

MEASURING INTERNAL EFFICIENCY OF SECONDARY SCHOOLS IN EJIGBO LOCAL GOVERNMENT AREA, OSUN STATE

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Abstract

The transformation of input into output is important function of any school system and this to a great extent determines the performance of a school. This study was carried out to determine the internal efficiency of secondary schools in Ejigbo Local Government Area of Osun State. The study adopted a survey research design using micro level data on educational efficiency in the Local Government Area. Specifically, the study intended to determine the progression rate, cost of wastage, wastage ratio and students' academic performance. The population for this study comprised of 16 secondary schools, while eight schools were selected for the study. A checklist tagged: "Educational Cost and Internal Efficiency Checklist" (ECIEC) was used to collect data for the study. The study showed that there was fluctuation in enrolment between 2007 and 2012 and that students' academic performance was found to be highest in year 2010 with a weighted average of 65%. The average progression rate was found to 99.68% while the wastage ratio was found to be 1.17. Furthermore, the percentage of the cost of wastage was found to be 1.70% of the total cost of wastage. The study concluded that the secondary schools in the Local Government Area were efficient. Based on the finding of the study, it was therefore recommended that the secondary schools should maintain the internal efficiency attain and that target should be set on the need for future improvement in efficiency.

Keyword: Internal efficiency, Progression rate, Wastage rate, Secondary school

Introduction

An education system is said to be efficient if maximum output is obtained from a given input, or if a given output is obtained with minimum possible input. Inputs and outputs have to be somehow valued so that they may be aggregated; and usually prices are used to perform this valuation function. The problems of measuring efficiency in education however are considerable. They mainly form the difficulties in measuring educational output as well as quantifying the relationship between inputs and outputs. How educational output is measured depends of course, on the nature of the objectives of the educational system depending on the philosophical, political or analytical view point adopted, the objective may differ considerably.

Educational statisticians and planners, while recognizing the adversity of objectives of education, often need to measure the output of the school system in a simple way. One such approach consists of considering the output of a given cycle of education as number of pupils who complete the cycle (graduates).

The study of internal efficiency between inputs and outputs among educational system has been examined by Coleman (1966), Plowden (1967) and Ryan (1973). These studies show that the current technologies of formal education are inefficient in developed countries. Wastage in the form of high failure and repeater rates, low teacher productivity etc. are

manifestation of internal efficiency in the school system. One often over looked way of sourcing fund for education is therefore to improve the efficiency profile of the school system (Ogbodo,1999). In another study conducted by Durosaro (1985) on resource allocation and internal efficiency of secondary school in the then Bendel State between 1975 and 1983 the findings of the study revealed that the wastage rate on secondary education recurrent expenditure were estimated to be 19.19% of the total recurrent expenditure. Out of this, repetition accounted for 4.05%, 0.68% to dropout and 14.45% to failure of students. Durosaro (1985) also discovered that total recurrent expenditure and wastage rates on secondary schools in Bendel State showed significant correlation over the period of study, thus, as the resource allocation increased, wastage rate decreased.

In a related study, Adeogun (1995) examined the internal efficiency of junior secondary education in Oyo State between 1986 and 1990. The study revealed that the system was internally efficient, because the wastage ratio decreased from 1.16 in 1988 to 1.07 in 1990 and wastage rate decreased from 8.7% in 1988 to 4.7% in 1990. Patwari (1981) in his study of measure of educational efficiency through a cohort analysis, discovered that outputs of educational system are certificated school leavers who have passed through a basic input of students' years. His analysis was based on the hypothetical flows of 1000 pupils through the primary level in Ibadan from 1973/74 to 1981 and their various promotion, repetition and dropout rates. He therefore concluded that maximum efficiency is never achieved in any country's educational system as a result of wastage in respect of pupils who repeat some of the grades. Adeyemi (1989) conducted another study on resource situation and internal efficiency of technical colleges in Nigeria. He made use of twenty-four technical colleges in the sampled states. The findings showed that the technical college were highly internally efficient and wastage ratio was 1.04 while wastage rate was 2.7%.

In another study of Adeogun (1999) on the analysis of internal efficiency of technical colleges in Lagos State. He used the reconstructed cohort method for two sets 1994-96 and 1995-97. and found that 1.00 and 1.08 quotient of the wastage ratios obtained for the two sets of cohort used for the study established that fact that the technical colleges in Lagos State was perfectly internally efficient.

Adeyemi and Ogunsola (1999) carried out a study on the efficiency in primary school in Esan West Local government area of Edo State. They used the progression rates and average progression rates to determine the wastage ratio, they found that the actual input-output ratio is 9.22 while the wastage ratio is 1.53. They therefore concluded that with the wastage ratio of 1.53 that is 0.53 deviation from the ideal is far from 1 and that it takes 9.23 pupil – years for a six year course, the public primary school in the local government area were not internally efficient.

Theoretical Context

Educational internal efficiency can be measured using various measures as identified by scholars. But the measure differ according to scholars. In the opinion of Adepoju (1998), educational efficiency can be measure using the inputs and the outputs of educational system. He further argued that in order to measure the efficiency of the educational system, one has to determine the inputs into the education production process and the outputs of such

system. Akinwumiju (1995) opined that the educational efficiency has two internal dimensions-the flow of students through the system with a minimum of wastage; and the quality of learning achieved in the system. He stressed further that wastage in the flow of students is manifested quantitatively in the form of drop out and repetition,, while the quality of learning is determined by the inputs and **outputs of the education system**.

In introducing an important measure of internal efficiency, Shehan (1973) saw efficiency as the degree of waste of resources within a given level of education. It is seen in terms of either the inputs or outputs system. That is to say an efficient oriented system is said to be one that produces required benefits and minimizes or avoids in its entirety waste. Emphasizing the importance of waste minimization as measure of internal efficiency, Webster argued that efficiency is the productive of desired effects especially productive operation as measured by a comparison of production to cost. He therefore concluded that an efficient system is one which produced quality product with low cost.

Ajayi (1999) showed that students' academic performance is a quality criterion to output measurement of educational system. In his study, he categorized students' academic performance into three.

- i. Candidate with 5 credit pass and above
- ii. Candidate with 4 credit pass and above
- iii. Candidate with less than 4 credit pass

The categorization is based on the fact that at least 5 credits in the SSCE is required for university admission, while four credits SSCE is required for admission into Polyphonic and Colleges of education. Moreover, employer of labour demands similar qualification from the school leavers for employment. Experts have also agreed that two measures are used as an expression of the efficiency of resources management in education. These are:

Cohort analysis: It is the historical analysis of a group of students entering the school system in a particular year and the through educational circle. It is a model used to measure the internal efficiency of the educational system.

Wastage: The major techniques used in measuring the production capacity of the educational system is to find out the number of students in the various categories during and at the end of the stipulated duration of study. Some of those who were enrolled at the initial grade may not end the course due to some reasons. This input-output model enables us to determine the degree of efficiency of the internal system of education. The graduate of the education is the final output which reflects the ultimate efficiency.

Studies have shown that cost and efficiency have a link. O'Donoghue (1971) pointed out that for an educational system to be efficient using cost variables as measures. The following conditions must be satisfied.

- i. **Cost-effectiveness:** the product of an educational system must justify the cost accrued on them.
- ii. **Cost minimization:** this means that in a competitive climate or situation the system must thrive to achieve cost-minimisation as failure to do so would lead the

competitors selling at lower price and would ultimately force the inefficient firm out of business.

- iii. **Unit cost:** a revealing unit cost will show the profit made in investment in education. This therefore means that an efficient education system is that which is cost-effective, minimize cost and have a revealing unit cost.

Purpose of the Study

This study is carried out to achieve the following objectives:

- i. To examine the trends in the school enrolment in the local government area between 2007–2012.
- ii. To examine the trends in the students' academic performance in the local government between 2007–2012.
- iii. To determine the progression rate, the average progression rate of secondary education in the Local government area between 2007–2012.
- iv. To find out the wastage rate/ratio in the secondary school in the Local government area between 2007–2012.
- v. To determine the cost of wastage in the secondary schools in the Local government area between 2007–2012.
- vi. To examine the factors that most influence the unit cost in the local government area.

Research Questions

The following research questions were raised to guide the study.

- i. What is the enrolment pattern in Ejigbo local government area between 2007 and 2012?
- ii. What is the trend in the students' academic performance between 2007–2012?
- iii. What is the progression rates and the average progression rate of secondary education in Ejigbo local government area?
- iv. What is the wastage ratio / rate in secondary education in Ejigbo local government area?
- v. What is the cost of wastage of secondary education Ejigbo local government area?
- vi. What are the factors that must influence the unit cost of secondary education in Ejigbo local government area?

Methodology

The research design adopted in this study is survey research design using micro level data on educational efficiency in the local government area. The population for this study comprised of the sixteen public secondary schools in Ejigbo Local Government area. Out of the population, eight secondary schools were selected using stratified random sampling technique. This constitutes 50% of the total number of secondary schools in the Local Government Area. These schools were chosen because of availability of data. To determine the internal efficiency of secondary schools in the local government area, the following methods were adopted:

- i. Determination of the Progression Rates (PR) and the Average Progression Rates

- (APR) in the Local Government area during the period of study.
- ii. Employing the convectional method to calculate the cost of **wastage**.
 - iii. Determination of the wastage ratio using the actual input-output ratio and the ideal input-output ratio.
 - iv. Measurement of internal efficiency – for this study, the following measures were used to determine the internal efficiency of the schools:
 - Students' academic performance
 - Wastage ratio
 - The time cohort method (tcm)

The instrument used for the collection of data for this study was a checklist specifically designed to collect data on variables of internal efficiency and cost. Such as school enrolment, school size and identification and students academic performance; for the six consecutive years between 2007 and 2012. The checklist was tagged "Educational Cost and Internal Efficiency Checklist" (ECIEC). The year from 2007 to 2012 were chosen because year 2012 mark the beginning of a new educational reform put in place in the state. This is to compare it with an ongoing study of the efficiency of the new educational system after the reform.

Analysis of Data and Presentation of Results

Research Question I: What was the enrolment pattern in the Local Government public secondary schools from 2007 – 2012?

Table 1: Enrolment pattern of public secondary schools in Ejigbo Local Government.

Year	JSS I	JSS II	JSS III	SS I	SS II	SS III	TOTAL
2007	1442	1465	1462	1334	1347	1330	8380
2008	1410	1287	1311	1333	1312	1265	7918
2009	1399	1256	1246	1241	1298	1256	7696
2010	1310	1217	1206	1240	1229	1224	7426
2011	902	1052	1247	1218	1223	1161	6803
2012	876	873	1041	1219	1097	1021	6126

Table 1 showed that the enrolment pattern increases across the year, and decreases from year 2009 to 2012. Also, enrolment among the classes varies. This might due to the effect of wastages.

Research Question II: What are the trends in the students' academic performance of secondary schools in Ejigbo Local Government?

Table 2: Analysis of data on students' academic performance

Year	Percentage passed
2007	44.7
2008	52.8
2009	61.8
2010	65.4
2011	65.2
2012	64.8

Table 2 showed that the highest academic performance was recorded in 2010 with the percentage passed of 65.4%, while the lowest academic performance was recorded in the year 2007 with the percentage passed of 44.7%.

Research Question III: What were the progression rates and average progression rate in the Local Government during the period of study?

Calculation of Progression Rate (Pr) and Average Progression Rate (APR)

GRADE						
1997	JSS I - JSS II	JSS II - JSS III	JSS III - SS I	SS I - SS II	SS II - SS III	SS III - OUT
1998	89.25	89.49	91.18	98.35	93.91	99.62
1999	89.07	96.81	94.66	97.37	95.73	99.45
2000	86.99	96.02	99.52	99.03	94.30	99.67
2001	80.31	86.53	96.70	98.63	94.47	99.67
2002	96.79	98.95	97.76	90.07	83.48	99.99

Table 3 showed a very high progression rate from one class to the other. It also revealed that the graduation rate is very high within the schools.

Table 4: Average progression Rates (A.P.R) of public secondary schools in Ejigbo Local Government.

GRADE	JSS I - JSS II	JSS II - JSS III	JSS III - SS I	SS I - SS II	SS II - SS III	SS III - OUT
A.P.R.	88.48	93.56	95.96	96.69	92.38	99.68

Research Question IV: What is the wastage ratio / rate in secondary schools in Ejigbo Local Government?

Table 4: Analysis of data on the wastage ratio and rates of secondary schools in Ejigbo Local Government?

Determination of the student-year per every successful completer of secondary education in the local government during the period of study.

To determine the wastage rate/ratio, the average progression rates obtained were applied to 1000 students to obtain the standard progression rates (SPR). The figure 1000 is usually taken to make the calculation less cumbersome because whatever figure is used if the average progression rates are correct, the result will be the same. Following Adeyemi's (1998) approach the standard progression is computed as presented below:

$$\begin{aligned}
 \text{Students in JSS 1 in year to } &= 1000 \\
 \text{Students in JSS 2 in year to } +1 &= 1000 \times .8848 = 885 \\
 \text{Students in JSS 3 in year to } +2 &= 885 \times .9356 = 820 \\
 \text{Students in SS 1 in year to } +3 &= 820 \times .9596 = 787 \\
 \text{Students in SS 2 in year to } +4 &= 787 \times .9669 = 760 \\
 \text{Students in SS 3 in year to } +5 &= 760 \times .9238 = 703 \\
 \text{Graduating student in year to } +6 &= 703 \times .9968 = 701 \text{ (output)}
 \end{aligned}$$

Standard Progression for Public Secondary School Students in the Local Government Area 2007–2012.

Table 5: Standard Progression Rate

SCHOOL YEARS	STUDENT – YEARS
To	1000
to + 1	885
to + 2	820
to + 3	787
to + 4	760
to + 5	703
TOTAL	4955

To obtain the student-year per every successful completer actual input-output ratio was determine thus:

$$\frac{\text{Student-year (Actual Input)}}{\text{Successful completer (output)}} = \frac{4955}{701} = 7.01$$

$$\begin{aligned} \text{Wastage Rate} &= \frac{\text{Actual input-output ratio}}{\text{Ideal input-output ratio}} \\ &= \frac{\text{Student-year (ideal input)}}{\text{Successful Completer}} = \frac{7.01}{6.0} = 1.10 \end{aligned}$$

Table 6: Wastage Rate

Input-output Ratio	Wastage Ratio	Wastage Rate
7.10	1.17	28.7

The table 6 above showed that the input-output ratio is 7.01 giving a wastage ratio of 1.17 and wastage rate of 28.7%

Research Question V: What is the cost of wastage in secondary schools in Ejigbo Local Government.

Table 7: Analysis of data on the total cost of wastage in secondary schools in Ejigbo Local Government.

Method of calculating cost of wastage

Conventional Method

- i. Student successfully completing cycle (i.e graduating) = 713
- ii. Number of student-year spent per unit output = 7.01
- iii. Duration of the cycle = 6 years
- iv. Average Annual Unit Cost = N4,780
- v. Cost per Graduate (unit output) = 4780×7.01 = N33507.8
- vi. Cost under Optimum Efficiency = 4780×6 = N28680

- vii. Cost of Wastage per Graduate = $(33507.8 - 28680) = \text{N}4,827.8$
 viii. Total Cost of Wastage = $4827.8 \times 713 = \text{N}3,442,221.4$

Table 8: Cost of Wastage

Total Public Cost ₦	Cost of Wastage ₦	Percentage of the Cost of Wastage
204,717,423.78	3,442,221.4	1.70

The cost of wastage was calculated to be N3,512,794 during the period of study and this constitutes about 1.70% of the total public cost on secondary education in the local government.

Research Question VI: What are the factors that most influence the unit cost of secondary education in Ejigbo Local Government?

Table 9: Analysis of data on the teacher-student ratio as a factor influencing the unit cost of secondary education in Ejigbo Local Government.

Year	Student population	Number of Teacher	Teacher Student Ratio
2007	8380	240	1:35
2008	7918	255	1:31
2009	7696	252	1:31
2010	7426	236	1:32
2011	6803	217	1:31
2012	6126	223	1:28

The result presented in the table 9 showed that the teacher-student ratio decreased from 1:35 in 2007 to 1:28 in 2012 giving an average of 1:31.

Table 10: Analysis of data on the average class size as a factor influencing the unit cost in secondary school in Ejigbo Local Government.

Year	Student Population	Number of Classroom	Average class size
2007	8380	190	44
2008	7918	104	41
2009	7696	203	38
2010	7426	203	37
2011	6803	205	35
2012	6126	205	30

In addition, the class size was on the decreased from 44 in 2007 to 30 student per class in 2012, that also given an average of 46 students per class.

Table 11: Analysis of data on the average teacher's salary as a factor influencing unit cost in Ejigbo Local Government.

Year	Teachers salary ₦	Number of teacher	Average teacher salary ₦
2007	10,165,054.07	240	42,354.39
2008	11,155,044.75	255	43,745.27
2009	13,531,055.81	525	53,694.67
2010	42,348,751.18	236	179,443.86
2011	29,711,845.20	217	136,920.95
2012	35,365,643.90	223	158,590.33

The average salary per teacher in the local government within the year study increased from N42354.39 in 2007 to N158590.33 in 2009, after which is started to fall giving an average of N102458.25.

Discussion of findings

The enrolment pattern during the period of study was stable on yearly basis with the highest enrolment in JSS I reducing toward the final year. This therefore gave a high progression rates among the classes. Also there was a high progression among SSI, SSII, and SS III to graduation. This high progression indicated that the system has tried to minimize wastage to the barest minimum given rise to a very high progression rate. This also indicates that the system is internally of year of effective schooling and the actual year of schooling with a maximum value of 1. With the wastage ratio of 1.10, that is 0.10 deviation from the ideal is very small. This means that the public secondary schools in the Local Government area under study were internally efficient, using 7.01 student-year for a six-year course. This therefore agreed efficient because very high progression rate has minimized wastage in the system to the lowest level.

The coefficient of efficiency of a school system is based on the relationship between the pupil with that of Adewumi (1989) in his study of resource situation and internal efficiency of technical collages in Nigeria. He reported that the internal efficiency of the technical colleges was high as result of low wastage ratio of 1.04 and the wastage rate of 27%. The cost of wastage was calculated to be N3,512,794 during the period of study and this constituted about 1.70% of the total public cost on secondary education in the local government area.

In relation to efficiency, the cost incurred on the wastage in secondary school is about 1.7% of the amount incurred on secondary education. The system is therefore said to be internally efficient. In a related study carried out by Adewumi (1989) find out that the low cost of wastage is a function of internal efficiency and therefore concluded in his study of resource situation and internal efficiency of technical colleges in Nigeria that the cost of wastage was found to be 3 kobo per student of the technical colleges in 1989. Shehan (1973) viewed is hinged on the fact that an efficient schools is said to be one that produces the required benefits and minimizes or avoids waste in its entirety.

The study revealed that the average teacher-student ratio during the year under investigation was found to be 1:31. This is generally low and tend to increase the unit cost of secondary

education in Ejigbo Local Government Area. This is favoured by the study of Otareri (1989) while studying the expenditure and cost of secondary education in the former Bendel State discovered that teacher-student ratio is among the factors that influence the unit cost.

This study also revealed that class size influenced the unit cost. An average class size of 38 students per class was found. This means that more money will be spent on teaching materials and building maintenance. This tends to increase the unit cost. In the study of Oburn (1970) on the effect of class size on unit cost found that school with lower class size has the higher unit cost while the schools with high class size has a lower unit cost. This view is also shared by Aknagbou (1987) when he found that the effect which average class size has on cost is that a small average class size lead, to provision of a higher number of classroom than large average class size.

The average teacher salary increases from 2007 to 2012. The annual average was N102458.25. The average teacher salary during the year under review was very high. In effect it has increased the unit cost. The finding of this study is similar to that of Ajayi (1997) in his study of unit cost and students' academic achievement in Ondo State Nigeria found that the most determinant of unit cost was the average teacher salary.

Conclusion

The study showed that secondary schools in the Local Government Area within the period under review were efficient. This was evident from the high progression rate, very low cost of wastage and high student's academic performance. This showed that the secondary schools in the Local Government Area were managed within the limit of the resources available to the State. These secondary schools were said to achieve this feat despite variations in the factors such as average teacher salary, average class size and student – teacher ratio that influenced the efficiency of these schools.

Recommendations

Based on the findings of this study, the following recommendations were made:

- i. School administrators should be encouraged to keep such as class size, average teacher salary and student – teacher ratio that influenced internal efficiency under control.
- ii. Secondary schools should set target of improving school efficiency.
- iii. Efforts should be made by teachers to reduce wastage through effective teaching.
- iv. Effective monitoring and supervision of teaching and learning activities in order to improve students' academic performance.

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