 1 | 20 |
| Boarding school | 1 | 20 |

Table 3. Heads of Departments Teaching Experience as indicated by the Heads of Departments (n=35)

| Years | Frequency | Percentage % |
|-----------------|------------------|---------------------|
| 1-3 | 16 | 45.71 |
| 4-6 | 3 | 8.57 |
| 7-10 | 4 | 11.43 |
| Above 11 | 12 | 34.29 |
| Total | 35 | 100 |

RESEARCH METHODOLOGY

Descriptive survey research design was used in the study. The study population consisted of 6 head teachers, 82 teachers and 150 form four girls of the year 2010 from 6 mixed/boarding secondary schools. Saturated sampling technique was used to select a sample size of 5 head teachers, 42 heads of departments and 150 form four girls. Questionnaire, interview schedule and document analysis guide were used to collect data. Face validity of the instruments was determined by experts in Educational Administration and Planning of Economics by incorporating their input in the final drafts of the instruments to make them valid. Reliability of the questionnaires was established through a pilot study by use of test re-test technique. The Pearson r correlation coefficient of the headteachers questionnaire was 0.8, that of heads of department was 0.75 and that of students 0.85 at p- value of 0.05. Thus the instruments were considered reliable. Quantitative data was analyzed using descriptive statistics in form of frequency counts, percentages and means. Cost Effective Ratio by Cellini (2010) and Efficiency Ratio formula by Levin (2002) were used in calculation of cost effectiveness of educating girls in day and boarding secondary schools. Qualitative data was transcribed and analyzed in emergent themes.

RESULTS

Demographic Characteristics of the Respondents

The respondents in this study included Headteachers, heads of Department and four girls of 2010. The demographic characteristics were as shown in Tables 2, 3, 6 and 7.

Table 2 shows that all 5 (100%) head teachers involved in the study were males. Four (80%) of the head teachers had been in headship for only 3 years and below while one (20%) had headed for 7 years. All the 5 (100%) had headed in mixed day and boarding mainly in their current station, twenty percent had headed in day school and another 20% had headed in boarding schools.

From the findings in Table 2, the head teachers had enough experience to give all the social and private costs in the school. It also indicates that they were able to give the factors that affect the performance of the girl child.

Concerning their teaching experience as indicated in Table 3, 45.72% had been teaching for 3 years and below, between 4 to 6 years were 8.57% while 11.43% had been teaching for between 7 to 10 years while those who had been in service for over 11years were 34.29%. The study found that 57.72% of the heads of departments had been teaching in mixed day and boarding secondary schools while 34.29% have taught in other different

Table 4. Distance Covered by the Day Scholar Girls from Home to School as reported by the Day Girl Students (n=21)

| Distance (Kilometers) | Frequency (f) | Percentage (%) |
|-----------------------|---------------|----------------|
| Below 0.5 | 1 | 4.78 |
| 0.5 to 1.5 | 5 | 23.81 |
| 1.5 to 3.0 | 10 | 47.62 |
| 3.0 to 4.5 | 3 | 14.29 |
| Above 4.5 | 2 | 9.52 |
| Total | 21 | 100 |

Table 5. Distance covered by the Boarder Girls from Home to School as reported by the Girl Students (n=103)

| Distance (Kilometers) | Frequency (f) | Percentage (%) |
|-----------------------|---------------|----------------|
| Below 0.5 | 2 | 1.94 |
| 0.5 to 1.5 | 10 | 9.71 |
| 1.5 to 3.0 | 23 | 22.33 |
| 3.0 to 4.5 | 19 | 18.45 |
| Above 4.5 | 49 | 47.57 |
| Total | 103 | 100 |

Table 6. Age of the Girls as indicated by the Girls Students (n=124)

| Age | Frequency (f) | Percentage (%) |
|--------------|---------------|----------------|
| 16 | 3 | 2.42 |
| 17 | 39 | 31.45 |
| 18 | 65 | 52.42 |
| 19 | 11 | 8.87 |
| 20 | 5 | 4.03 |
| 21 | 0 | 00 |
| 22 | 1 | 0.81 |
| Total | 124 | 100 |

schools apart from their current stations. The findings in Table 3, shows that most of these heads of departments had the required experience in teaching and would give information required on cost effectiveness of educating the girl child in day boarding schools.

The girls were asked to indicate the distance from their home to school and the responses were as shown in Table 4. Table 4 shows the distance covered by the girls from home to school. Below 0.5 kilometers were 4.78% while those coming between 0.5 to 1.5 Kilometers were 23.81%. Ranging from 1.5 to 3.0 Kilometers were 47.62%, ranging from 3.0 to 4.5 Kilometers were 14.29%, and for those whose distance between their home and school were above 4.5 Kilometers were 9.52%. Majority of the day scholars come within a range of 1.5 to 3.0 kilometers from their home area. The findings indicated that 71.43% day scholars reside far from their schools. It also implied that they leave their homes very early and report back very late. Such long distances could affect their performance it also implies that for them to attend tuition on time they should have good transport network.

This implies that most of these 15 girls would have opted to board if they had money. With this kind of lifestyle, these students will always be fatigued in class and lack concentration hence affecting performance.

Table 5 shows the distance covered by boarder girls from home to school. Below 0.5 kilometers was 1.94% those coming between 0.5 to 1.5 Kilometers were 9.71% of the girls. Ranging 1.5 to 3.0 Kilometers 23.30% while those ranging from 3.0 to 4.5 Kilometers were 18.45% and for those whose distance between their home and school was above 4.5 Kilometers were 47.57%. Basing on the findings, 86.35% of the boarders came from a distance of between 1.5 to 4.5 Kilometers. This is an indication that the boarder girls are boarding because they are able financially unlike the day scholars who could be coming from the same distance. The students board schools because of the distance they are likely to cover every day trying to reach school.

Table 6 indicates the age of the form four girls as given by the girls, 2.42% of the girls were 16 years, 31.45% were 17 years, 52.42% were 18 years and 0.18%

Table 7. Number of Siblings in the Family as given by the Girls Students (n=124)

| Number | Frequency (f) | Percentage % |
|--------------|------------------|-----------------|
| 1 | 2 | 1.60 |
| 2 | 3 | 2.42 |
| 3 | 14 | 11.29 |
| 4 | 12 | 9.68 |
| 5 | 20 | 16.13 |
| 6 | 22 | 17.74 |
| 7 | 25 | 20.16 |
| 8 | 19 | 15.32 |
| 9 | 7 | 5.65 |
| 11 | 1 | 0.81 |
| Total | 124 | 100 |

Table 8. Population of the Students and Teachers in Schools and Government Expenditure on Teachers for educating One student as reported by Head teachers (n=5).

| Schools | P | Q | R | S | T |
|---------|-----|----|---------|----------|-----------|
| A | 250 | 10 | 159,000 | 636.00 | 7,632.00 |
| B | 394 | 16 | 485,000 | 1231.04 | 14,772.48 |
| C | 385 | 13 | 419,000 | 1,088.36 | 13,060.32 |
| D | 581 | 28 | 655,000 | 1,127.36 | 13,528.37 |
| E | 317 | 15 | 543,000 | 1,712.93 | 20,555.16 |

Key: P = The students population, Q = Teacher population, R= Total teachers salary per month, S= Government Expenditure on the teachers to teach one child in a month and T = Government Expenditure on teachers for educating one student per annum.

Note: teachers employed by Board of Governors and paid from government subsidy through Free secondary education policy per zonal emoluments paid pay parents included.

were 22 years. This shows that at least the girls are the right age when they are under going secondary education with the highest percentage being 18 years. The other students who are 19 years and above might have come back to school to repeat, they started school later or had benefited from the free secondary education. The other reason of this trend is that these girls could have dropped out at some point due to other reasons like teenage pregnancies. Fee problem is also another reason, lack of interest and others could be having family problems. For those who are 17 years and below could have who started school earlier before the right age which is 6 years (Republic of Kenya, 1964).

Table 7 shows most girls had a number of siblings in their families. From the information, it is very clear that majority of the girls had 7 siblings. This meant that there was high demand for fees from their parents.

Table 8 indicates the population of the students, teachers and how much the government and Board of Governors pays to the teachers to educate one student. The amount incurred by government was arrived at by taking the total cost of teachers salary divided by the total population of the students in the school. It differs from

one school to another because of the student teacher ratio. The teachers' salary ranges between Kshs. 7632 to Kshs. 20,555.16 for the services offered to each girl child per year.

Research Question 1

The research question responded to was: What are the direct private and social costs of educating girls in day secondary schools?

Table 9 shows the direct private costs paid by parents to the school towards a day scholar girl in secondary school. They are used by the school to meet the students' requirements. These costs were for lunch, caution money, private tuition and Parents Teachers Association projects. School A paid Kshs 9,400, B pays Kshs 11,700 while school C and E pays Kshs 13,000, and for school D they paid Kshs 11,500. The variation in payment was because some schools charged more for lunch levies and Parents Teachers Association project levies compared to others. Thus the amount paid for lunch ranged from Kshs 5,400 to Kshs 9,000. Private

Table 9. Direct Private Costs of Educating Girls in Day Schools as indicated by the Head Teachers (n=5)

| Vote heads | Schools and levies charged | | | | |
|--------------------------------------|----------------------------|---------------|---------------|---------------|---------------|
| | A | B | C | D | E |
| Tuition | 0 | 0 | 0 | 0 | 0 |
| Lunch | 5,400 | 8,200 | 7,500 | 9,000 | 7,500 |
| Repair, Maintenance and Improvement | 0 | 0 | 0 | 0 | 0 |
| Local Travel and Transport | 0 | 0 | 0 | 0 | 0 |
| Administration Costs | 0 | 0 | 0 | 0 | 0 |
| Electricity, water and Conservancy | 0 | 0 | 0 | 0 | 0 |
| Activity Fees | 0 | 0 | 0 | 0 | 0 |
| Personal Emolument | 0 | 0 | 0 | 0 | 0 |
| Medical | 0 | 0 | 0 | 0 | 0 |
| Caution money | 500 | 500 | 500 | 500 | 500 |
| Private tuition | 1,500 | 1,000 | 3,000 | 0 | 3,000 |
| Parents Teachers Association project | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| Total | 9,400 | 11,700 | 13,000 | 11,500 | 13,000 |

Table 10. Total Direct Private Costs of Educating Girls in Day Schools as indicated by the Head Teachers (n=5) and Day Scholars (n=21).

| Schools | X | Y | Total |
|----------------|------------------|------------------|------------------|
| A | 9,400.00 | 9,815.00 | 19,215.00 |
| B | 9,400.00 | 13,798.17 | 23,198.17 |
| C | 9,400.00 | 19,932.00 | 29,332.00 |
| D | 11,500.00 | 8,302.00 | 19,802.00 |
| E | 13,000.00 | 16,275.00 | 29,275.00 |
| Average | 10,540.00 | 13,624.54 | 24,164.54 |

Key: X= Costs paid by the parents to the school as reported by the head teachers.
Y= Costs on personal effects as reported by the girls.

Table 11. Distribution of the Government Subsidies for day scholars (n=5)

| Vote head | (Kshs) |
|-------------------------------------|---------------|
| Tuition | 3,600 |
| Boarding, Equipment & Stores | 0 |
| Repair, Maintenance and Improvement | 400 |
| Local Travel and Transport | 400 |
| Administration Costs | 500 |
| Electricity, water and Conservancy | 500 |
| Activity Fees | 600 |
| Personal Emolument | 3,965 |
| Medical | 300 |
| Total school Fees | 10,265 |

tuition levies also varied from one school to another, one school charged Kshs 1000, another one Kshs 1,500 and the others Kshs 3,000. One school did not charge private tuition levy. Caution money and Parents Teachers Association project levies were the same in all the schools.

From Table 10 the direct private costs paid by the parents directly to the school were Kshs 10,540 on average. The costs varied from one school to another,

variation was because of the place where the school was situated and the requirements in that particular school. The direct private costs incurred by the parents on the girls' personal effects, transport and other requirements during the year were given by the form four day scholar girls and the amount varied from one school to another. It ranged between Kshs 8,302/= and Kshs 19,932/=.

Table 11 shows the costs incurred by the government for the girl's education after the introduction of Free

Table 12. Total Direct Social Costs of Educating a Girl Child in Day Secondary Schools in Kericho District as indicated by the head teachers (n=5)

| Schools | X | Y | Total |
|----------------|---------------|------------------|------------------|
| A | 10,265 | 7,632.00 | 17,897.00 |
| B | 10,265 | 14,772.48 | 25,037.48 |
| C | 10,265 | 13,060.32 | 23,325.32 |
| D | 10,265 | 13,528.37 | 23,793.37 |
| E | 10,265 | 20,555.16 | 30,820.16 |
| Average | 10,265 | 13,909.67 | 24,174.67 |

KEY: X= Government subsidy, Y= teachers salary.

Table 13. Direct Private and Direct Social costs of Educating a Girl Student in Day Secondary School

| Schools | Direct Social costs | Direct private costs | Total |
|----------------|---------------------|----------------------|------------------|
| A | 17,897.00 | 19,215.00 | 37,112.00 |
| B | 25,037.48 | 23,198.17 | 48,235.65 |
| C | 23,325.32 | 29,332.00 | 52,657.32 |
| D | 23,793.37 | 19,802.00 | 43,596.37 |
| E | 30,820.16 | 29,275.00 | 60,095.16 |
| Average | 24,174.67 | 24,164.43 | 48,339.10 |

Table 14. Direct Private Costs of Educating Girls in Boarding school as indicated by the Head Teachers (n=5)

| Vote heads | Schools and levies charged | | | | | Average |
|-------------------------------------|----------------------------|---------------|---------------|---------------|---------------|------------------|
| | A | B | C | D | E | |
| Tuition | 0 | 0 | 0 | 0 | 0 | 0 |
| Boarding, Equipment & Stores | 13,035 | 12,000 | 13,034 | 13,034 | 13,034 | 12,827.40 |
| Repair, Maintenance and Improvement | 400 | 400 | 400 | 800 | 400 | 480 |
| Local Travel and Transport | 500 | 500 | 500 | 0 | 500 | 400 |
| Administration Costs | 0 | 0 | 0 | 0 | 0 | 0 |
| Electricity, water and Conservancy | 500 | 3,150 | 1,500 | 2,000 | 1,500 | 1,730 |
| Activity Fees | 0 | 0 | 0 | 0 | 0 | 0 |
| Personal Emolument | 0 | 1,500 | 2,743 | 6,708 | 2,743 | 2,738.80 |
| Medical | 0 | 0 | 0 | 0 | 0 | 0 |
| Caution money | 500 | 500 | 500 | 500 | 500 | 500 |
| Private tuition | 1,500 | 1,500 | 3,000 | 0 | 3,000 | 1,800 |
| Parents Teachers Association | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| TOTAL | 18,435 | 22,250 | 23,677 | 25,042 | 23,677 | 22,476.20 |

Secondary Education in 2008.

The direct social cost or government subsidy of educating a girl was indicated in Table 12. The government on average spent 42.46% of the direct social costs on the girls' tuition. The amount the government paid was the same in all the schools.

From Table 13 the total social and direct private costs the government and parents incur towards the girl's education. The total amount spent by the government was Kshs 24,174.67 on average though there was variation from one school to another because of the teacher pupil ratio. It ranged from Kshs 17,897 to Kshs 30,820.16. On average the government spent Kshs. 24,174.67 (50.01%) on the dayscholar girl.

Research Question 2

The research question responded to was: What are the direct private and social costs of educating girls in boarding secondary schools?

Direct private costs shown in Table 14 paid to school by the parents were paid towards the boarding fees, Repair maintenance and enrolment EW&C, personal emolument, caution money and Parents Teachers Association projects. This amount ranges from Kshs 18,435 to Kshs. 25,032. Boarding fees varied from one school to another ranging from Kshs. 12,000 to Kshs. 13,035, for Repair, Maintenance and Improvement they all pay Kshs. 400 and Local, Travel and Transport Kshs. 500

Table 15. Total Direct Private Costs of Educating Girls' in Boarding Secondary Schools as indicated by the Head Teachers and Girls' Students. (n =5) and (n= 103)

| Schools | X | Y | Total costs |
|----------------|------------------|------------------|------------------|
| A | 18,435.00 | 16,776.88 | 35,211.88 |
| B | 18,435.00 | 17,895.81 | 36,330.81 |
| C | 18,435.00 | 21,435.89 | 39,870.89 |
| D | 25,032.00 | 15,926.91 | 40,958.91 |
| E | 23,677.00 | 20,898.64 | 44,575.64 |
| Average | 20,802.80 | 18,586.63 | 39,389.63 |

Key:

X= Direct private costs paid to the school by parents given by the girls.

Y= Directs private costs parents spent on the personal effects given by the head teachers.

Table 16. Distribution of the Government Subsidies for day scholars (n=5)

| Vote head | Amounts (Kshs) |
|-------------------------------------|----------------|
| Tuition | 3,600 |
| Boarding, Equipment & Stores | 0 |
| Repair, Maintenance and Improvement | 400 |
| Local Travel and Transport | 400 |
| Administration Costs | 500 |
| Electricity, water and Conservancy | 500 |
| Activity Fees | 600 |
| Personal Emolument | 3,965 |
| Medical | 300 |
| Total school Fees | 10,265 |

except one school. Electricity, Water and Conservancy ranged between Kshs. 500 to Kshs 3,150. School 'A' did not charge anything for personal Emolument, the rest of the schools pay but it was varying from Kshs 1,500 to Kshs 6,708. For caution money, they pay Kshs 500 for all the 5 schools the same applies to Parents Teachers Association projects. For private tuition, it ranged from Kshs 1,500 to Kshs 3,000. The average total cost paid direct to the school per border girl child was Kshs 22,476.20, but it was different from school to school. The difference was that, the cost of living and quality of food was different from one school to another. According to the Ministry of Education, (2008) the standard fees structure for boarding students to be paid by the parents was Kshs 18,627 this is higher compared to the amount the parents paid in 3 schools used in this study and the other two schools pay more than what is given in the standard fee structure.

Direct private costs paid directly to the school by the parent were Kshs 20,802.80 (52.81%) of the total direct private cost. The costs incurred by the parents towards their children other expenses or personal effects were Kshs 18,586.63 (47.19%). This amount was spent on buying mattress, shoes, soap, tissue paper, uniform, pocket money, transport and other personal effects. It differs from one school to another and it range from Kshs

15,926.91 to Kshs 21,435.89. The difference in costs is because of parents' financial ability and the requirements in some schools.

Table 16 indicates the amount the Government pays towards the girl education after the introduction of Free Secondary Education in 2008. This amount is used for tuition fees and other expenses like Repair, Maintenance and Improvement, Local Travel and Transport, administration costs, activity fees, Electricity, water and conservancy personal emolument and medical. The costs given by the head teachers are similar with what was given in the standardized fees structure given by the Ministry of Education (2008).

The direct social cost or government subsidy of educating a girl child as indicated and discussed in Table 4.15. The government in this study spent 42.46% of the social costs on the girl tuition; this is similar in all the schools used for the study. Teachers' salary is the amount paid by the government to teachers for offering services to each child. This is a sampled population and it is a representation of Kericho District. The costs differ from one school to another depending on the grade of the teacher. For instance, in one of the schools the total number of teachers in the whole school was 10 while the students were 250. Taking the total amount paid to these teachers and the entire population of the students the

Table 17. Total Direct Social Costs of Educating Girls' in Boarding Secondary Schools as indicated by the Head Teachers (n=5)

| Schools | X | Y | Total |
|----------------|---------------|------------------|------------------|
| A | 10,265 | 7,632.00 | 17,897.00 |
| B | 10,265 | 14,772.48 | 25,037.48 |
| C | 10,265 | 13,060.32 | 23,325.32 |
| D | 10,265 | 13,528.37 | 23,793.37 |
| E | 10,265 | 20,555.16 | 30,820.16 |
| Average | 10,265 | 13,909.67 | 24,174.67 |

Key: X= Government Subsidy, Y= Teachers Salary

Table 18. Total Direct Private and Social costs of Educating a Boarder Girl in Secondary School

| Schools | Direct Social costs | Direct Private costs | Total |
|----------------|---------------------|----------------------|------------------|
| A | 17,897.00 | 35,211.88 | 53,108.88 |
| B | 25,037.48 | 36,330.81 | 61,368.29 |
| C | 23,325.32 | 39,870.89 | 63,196.21 |
| D | 23,793.37 | 40,958.91 | 64,752.28 |
| E | 30,820.16 | 44,575.64 | 75,395.80 |
| Average | 24,174.67 | 39,389.63 | 63,564.30 |

researchers found out that the costs the government spent on teachers salary per child in a year totaled to Kshs 7,632.

Table 18 shows the total costs the parents and the government spent to educate a child in boarding school. The social costs are the ones the government spent on the girl child ranging from Kshs 17,897 to Kshs 30,820.16 per child in a year for a boarder. This amount was 38.03% of the total costs spent on the boarder girl. This does not concur with what was given by the Ministry of Education Science and Technology (2003) the amount the government spent on a child secondary education is 34.6% of the average per capita consumption. The difference could be because of the introduction of the Free Secondary Education in 2008. The parents spent between Kshs 35,211.88 to Kshs 44,575.64 per year for a boarder girl. The parents incur 61.97% an indication that the parents with children in boarding schools pay more compared to day scholars. This was almost similar to what was given by the Ministry of Education Science and Technology, (2003) when it stated that households spent 65.4% secondary expenditure per pupil. While Ayodo, (2006) indicates that the household spent Kshs 25,000 to provide secondary education for boarding students. The cost given by Ayodo (2006) is lower than the current spending per household probably due to lapse of time.

Research Question 3

The research question responded to was: What are the cost effectiveness ratios of educating girls in day and boarding secondary school?

To address this research question the study established the costs of educating girls in day and boarding secondary schools and their performance in Kenya Certificate of Secondary Education in 2010. The costs of educating the girls were as shown in Tables 4.12 and 4.17; and their performance Table 4.18. This study used the following formula by Cellini (2010) to find out whether it was cost effective to educate a girl in day or boarding school.

$$\text{Cost-Effectiveness Ratio} = \frac{\text{Total Cost}}{\text{Units of Effectiveness}}$$

The costs effectiveness ratio was arrived by adding all the direct private and social costs in each school for the day scholars and boarders. It was then divided by the academic performances in Kenya Certificate of Secondary Education in terms of mean scores. According to this study, the cost effectiveness Ratio was arrived at by using the following formula,

$$\text{CER} = \frac{\text{Cost of Educating a Secondary School Girl}}{\text{Mean scores in Kenya Certificate of Secondary Education Examinations}}$$

This study used the costs incurred by the government on the teachers and the amount paid towards the education of each child. It also included the amount the parents pay on school fees and the child personal effects. Cost effectiveness ratios for educating girls in day and boarding secondary schools were calculated using the formula by Cellini (2010). For example for school "A", the Cost Effective Ration for educating a girl in day secondary school was calculated as follows: The total

Table 19. Direct Social Costs in Kenya Shillings

| Number of teachers' | Amount Paid to the teachers | Total (Kshs) |
|---------------------|-----------------------------|----------------|
| 6 | 19,500 x 6 | 117,000 |
| 4 | 10500 x 4 | 42,000 |
| Grand total | | 159,000 |

Table 20. Cost Effectiveness Analysis of educating a Day Scholar Girl in Kericho District

| School | Costs | Performance | CER |
|--------|-----------|-------------|------------------|
| A | 37,112.00 | 2.00 | 18,556.00 |
| B | 48,235.65 | 3.33 | 14,485.18 |
| C | 52,657.32 | 4.50 | 11,701.63 |
| D | 43,595.57 | 3.60 | 12,109.88 |
| E | 60,095.16 | 3.50 | 17,170.05 |

costs of educating the girl is divided by the girls performance in a given year in Kenya Certificate of Secondary Education. In this case the total costs were arrived at by adding direct private costs to direct social costs as illustrated herein, that is (Table 19):

$$\begin{aligned} \text{Average salary of each teacher} &= \frac{159,000}{10} \\ &= \text{KSH.15,900} \end{aligned}$$

The amount paid to teach each child was arrived as follows:

$$\begin{aligned} &= \frac{\text{Average pay per teacher}}{\text{The entire students' population}} \\ &= \frac{15,900}{250} \\ &= \text{KSH.63.6 per month} \end{aligned}$$

Therefore the pay for the year = 63.6 x 12 = KSH.7, 632 per annum.

Direct Social Costs = teacher salary + Free Secondary Education fund per girl

$$\begin{aligned} &= \text{KSH. 7,632} + \text{KSH.10, 265} \\ &= \text{KSH.17, 897} \end{aligned}$$

Direct Private Costs = School fees paid directly to the school by the parents and the money

Spent on the girl as parental obligation:

$$\text{KSH. 9,400} + \text{KSH. 9,815} = \text{KSH. 19,215}$$

Cost Effectiveness Ratio =

Direct Social and Private Costs
KCSE mean score for 2010

$$\begin{aligned} &= \frac{19,215 + 17,897}{2} \\ &= \text{KSH. 18,556} \end{aligned}$$

For all the schools A to E the Cost Effectiveness Ratios were as shown in Tables 20, 21 and 22 for both day scholar girl and boarder girl.

Table 20 gives the cost effectiveness ratio of day scholar girl in five secondary schools.

It is ranging from Kshs 11,523.85 for the lowest to Kshs 18,556 for the Cost Effectiveness Ratio highest day school. This indicates that cost effectiveness differ in the five schools depending on the schools charges.

Table 21 gives the costs effectiveness ratio of boarder in five schools derived by relating the costs and performance. It ranged between Kshs 14,967.88 to Kshs 21,422.45 for the lowest to the highest respectively. Cost effectiveness ratios also vary in the sampled schools, this also depends on their charges and the location of the school.

Table 22 provides cost effectiveness ratios of the five schools. School A used Kshs 18,556 to achieve the mean score of 2.00 for dayscholars and Kshs 17,299.30 to achieve a mean score of 3.07 for boarders. For school B it costed Kshs 14,485.18 to achieve the mean score of 3.33 for dayscholars and Kshs 14,967.58 to achieve the mean score of 4.10 for boarders respectively. School C used Kshs 11,701.63 to achieve the mean score of 4.50 for dayscholars and Kshs 21,422.45 to achieve a mean score of 2.95 for boarders. School D used Kshs 12,109.88 to achieve mean score of 3.60 for dayscholars and Kshs 16,560.69 to achieve a mean score 3.91 for boarders. For school E the government and parents used Kshs 17,170.05 to achieve the mean

Table 21. Cost Effectiveness Analysis of educating a Boarder Girl in Kericho District

| School | Costs | Performance | CER |
|--------|-----------|-------------|------------------|
| A | 53,108.88 | 3.07 | 18,440.58 |
| B | 61,368.29 | 4.10 | 14,967.88 |
| C | 63,196.21 | 2.95 | 21,422.45 |
| D | 64,752.28 | 3.91 | 16,560.69 |
| E | 75,395.80 | 3.82 | 19,737.12 |

Table 22. Cost Effectiveness Analysis of educating Girls in Day and Boarding Secondary School in Kericho District

| School | Day scholars CER | Boarders CER |
|----------------|------------------|------------------|
| A | 18,556.00 | 18,440.58 |
| B | 14,485.18 | 14,967.88 |
| C | 11,701.63 | 21,422.45 |
| D | 12,109.88 | 16,560.69 |
| E | 17,170.05 | 19,737.12 |
| Average | 14,804.55 | 18,225.74 |

score of 3.50 for dayscholars and Kshs 19,737.12 to achieve the mean score of 3.82 for boarders respectively.

DISCUSSION

Head teachers in Kericho District had enough experience to give all the required information on the social and private costs of girls in their schools. They were also able to give factors that affect the performance of the girl child. The findings also show that most heads of departments had the required experience in teaching as they were deployed almost immediately after employment as heads of their departments in their schools. Seventy one point four three percent of the day scholars resided far from their schools. This implied that they left their homes very early and reported back very late. Such long distances could affect their performance. It also implied that for them to attend tuition on time they should have had good means of transport. This implies that most of the girls would have opted to board if they had money. With this kind of lifestyle, these students would always be fatigued in class and would not lack concentration on their studies hence affecting performance. This was an indication that the boarder girls boarded because they were able financially unlike the day scholars who came from the same distances. The students boarded in schools because of the distance they covered every day trying to reach school. Most of the girls were at the right age of being in secondary education with the highest percentage being 18 years. The other students who were 19 years and above were students who might have come back to school to repeat or they started school later or had

benefited from the free secondary education policy. The other reason for this trend is that some of these girls could have dropped out at some point due to other reasons like teenage pregnancies, fee problem and family problems. For those who were 17 years and below could be the students who started school earlier before the right age which is 6 years (Republic of Kenya, 1964). Some schools charged more fees compared to other schools because the schools were situated in different places and the standards of living were different. For example, schools found a long the high way and next to the town centre were more costly compared to the schools in the rural areas and the ones far away from the highway. The variation was also due to variation in lunch and private tuition levies. The parents come up with the charges for these during the Parents Teachers Association forum. The District Education Board then approves these charges together with Parents Teachers Association project levies. These findings do not concur with those of Jagero (2010), as the current study found that the amount paid for Parents Teachers Association was Kshs 2,000 while Jagero's (2010) findings that payments were Kshs 2,650. This difference was due to the fact that Parents Teachers Association funds, are not standardized. For personal emoluments it concurred with Jagero's study, the parents did not pay personal emolument. The amount paid for lunch on average according to the study was Kshs 7,520. It varied from one school to another due to differences in the cost and quality of the food the schools offered to the students. This study established that the cost of private tuition was on average Kshs 1,700. This finding differed from Jagero's (2010) finding that the cost of private tuition was

Kshs 1,100 in Kisumu District. This study, found that there was variation on what the government spent on the girl's education. The variation in the costs from one school to another was because of the teachers' range of salaries. Thus some teachers earned more than others because of their higher grades and more teaching experience. The other reason was the variation in population of the teachers and the students. The services offered by the teachers to the students differed in many ways not just necessarily in class but also in co-curricula activities and other aspects during the life of a child in their secondary school. The government expenditure on the border girl ranged from Kshs. 17,897 to Kshs. 30,820. This amounted to 38.03% of the total costs spend on the border girl. Some schools charged quite low levies because of the location and the cost of living in the locality. These schools were also self-reliant, that meant they produced most of the required foodstuffs. The other schools that charged highly because they were either located in town Centre or along the highway or for other reasons. School 'E's high charges was due to accumulated debts and constructions going on hence the school had many demands leading to varied charges. The variation also in the costs from one school to another was because of the teachers' range of salaries whereby some earned more than others because of their higher grades and long teaching experience while others earned lower because of lower grades and few years of teaching experience.

On average, the government and the parents required Kshs 14,804.55 to achieve mean score of 3.19 for the day scholars and Kshs 17,997.49 to achieve mean score of 3.59 for boarders. This study focused on the costs effectiveness analysis of educating a day scholar and a boarder girl in mixed day and boarding secondary school. It agrees with the findings of Jagero (2010) Ngware et al (2007) and the Republic of Kenya (1988 and 2004) which found that it was more cost effective to educate a girl child in day school than in a boarding school. It will be cheaper for the government and the parents because less will be required to improve a grade in day school compared to a boarding school whereby more money is required to improve the same grade. Woodall (2004), states that it is desirable to choose those alternatives that are least costly for reaching a particular objective or that have the largest impact per unit of cost. This agrees with the findings of this study. Hence it will be wise to take a child to a day school because it is less cost effective compared to a boarding school. The mean scores were almost similar for both day scholars and boarders. The study further sought to establish the Efficiency Ratio in order to compare the two approaches or systems of educating the girl child. Cost effectiveness is an efficiency measure for improving two systems and to calculate the Efficiency ratio the formula by Levin (2002) was used, that is:

$$\text{Efficiency Ratio} = \frac{\text{Cost Effective Ratio of day scholar girl}}{\text{Cost Effective Ratio of Boarder girl}}$$

If the Efficiency Ratio = 1 then both systems or approaches are equally efficient

If the Efficiency Ratio > 1 then day scholar girl approach is less efficient.

If the Efficiency Ratio < 1 then day scholar girl approach is more efficient.

$$\text{From Table 22, the ER} = \frac{14,804.55}{18,225.74} = 0.8123$$

Since Efficiency Ratio is less than 1, educating a girl in a day secondary school was more efficient than in a boarding secondary school. Nevertheless, the teaching service offered by the teachers is not dependent on the salaries paid.

CONCLUSION

The direct private costs paid by the parents directly to the school were Kshs 10,540 on average. The costs varied from one school to another, variation was because of the place where the school was situated and the requirements in that particular school. The direct private costs incurred by the parents on the girls' personal effects, transport and other requirements varied from one school to another. It ranged between Kshs 8,302 and Kshs 19,932. The government on average spent 42.46% of the direct social costs on the girls' tuition. The amount the government paid was the same in all the schools. The total amount spent by the government on girl child was Kshs 24,174.67 on average though there was variation from one school to another because of the teacher pupil ratio. It ranged from Kshs 17,897 to Kshs 30,820.16. The average total cost paid direct to the school per border girl child was Kshs 22,476.20, but it was different from school to school. The difference was that, the cost of living and quality of food was different from one school to another. According to the Ministry of Education, (2008) the standard fees structure for boarding students to be paid by the parents was Kshs 18,627 this was higher compared to the amount the parents paid in some schools. Direct private costs paid to the school by the parent were Kshs 20,802.80 (52.81%) of the total direct private cost. The costs incurred by the parents towards their children expenses or personal effects were Kshs 18,586.63 (47.19%). This amount was spent on buying mattress, shoes, soap, tissue paper, uniform, pocket money, transport and other

personal effects. It differed from one school to another and it ranged from Kshs 15,926.91 to Kshs 21,435.89. The difference in costs was because of parents' financial ability and the requirements in some schools. On average, the government and the parents required Kshs 14,804.55 to achieve the greatest output mean score of 3.19 for the day scholars and Kshs 17,997.49 to achieve the greatest output mean score of 3.59 for boarders. It was therefore cheaper to educate the girl child in a day school than a boarding school.

RECOMMENDATIONS

The government should have plans of having more day schools to educate more girls as it is more cost-effective.

The parents should not discourage their girls from going to a day school because it is cheaper for them since most parents live below the poverty line.

The government should, where possible convert some boarding girls schools to day schools.

The government should increase funding in boarding secondary schools to make it affordable.

The girls should be given a chance to make a choice between boarding school and day school because it helps them have a positive attitude towards schooling.

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