DETERMINING SCHOOL OPTIMAL SIZE AND INTERNAL EFFICIENCY IN SECONDARY SCHOOL A CASE OF PUBLIC SECONDARY SCHOOL IN TIRAP DIVISION MARAKWET DISTRICT

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RESEARCH REPORT SUBMITTED IN PARTIAL FULFILLMENT FOR THE DEGREE OF BACHELOR OF EDUCATION IN SCIENCE OF KAMPALA INTERNATIONAL UNIVERSITY.

APRIL 2008
DECLARATION

I Wilfred Kiprono Kemboi do hereby declare to the best of my knowledge that this research project is my original work and that it has never been submitted to any university or any other Institution for an award of degree or its equivalent.

The literature and citations from other people’s work has been dully referenced and acknowledged in the text, footnotes and bibliography.

Sign: .......................... Date: ........../........../...........

WILFRED KIPRONO KEMBOI
APPROVAL

I do recommend this work as the Supervisor with authority given unto me for submission in relation to the award of a Degree in Education Science.

Sign: ..................................................  Date: ..................................................

Mr. Kimwise. Alone
DEDICATION

To my beloved wife Rose and our dear children Faith and Mercy.
ACKNOWLEDGEMENT

I would like to thank all those who helped in one way or another in the course of this project. The preparation of the same has been a challenging task made possible through a number of individuals.

My special thanks go to Mr. Kimwise who was my supervisor. I attribute the success of this report to his tireless effort and hard work.

Thank you all and may our lord bless you.
DEFINITION OF TERMS

• Optimal size
  most efficient School size.

• Recurrent expenditure
  The cost of running a school.

• School size
  Total student population in a school.

• Division
  An area under a district officer

• Internal efficiency
  The maximum use of resources allocated to a school to achieve the maximum output.

• Long run
  A period of time for all inputs to be varied.

• Exogenous inputs
  Inputs that the school has no direct control over.

• Endogenous inputs
  Inputs that the school has direct control over.
ABSTRACT.

The purpose of this study was to determine the optimal school size that enhances internal efficiency in operation of secondary schools in Tirap division. The study was also aimed at determining the minimum school enrollment beyond which the unit cost of education increases and below which it is fiscally uneconomical to operate it.

The study was to provide important information to educational planners and policy makers to determine the optimal size of secondary schools. Both theatrical and conceptual frame work was used in the study. A theoretical frame work of a cost functional in education was used. In order to determine the optimal school size of the equation

\[ X_1 = a + bx_2 + cx_2^2 \]

was used.

A conceptual frame work that showed how optimal school size was determined through appropriate combination of school inputs.

Literature related to the study was reviewed. It was studied under the school size.

A research design was descriptive. Data for this study was collected from the population of four secondary schools in the division. The four schools were sampled out for the study. A pre-test of the research instrument used was done to attest its validity and reliability. The research instrument used was a questionnaire which was completed by the principals for the four sampled schools. The findings of this study revealed that the school optimal size in Tirap division is one 174 students. In the view of this finding, it is recommended that school managers should put in mind the school optimal size while planning for education.
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CHAPTER ONE

BACKGROUND OF THE STUDY

1.0 Introduction

This chapter looks at the background of the study, statement of the problem, purpose of the study, objectives, research questions, scope, significance and limitations of the study carried out.

1.1 Background

As enrollment increased it has been difficult and more often impossible for education system to maintain the level of quality and efficient of the pre-expansion of facilitates, classroom equipment and teaching materials have not kept place with the expanding number of students.

Education uses up scarce resources, both private and public on a gland scale and studies should be done to access ho will they are being used. The government and household face various. Financial constraint in finding education in this country. The high cost of education is forcing shareholders to look for ways of ensuring that the scarce resources are efficiency utilized. Resources can usually be combined in variety of ways to achieve the same results, but until different costs, some combination of imputes may give a better output until lower or the same cost.
Ominde report point out “A school should be large enough to secure the maximum e.g. economies in building and equipment” (Republic of Kenya 1964:72). The third national department plan on the efficiency utilization of educational resources pointed out the basis of existing institutional rather than building new once, it state in the long run the government intents, to make a three school the maximum size of a school (Republic of Kenya 1978:419).

Kenya like most developing countries faces a great shortage of trained manpower at all levels and they wish to replace expatriate workers as quickly as possible.

In the former colonial territories the local people had often received a little public sponsored education and they had to make up this by seeking further education in the internal efficiency of the entire educational system” (Republic of Kenya 1989-1993:16) from the above the study came out.

1.2 Statement of the problem

Though the government has been concern with ensuring efficient utilization of education resources in schools, there has been no systematic study done on utilization of resources, the concern of this study will be to determine the internal efficiency in terms of optimal enrollment in secondary schools in the area of the study.

1.3. Purpose of the study

In using cost function to analyze secondary schools optimal enrolment, the study was to do the following;
1. Use data on school expenditure to determine the school optimal size

i Find out there existed internal economies of scale in the secondary schools.

ii Draw conclusion and recommendations that could help policy makers and implementers to lower the unit cost in operation of secondary schools.

1.4. Objectives of the study

The specific objectives that the study was expected to achieve included:

i) To determine the optimal school size

ii) To find out if internal efficiency exist in secondary schools in the area of study

iii) To establish the relation between expenditure and size

1.5. Research questions

The study was to address the following research questions:

i. What school size was considered optimal enrollment?

ii. What internal efficiency exists in secondary schools?

iii. What is the relationship between school expenditure and school size?

1.6. Scope

Tirap division was one of the seven divisions that form Marakwet district; it borders Tot division, Kapyego division, Tunyo division and Kapsowar division. The division had four secondary schools of which one was a provincial secondary school while the rest were district
The school are situated near the main road from Eldoret town to Kapenguria town.

1.7. **Significance of the study**

The study is to provide useful information to educational planners and policy makers to determine the optimal size of secondary schools.

Head teachers will be able to understand the major determinants of efficient resource allocation in schools.

Board of governors and the school administrators would be able to determine whether efficiency exist in their schools.

Principals would be able to know how much it would cost the school if it had to enroll more students.

1.8. **Limitations**

Obtaining the information on school finances was not easy. Data collated may not have been accurate.

Prices of commodities keep on changing. This was because the economy was not static.

There was lot of dropouts and transfers among the students in this area of the study.

The instrument used, Principals questionnaire was only filled by the Head teachers.

The area of study was small.

The infrastructure of the area was poor.

Being self-sponsored, finance was a limitation.
CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

This chapter reviewed literature related to study. It dealt with what others had done as far as the determination of school drop outs is concerned. It was organized under the following sub-headings; school size, internal efficiency and theoretical frame work and conceptual frame work.

2.21 School size.

A number of studies have been conducted to determine the school size that is quite efficient. Some of them concluded that small school sizes are more effective than large ones. One of the most comprehensive of these studies was conducted by Cohn and Hu (1973) examined cost of secondary school in Michigan State of United state of America, from the findings of the study, it was concluded that significant economies of scale existed at varying levels. In consistent with the theory of production, significant diseconomies of scale emerged only when the optimum size of a school was exceeded. These studies therefore pointed out the need for economies of scale were exceeded. These studies therefore pointed out the need for economies of scale in the operation of secondary schools. Mwendwa (1966) and Ngure (1975) studied the need for economies of scale in the operation of secondary school as a solution to lowering unit costs of education in Kenya.
Administration wants to increase it. Its economically important; according to them, this possibility of reducing school size below the optimal point is physically impossible in most schools and dropping the class size from 30 to 28 is not warranted when one achievements gains.

Ndiritu (2004) carried out a research in Kenya in which he established that optimal size for the school is the study was 400 students i.e. the most efficient (optimal) size for the school. At this point they will be efficient utilization of resources. He found out that at the optimal size the minimum amount that could be spent to produce a single output will be Kshs. 29, 787, 19. Any increase and cost of production will be high from his regressions.

2.2. Internal efficiency in schools

An area of interest arising out rapid educational expansion is the efficiency question. It is not unreasonable for scale stake holders and the government claimant of increasing proportions of national resources, the educational system has the obligation to see that within its accepted objection these resources are allocated and utilized efficiency.

Eicher (1984), in a world bank study of sub-Saharan Africa examined the prudential; for reducing unit costs as a way of increasing enrolment within an existing budget and secondary tapping private resources of financing education in the region. The study recommended that in order to reduce educational unit cost, there was need to improve the internal efficiency of educational stems and at the same time maintain or improve the quality of education.
The study Bennet (1972) looked at the operation of Makerere University in Uganda. It was observed that inefficiency existed and therefore marginal cost calculations were carried out. These marginal calculations led to the expansion of the university between 1966 and 1971.

Kirange (1986) examined research area needed to improve efficiency of the educational system in Kenya. The study pointed out various internal and external efficiency of an educational system.

Expenditures increase dramatically with a decrease in class size is to additional classroom, teacher, classroom equipment and material and administrations. Since on the basis of available data no optimum class size can be scientifically established as a function of education benefits decisions regarding class size are bounded by fiscal policy on one hand curriculum policy on the other hand. The former deals within the questions of cost - effectiveness of investment in optimally enrolled schools.

2.3 Theoretical framework

Educational is a production process which uses up limited resources that have opportunity cost that school have inputs and outputs and that one of their nominal purpose is to take human raw materials (i.e. children) and connect it into something valuable. The production function theory can be applied in education industry. A production function is a mathematical statement of the relationship between various inputs and outputs arrived at by trail and error analysis. Which suggest the best attribution of inputs needed to produce the output. The pressure for efficiency not only entails the minimization of cost the most
efficient optimal output level. School operate under several variable numbers of teacher, class size, school size, home background, social, economic and cultural factors of students which affect educational output.

For schools to produces a certain level of output it has to combine inputs in some proportions. To determine the internal efficiency of as a school, the cost functions are the long run need to be found. Out in utilization of resources, cost function analysis. Helps to shed light on the way total cost of inputs or their average. Cost changes in relation to this size of institution.

Students are a special kind of input that can be combined with other inputs to produce a maximum number of graduates. The educational resources are categorized into two exogenous and endogenous. Exogenous were inputs which school did not have direct control over. Endogenous inputs were the inputs which the school had direct control over and could therefore combine them appropriately, e.g. textbooks, classrooms facilities and class size among others.

Endogenous resources are divided into two variable and fixed inputs; variable inputs were those which could be altered within a short period of time e.g. textbooks, laboratory equipments e.t.c. fixed inputs that took a comparative longer time to acquire e.g. libraries, laboratories and classrooms, when those education resources were efficiently utilized they could determine the optimal enrolment size of a school. Those resources could dictate the number of students that could be admitted to a school. Those inputs were to be combined appropriately with the enrolled students to bring about optimal school size.
CHAPTER THREE

METHODOLOGY

3.0. Introduction

This chapter covers research design, population, sampling procedure, research instruments, validity, reliability, data collection procedure, and data analysis.

3.1. Research design

The researcher used descriptive research design. This was because it could describe the state of affairs as it existed. Kerlinger (1969) this approach was appropriate because the study would involve fact finding and enquiries of the most efficient size in secondary schools. Orodho (2003) observed that descriptive research was designed to obtain information concerning the current phenomena and where possible to draw valid general conclusions from facts discussed. This study sought to determine the optimal size that was most efficient.

3.2. Population

The four secondary schools in the division formed the target population of the study. The target respondents were the four principals of these schools.
3.3. Sampling procedure

Stratified random sampling and purposive sampling technique was used to select the samples for the study. Stratified random sampling was used to group the schools in different categories from each category then actual school was selected randomly in such away that each school could have an equal chance of being selected.

3.4. Research instruments

A principal’s questionnaire on school expenditure resource endowment and enrolment was used in the study. The questionnaire contained both structured and semi structured questions. The instrument was administered to the school principals.

3.5. Validity and reliability

Piloting was conducted to check the questionnaires content, structure, sequence, meaning and ambiguity of questions. The researchers pre-tested the instrument to ensure that respondence was providing the correct information in relationship with the objectives of the study. The researcher used split halt procedure to test the reliability of the principals. This was necessary because some explanation may be on how cost figures could be arrived at.

3.6. Data collection procedure

An introduction letter from Kampala International University was obtained to enable the researcher too administer questionnaire to the principals. The researcher then personally visited the schools to administer questionnaire to the principals. This was necessary because some explanations were necessary.
3.7. Data analysis

Before the actual data analysis, the gathered data was to be validated, edited and coded. During the validation process, the questionnaires were being checked to statistics. The data as tool was presented in a number of ways that was easy to interpret such as frequency distribution tables and regression equations.
CHAPTER FOUR
PRESENTATION, INTERPRETATION AND DATA ANALYSIS

1.0 Introduction

In this chapter, the researcher analyzed the findings of the study. The findings were presented in tables which showed category, frequency and percentages from the tally of each response. They were also presented in graphs, and a few were translated in pie charts. They all reflected responses from teachers and parent.

General information about the schools.

Table 4:0 School establishments

<table>
<thead>
<tr>
<th>YEAR</th>
<th>FREQUENCY</th>
<th>PERCENTAGE %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976-1985</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>1986-1995</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>1996-2005</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td><strong>4</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

From the table, 50% of the schools sampled in the division were established between 1986 and 1995, the schools established during this period were all missionary sponsored schools. One was a boy’s school. One of the sampled schools was established between 1976 and 1985 and is a harambee school. The other schools were established between 1996 and 2005 which were basically established through the constituency development fund (CDF).
Table 4.1: Sponsors of the school

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Frequency</th>
<th>Percentage%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission</td>
<td>3</td>
<td>75</td>
</tr>
<tr>
<td>Harambee</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

From the table 75% of the schools were funded by the church. The African inland church (AIC) and the Catholic Church are the only two churches that established schools in this region. The high number of church sponsored schools is because the area of the study is marginalized and ASAL and one of the sampled schools were tournament established through harambee and C.D.F.

Table 4.2: Student compositions

<table>
<thead>
<tr>
<th>Compositions</th>
<th>Frequency</th>
<th>Percentage%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>Boys</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>Mixed</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

From the table 4:3 two of the sampled schools were mixed schools. One girl school while the other a boy’s school.
Table 4.3: Operations of the schools

<table>
<thead>
<tr>
<th>Operation</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boarding</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>Partly boarding</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Day</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.4 reveals that 100% of the sampled schools were boarding. The reason behind this is the long distance between the schools contributed by low population density in the division this is also contributed to the poor infrastructure in the division of sampled schools there is no day or partly boarding schools. The reason is the parents are not committed to take their children to school.

Table 4.4: KCSE performances

<table>
<thead>
<tr>
<th>Mean score</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-12</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6-7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4-5</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>2-3</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>100</td>
</tr>
</tbody>
</table>
One of the indicators of internal efficiencies in secondary schools is KCSE performance. It measures the quality of education offered in the schools. Table 4:5 shows how the schools performed in KCSE in 2007. None of the sampled schools and in fact not one of all schools in the division had a mean of 6 and above in 2007. 50% had a mean between 4 and 5 while those with 3 and below were also 50%.

The table shows that there was a general poor perform in the sampled schools in 2007 KCSE. This shows that there is some inefficiency in the schools sample.

Table 4.5 Teaching Learning Resource in the School

<table>
<thead>
<tr>
<th>Physical resources</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical laboratory</td>
<td>1</td>
</tr>
<tr>
<td>Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>Biology</td>
<td>1</td>
</tr>
<tr>
<td>Library</td>
<td>3</td>
</tr>
<tr>
<td>Sufficient text books</td>
<td>2</td>
</tr>
<tr>
<td>Class rooms</td>
<td>4</td>
</tr>
<tr>
<td>W/shops</td>
<td>0</td>
</tr>
<tr>
<td>Toilets</td>
<td>4</td>
</tr>
<tr>
<td>Electricity</td>
<td>1</td>
</tr>
<tr>
<td>Water</td>
<td>4</td>
</tr>
<tr>
<td>Playing grounds</td>
<td>2</td>
</tr>
<tr>
<td>Dining halls</td>
<td>2</td>
</tr>
</tbody>
</table>

The sampled schools had one laboratory that was used for all the sciences practical lessons in the school. Two of them had chemistry laboratory and the other biology and physics
laboratory, none of the schools had a workshop, two of the sampled schools had sufficient
text books. This may have been the reason for the general poor performance of the sampled
schools. 1A 2007 KCSE in general, the schools in the division are poorly endowed with
learning resources and physical resources.

4:6 Major variables

The researcher used the following variables in the study, the student recurrent expenditure
which was taken as the dependent variables schools size, school size squared pre student
non human expenditure, average class size. The table below shows the analysis of the
variables used.

- Table 4:7 Major variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unit</th>
<th>Mean</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. School size</td>
<td>student</td>
<td>159</td>
<td>45</td>
<td>362</td>
</tr>
<tr>
<td>2. per student</td>
<td>student</td>
<td>159</td>
<td>45</td>
<td>362</td>
</tr>
<tr>
<td>Shilling recurrent</td>
<td>shillings</td>
<td>18850</td>
<td>15700</td>
<td>22000</td>
</tr>
<tr>
<td>Expenditure.</td>
<td>shillings</td>
<td>18850</td>
<td>15700</td>
<td>22000</td>
</tr>
<tr>
<td>3. Average class size</td>
<td>student</td>
<td>40</td>
<td>8</td>
<td>126</td>
</tr>
<tr>
<td>4. Per student non</td>
<td>shillings</td>
<td>1875</td>
<td>1500</td>
<td>2000</td>
</tr>
<tr>
<td>Human expenditure</td>
<td>shillings</td>
<td>1875</td>
<td>1500</td>
<td>2000</td>
</tr>
<tr>
<td>5. School size squared</td>
<td>student</td>
<td>40086</td>
<td>2025</td>
<td>131044</td>
</tr>
</tbody>
</table>

From the above table, the mean size for the sampled schools was 159 students where the
smallest school had 45 students and the largest school had enrollment expenditure was
sh.18850. The lowest was sh.15700 and the highest was sh.22, 000.
The class mean size was 40 students the school with the lowest class size was with and students while the highest was 126 students.

**Regression Analysis Results.**

Regression analysis is a type of analysis used when a researcher is interested in finding out whether an independent variable or variables (Mugenda and Mugenda 2003)

A multiple regression model of the form

\[ X_1 = a + bx + cx_2 + dx_3 + ex_4 + fx_5 \]

Was used: Where

- \( X_1 \) = per student recurrent expenditure.
- \( X_2 \) = School size
- \( X_3 \) = Average class size
- \( X_4 \) = per student non human expenditure
- \( X_5 \) = School size squared

This model was used to predict the variation of the dependent variable \( x_1 \) (per student recurrent expenditure) from the independent variables in the model.

It was best on the assumption that there was a cause effect relationship between the values of values of the variables both the dependent and independent. The linear assumption was made in all variables except for school size that was assumed to have parabolic relationship.
with the dependent variable. This assumption was held in order to investigate the long run. Cost curve in the public secondary schools in Tirap division.

Table 4.8 shows the correlation co-efficiencies. The variable depicts the relationship between them. The correlation techniques were sued to analysis the degree of relationship between variables.

<table>
<thead>
<tr>
<th></th>
<th>X₁</th>
<th>X₂</th>
<th>X₃</th>
<th>X₄</th>
<th>X₅</th>
</tr>
</thead>
<tbody>
<tr>
<td>X₁</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X₂</td>
<td>-0.8000</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X₃</td>
<td>-0.8000</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X₄</td>
<td>0.4000</td>
<td>-0.8000</td>
<td>-0.8000</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>X₅</td>
<td>-0.8</td>
<td>1</td>
<td>1</td>
<td>-0.8000</td>
<td>1</td>
</tr>
</tbody>
</table>

Where:

X₁ = per student recurrent expenditure

X₂ = School size

X₃ = Average class size

X₄ = per student non-human expenditure

X₅ = School size squared.
Regression analysis assumes that

a) Each independent variable is linearly related to the dependent variable.

b) The observations are independent of each other which imply the sample was drawn at random.

c) The values are normally distributed around the mean at each level of x in the population.

From table 4-9 it is shown that there is a negative correlation between per student recurrent expenditure with the school. The co-efficient of school size square was positive this meant that the long run cost curve was parabolic. This curvilinear curve was cannot be increased indefinitely. There was appoint in the enrolment beyond the optimal school size where the per student recurrent expenditure could start to rise at this point internal inefficiencies could be realized which meant that further enrolment could result to increased costs. The cost functions for the schools was given by: \[ X_1=31180 -10.55X_2 - 99.67X_3 +0.28X_4 +0.0303X_5 \]

**Table 4.9 Regressive linear Cost function**

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Co-efficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>X2</td>
<td>-10.55</td>
</tr>
<tr>
<td>X3</td>
<td>99.67</td>
</tr>
<tr>
<td>X4</td>
<td>0.28</td>
</tr>
<tr>
<td>X5</td>
<td>0.0303</td>
</tr>
<tr>
<td>Constant</td>
<td>31,180</td>
</tr>
</tbody>
</table>
From table 4-9 the regression coefficient for the school size ($X_2$), was negative this implied that as the independent variables increases and vice versa.

The negative coefficient (-10.55) of the school size implied that has the school size was increased, to the optimal school size the limit cost decreased. The optimal school size for the schools in the study was 174 students that was the most efficient school size for the schools in the division in 2007. The cost of educating a student in a school that was operating at the optimal school size (174 students) was ksh.30261.36. The mean enrolment of the sampled schools was 159 students at this enrolment; the unit cost of educating a student was Ksh 30268.56: A school could save ksh. 690 per student if it had to increase its enrolment from 159 to 174 students. This was to translate to ksh.1200.60 to be saved. The cost of educating students by a school with an enrolment of 250 was ksh.30436.26 which was ksh 167.69 more than a school that was operating optimally. This implied that in either way, internal efficiencies were experienced by schools that had their enrolment above or below the optimal size (174 students). An increase in school size beyond 174 students could lead to diseconomies of scale as depicted by u-shape
CHAPTER 5

SUMMARY, CONCLUSION & RECOMMENDATION

5.0 Introduction

This chapter summarizes the whole research process. It first provides a brief summary of the whole study with particular reference to the research problem methodology results, the main contribution of the research and recommendation for further work. It provides a summary of the main findings of the study, conclusion and recommendations.

5.1 Summary

This study was about the determination of optimal school size and existence of internal efficiency in public secondary schools in Tirap division in 2007. The variables used in this study were per student recurrent expenditure, school size, school size squared, average class size, and per student recurrent expenditure. The per student recurrent expenditure was taken as dependent variables while the rest were taken as independent variables.

On the general information about the schools 25% of the sampled schools were established between 1976 and 1985, 50% were established between 1986 and 1995 and another 25% were also established in 1996. The researcher found out that 75% of the schools were founded and sponsored by the missionaries and on student composition there were more boys than girls attending schools, in the division, mixed schools were 50% while boy’s schools formed 25% and there is no day or partly boarding schools in the division.

KCSE performance being an indication of internal efficiency is schools, 2007 KCSE results depicted that 50% of the schools had a mean grade of 4 and above the KCSE performance.
in the division is poor. This may be attributed to poverty and cultural practices like female genital mutilation and circumcision. The researcher found out that most students were absent from schools had the rational physical facilities required in the schools.

The school mean was 159 students on average class size; the mean was 40 students with a minimum of 8 and maximum of 126 students.

On the regression analysis results, it was found out that the correlation between the per student recurrent expenditure (dependent variable) and the school size was negative this showed that the two variables were inversely related such that when one variable increased the other decreased. As the school size increased the recurrent expenditure decreased and vice versa. The correlation co-efficient of class size was -0.8000. The correlation coefficient between school sizes squared and non-human per student expenditure was -0.800. This depict that they were inversely related indicating that as the school size squared is increased: the non human expenditure reduced and vice versa.

The model used to analyse data was given as

$$X_1 = a + bx_2 + cx_2^2 + dx_3 + ex_4 + fx_5^2$$

The cost function for the sampled schools was given as

$$X_1 = 31180 - 10.55x_2 - 99.67x_3 + 0.28x_4 + 0.0303x_5^2$$

The optimal school size was 174 students. At optimal enrolment size the unit cost for educating a student was Ksh 30261.66, the correlation co-efficient of the school size was positive which implied that the schools could not increase enrolment indefinitely because when enrolment went beyond 174 students, optimal school size, the cost of operating stated
to increase hence inefficiency. Most of the sampled schools did not operate at the optimal
size hence were a lot of internal inefficiencies in the sampled schools.

5.2 Conclusion

Optimal school size in the most efficient school size. it is the enrolment size in which the
unit cost of operating is minimal. The optimal school size in Tirap division in 2007 was
174 students most schools were not operating optimally because there were cases of over
and under enrolment. A school had a student population of 362 students. In such a case the
resources at their disposal were over utilized hence creating some shortages.

Another case was a school which had 45 students this was a series case of under enrolment
resources were underutilized hence internal inefficiencies were realized in both cases
above. Another indicator of internal inefficiencies experienced in the division was depicted
by the poor KCSE performance in the division in 2007.
5.3 Recommendations

The principal’s stakeholders and school managers should put in mind that the optimal school size while planning for education provision. They should be guided by studies of this kind in their planning to avoid inefficiencies and diseconomies of scale. Schools that are under enrolled should be matched with others in order to attain the optimal size because it is very expensive to run such a school. Schools that are over enrolled (above the optimal size) should create more streams that established more schools in order to enjoy economies of scale.

The government should provide the minimum physical human and financial requirements to schools tournament intervention on the school size should be based on well research studies according to the unique feature of all schools and divisions.

5.4 Suggestion for further research

Research on various categories of secondary schools should be undertaken. Research on Boarding schools, Day schools, Provincial schools and National schools should be undertaken separately. Research also on all levels of education should be carried out from primary level secondary level, tertiary level and university levels of Education.
REFERENCES


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Mugenda O.M. Mugenda A.G (1999), Research Methods Qualitative and Quantitative Approaches, Nairobi :Act Press,

Mwenda, K. (1966),”constraint and strategy in planning education”, in Sheffield T.J. (Ed), educational employment and rural development, Nairobi: EUP house..
## APPENDIX A

### BUDGET

Table A 1

<table>
<thead>
<tr>
<th>particulars</th>
<th>Amount (kshs)</th>
</tr>
</thead>
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<tr>
<td>Typing and secretarial duties</td>
<td>5,000</td>
</tr>
<tr>
<td>stationary</td>
<td>1,000</td>
</tr>
<tr>
<td>photocopy</td>
<td>1,000</td>
</tr>
<tr>
<td>Transport</td>
<td>8,000</td>
</tr>
<tr>
<td>subsistence</td>
<td>6,000</td>
</tr>
<tr>
<td>miscellaneous</td>
<td>5,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>26,000</strong></td>
</tr>
</tbody>
</table>
### APPENDIX B

### TIME FRAME

**TABLE A 2**

<table>
<thead>
<tr>
<th>activity</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Literature review and proposal</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2. Drafting the final copy</td>
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<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Typing and binding</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Handing in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>
Dear, respondents,

This questionnaire is designed to gather information in the optimal enrolment size and efficiency in secondary schools in Tirap division, this study is being carried out in partial fulfillment of the requirement for bachelor of education in Kampala international university. The formation in this questionnaire will be treated with confidentiality and at no instance will it be revealed to anyone. The information will not be used for any other purpose other than of this research. Your assistance in facilitating the same will be highly appreciated.

General information about the school

1. Which year was the school established?..............................

2. Is your school public or private?...................................

3. Is your school day or boarding?..................................

4. What was the total enrolment of your school in 2007?..........

5. How many classroom do you have?.................................

6. Are they sufficient?..................................................

7. Do you have sufficient dining hall?...............................

Recurrentment expenditure incurred by the school in 2007
8. Total amount of expenditures on school BOG employees Kshs. 


10. Tuition expenditure 

11. Capital assets (e.g. Building) Kshs. 

12. Other activity (specify) Kshs. 

13. Sources of finance  
   
   a) 
   
   b) 
   
   c) 
   
   d) 
   
   e) 

14. In your opinion, do you think the school ensures efficiency in its administration?