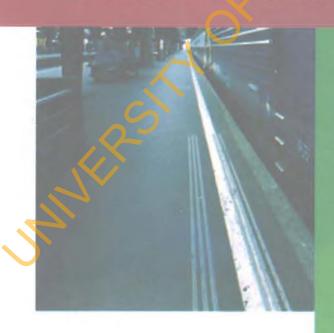




PRINCIPLES, OPPORTUNITIES, APPLICATION AND CHALLENGES





Edited by

A. O. Ayeni
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KNOWLEDGE AND LEARNING MANAGEMENT (KALM):

PRINCIPLES, OPPORTUNITIES,
APPLICATIONS AND CHALLENGES

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A.O. Ayeni Uche G. Emetarom Eunice O. Omoregie J.A. Undie J.E.Okon



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Towards Efficient Cost Control in Public Secondary Schools in Nigeria: An Empirical Application of the Systems Theory.

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Abstract

In many developing countries like Nigeria, secondary education is heavily financed from State budgets. Although it is government's desire to provide increased access to secondary education in the face of limited resources, the cost of these increases has made the continues expansion of secondary education unsustainable. Such has necessitated the need to improve control over cost of public education in order to provide increased access to all eligible school-age children. This paper examined the application of System's, theory to the control of unit cost in public secondary schools in Nigeria. The study found that efficient cost control and increased access can be achieved through adequate knowledge with the application of Systems theory. It therefore recommended the adoption of System's theory as a strategic framework for reducing unit cost and increasing access to secondary education in the face of limited financial conditions.

Introduction

In Nigeria, as in most other low-income countries, the problem of tightened budget brought about by declining economic fortunes has comparatively reduced the financial conditions of most public institutions especially education. Added to acute financial stress of these public institutions is the increasing demand for education in the face of other pressing macro-economic challenges confronting government. Unfortunately however, these daunting challenges have been compounded by inefficient use of available resources in public schools. Consequently, there is high cost of public school operations that could have severe implication for access and overall educational development.

Notwithstanding the under -investment in public secondary education, there may be need for significant cost reduction within the school system which could be achieved through an intensive use of available resources in schools. Every organization strives to provide its service at the lowest cost possible by adopting the cheapest technique of production that invariably justifies the need to improve efficiency in the system (Isuku, 2011). The rationale for efficient use of available resources in schools is premised upon the limited financial outlay available to education and particularly secondary education system. Specifically secondary education financing is the worst hit when compared with other levels of education in most developing countries (Lewin & Cailloids 2001). According to Akinsolu, (2002), in Isuku (2011), the essence of emphasizing efficiency in the use of resources is to enable the schools system assess the cost effectiveness of the school system. Thus the educational manager may need to improve the cost effectiveness of the school system either by changing the amount, quality and proportion of inputs or by using present inputs more intensively without basically altering the systems' existing structure and technology (Coombs & Hallack 1987). An example in this case is changing the size factor (enrolment size, average-class-size and student-teacher-ration) as well as ensuring greater use of building facilities.

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Historical Development of the System Theory and its Application in Education

According to Fabunmi (1997), the systems theory is traced back to Aristotle (384 - 322 BC) who contented that "the whole is greater than the sum of its parts." Since then, this theory has been applied to illustrate the functioning behaviour of both living and non-living things. Cole (1986), defined a system as the collection of interrelated parts, which form a whole. While Nwankwo (1986), defined a system as 'a series of interrelated and interdependent parts, such that the interaction of the parts (sub-systems) affect the whole system'. The systems theory therefore rests on the fact that each of the component parts is vital and performs specific functions for the survival of the entire body. A system comprises two major distinctions. It could be open or closed system. The closed system is such that does not interact with the environment and is self-supporting. It has relatively rigid impermeable boundaries and hence, has very few inputs/outputs (Cole, 1986). The open system on the other hand, rely and interacts with the environment from which it derives its inputs, process these inputs and discharges them as outputs in more or less useful manner to the environment

The use of the systems theory here is based on the fact that the school is a system which consists of interrelated parts each working inter-dependently towards achieving the goals and objectives of the whole education sector. The connection between efficient use of available resources and the school system is explained by the amount of inputs into the system and the output that is produced. A system is therefore said to be efficient if maximum output is obtained from a minimum inputs (UNESCO, 2003). Both the production and cost theories are therefore sub-summed into the systems theory in an attempt to operationalize the interrelationship of the different elements in the system.

Need to Reduce Unit Cost in Public Education

Unit or average cost of education refers to the cost of educating one student at a point in time. Unit cost can be measured in different ways. For instance, if the total expenditure on education is divided by the total number of students enrolled, then we have unit or average cost per student. If on the other hand, the total expenditure incurred is divided by the total number of graduates, then it is the unit cost per graduate. According to Babalola, (1995), it is also possible to have unit cost per teacher and unit cost per class etc.

In many developing countries like Nigeria, unit cost with GNP per capital represents a much heavier economic burden when compared with developed countries. For instance, in the work of Zymelman in Psacharopoulos & Woodhall (1985), it was shown that developed countries spent 55 percent of their GNP per capital on each student at the higher education level, whereas developing countries on the average spent five times the level of GNP per capital income on each student.

Although these heavy cost burden have been somewhat reduced, unit costs particularly at the secondary level still represent a much heavier burden (with respect to GNP per capital) in Africa countries than in developed countries, Asia or Latin America (Psacharopoulos & Woodhall 1985). Whereas unit costs are half the annual GNP in OECD countries, one-and-a-half times in Middle East and North Africa, it is eight to nine times that in West Africa (Psacharopoulos & Woodhall, 1985).

Because of the important role played by unit cost as an index for determining the expensiveness or otherwise of the school system, it is ideal to pay serious attention to its growth. Moreover, unit cost analysis is needed for cost comparisons or projection as it will help the educational planner to make proper planning decisions that will help to lesson the cost burden of education on the government. It should be noted that a reduced unit cost will provide increased opportunity for access to schooling. Decisions about alternative educational technologies for instance require information on unit costs (such as cost per

hour) and a full understanding of the cost implications of alternative technologies (such as radio or television) which require analysis of both fixed and variable costs. According to Psacharopoulos (1992), one of the very reasons for a high unit cost in most developing countries such as Nigeria is the very low enrolment. Thus, expansion in secondary education through increased enrolment may enable the country to reduce cost per student. However, some authorities in the field of cost analysis have argued that the very low level of enrolment in schools may not be the single factor for a high unit cost in most of the developing countries. The assertion is that since teachers salaries is an important determinant of the total recurrent cost of schools, the question to ask is whether the student teacher-ratio is high enough to effect a positive change in the unit cost of education (Miugat & Tan 1988; Haddad 1994; Biray 1998; Abagi & Odipo 1999) units cost of education has been influenced by certain factors among which are the averageclass size, average school size and teachers salaries (Longe 1981), Moreover, Coombs & Hallak (1987), Psacharopoulos & Woodhall (1985); Minget & Tan (1988) have emphasized type of curriculum teachers' salaries and quality of teachers as additional factors influencing unit cost in schools. This implied that in an attempt to cut down unit cost and give greater opportunity for access, effort should be directed towards the control of these size factors in schools.

Cost Reduction Strategies in Education

Cost analysts have discussed different strategies of cost control in educational institutions. Researches have shown that effective control of recurrent expenditure will impact more positively on the institution since it constitute about 80 percent of schools total cost (Ajayi, 2004; Adedeji, 1994 and Coombs & Hallak, 1987). According to Adedeji (1994), in reducing education cost, emphasis must be shifted to the control of the recurrent expenditure, which constitutes the most significant item of the total expenditure of any investment with about 80 to 90 percent of the total expenditure of an institution. Psacharopoulos & Woodhalf, (1985) explained that the teacher salary as a major determinant of recurrent cost should be the main item of focus in attempting to reduce the high recurrent cost of education. While Oladejo (2001) suggested the following options:

- (i) The elimination of expenses not concerned with direct instruction of students.
- (ii) Increase in the load of the faculties (in the case of higher institutions).
- (iii) Rearranging the class-size in such a way as to enlarge the size of classes.

Babalola, Okunola, Adeyemi & Ibekwue (1996), carried out a study on cost and financing of University. Education in Nigeria, the researchers among other recommendations suggested increase in enrolment size. Using a regression model to predict the behaviour of costs in the institutions sampled, they found that the higher the enrolment size, the lower the administrative expenditure per student. Other cost control strategies suggested by the researchers included an increase in the Junior/senior staff ratio. It showed that a higher Junior/senior staff ratio would reduce administrative expenditure per student. While Carnoy (1999), reported that one of the key proposal for reducing the cost of schooling at all levels was to increase the class size.

According to Psacharopoulos & Woodhall (1985), one of the methods of cost control in education in the face of stagnant government support, is by reducing the unit cost of education through greater efficiency. Further more, the authors opined that class-sze has a considerable effect on cost because of the additional expenditure on teachers, classroom equipment, materials and administration. Thus, it is better to allow a modest increase in the average-class-size. In the opinion of Alaluusa (1992), efficient cost management can be achieved through proper cost allocation or cost assignment, which

should include the determination of unit cost for products and services. While Longe, Adedeji and Osasona (2000) maintained that cost information is crucial in decision making as it facilitate efforts to make the best but least costly choice among alternatives. Awopegba 1986; Mingat and Tan, 1988 opined that efficiency in the use of resources available will be reflected in the enrolment pattern of the institution, the student-teacherratio and hence the higher the student-teacher-ratio, the more efficient the system. Babalola (1985) and Babalola, et al., (1996) therefore remarked that a number of cost-saving potentials resides in school exploring economies of scale.

System Theory and Efficient use of Resources in Schools

The identification of the inputs and outputs of a system will provide useful information about the system especially for some coupled systems, which may be difficult to understand except through the input-output analysis. The school system is typical example of such a system. Secondary schools, for instance, depend on their environment for sustenance. They absorb inputs from the environment, which they discharge back to the environment after due process. Hence, the open system theory is very suitable for this study as the education system consists of sub-system to which the concept of interaction and interdependence of parts with each other and the other system (Supra system) are applicable. According to Peretemode (1996), the school as a system is a unified, purposeful organization composed of interrelated parts. These parts are important to the extent that the fate of the components to a large extent determine the fate of the whole and vice versa. Hence, the educational institution consisting of a coordinated network of people (students, teaching and non-teaching personnel) material and events organized to achieve the goals of the organization (Ndefo, 2006).

The input-output analysis has been useful in the study of complex social system as the educational institutions. The outputs of a system have been considered in many circumstances in relation to its inputs. Hence, a productive organization endeavours to favourably balance its output to the inputs utilized. The mathematical relationships between these inputs/output concepts are expressed as an equation referred to as the production function. The basis for the application of the production function in education is that education is a multi-productive organization that is; it does not produce a single output.

Thomas (Ndefo, 2006) used the open system theory as a basis for distinguishing three models of input-output relationships in the production of education, which reveals the nature of resource exchange between the school and its environment. These models are distinguished from one another in the way input and output are defined as well as the way their principal users have defined them. These users according to Ndefo (2006) are the economists, the administrators and the psychologists. The economist's education production function is seen as contributing to the economy through the individual's acquired competences. The economy in turn, contributes resources for the operation of the school system. Thus, a productive school is one in which the monetary value (benefits of education) the individual obtains, balances favourably with the cost of providing the education. While the outputs therefore represents the qualitative and quantitative improvement resulting from schooling, the inputs on the other hand comprises the cost incurred in the provision of that education.

However, a review of the system-oriented empirical studies show that researchers often usually pay attention to those aspects that best assist them to achieve their objectives. For instance UNESCO 1992; Ndefo, 2006 and Fabunmi, 1997), designed a system input-process-output model for measuring educational performance. The models provided a method for assessing the output of education given the inputs. On the basis of

the model, questions about the inputs relate to the students and resources (human, material, content, support services, physical structure, facilities, funds and time) these seek to determine whether all children of school age are involved in the educational process as well as the social, economic and cultural implications in a case of any deviation. The transformation process comprises organization and management in the use of various resource inputs. This emphases the effective and efficient utilization of resources, which could be measured by such quantifiable indicators as enrollment, student-teacher-ratio and average-class-size. According to Fabunmi (1997), the effective and efficient utilization are resources is a function of the quality of inputs, quality of transformation process, effective leadership as well as the learning period. The output of the school system on the other hand, consist of the graduates who have acquired one form of knowledge or the other at the end of the schooling period, and which can be evaluated either quantitatively (in terms of the number of graduates) and qualitatively (in terms of cagnitive and noncognitive skill acquired).

The secondary school system is an open system, which derives its inputs from the environment, process them and send them back to the environment. Any shortfall from the educational expectation is identified by means of the feedback mechanism and necessary corrective measures are made. Figure 1 below represents a possible model showing the various interactions within the school system as adapted from Ndefo, 2006; UNESCO, 2003 and Fabunni, 1997.

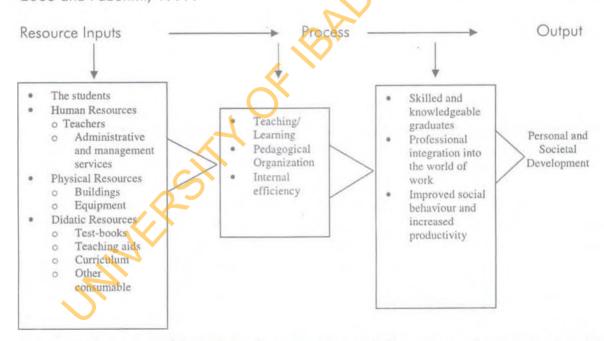


Fig. 1: A System Model showing the interactions of the various elements in a typical school.

Source: Adapted and modified from Ndefo 2006, UNESCO 2003 and Fabunmi 1997

UNESCO (1992) in Ndefo, (2006), stated that the relative weight assigned to the different dimension in its model should be a function of the context. Hence, it is possible to examine the relevant dimensions in this model while holding other variables constant. Thus, by ignoring certain variables in the system, it is then possible to assess the interrelationships among the variables in order to sharpen the focus of the current study, especially in relation to the provision of schooling opportunity to greater secondary-age children at a cheaper cost possible

In view of this, the modification made in this model was to hold constant the fixed inputs such as building and equipment as well as other non relevant variables to this present study since the major concern of the study was to examine the influence of of size factors on the recurrent unit cost of production in public schools through the the application of the system theory. The modified system model is therefore represented in figure 2 below:

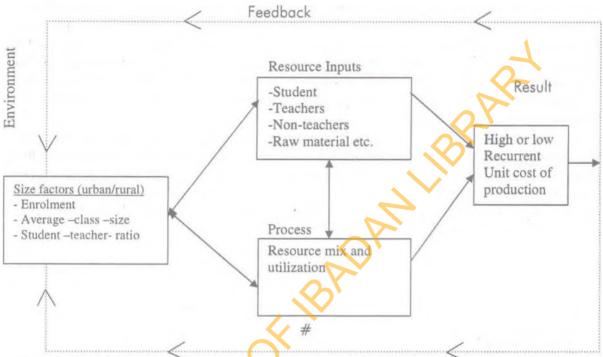


Fig.2. A Model for assessing the functional relationship of Size factors and recurrent unit cost of Secondary Schools

Source: Author

The model (Figure 2.) describes the interlink between school size factors (enrollment, average-class-size and student-teacher-ratio) and the recurrent unit cost of public secondary schools. The sizes here as measured by the size factors (enrollment, average-class-size and student-teacher-ratio) to a great extent are assumed to exert a form of influence on recurrent unit cost in schools. The inputs are the resources that are utilized to produce a given quantity of output in the school system. The resource inputs are usually assigned a certain price value. If the resources are efficiently manipulated and utilized, the cost of producing such outputs will be minimal. If on the other hand, the resources are inefficiently mixed and utilized, it will incur a higher cost of production to the school system and consequently could limit the attainment of the overall educational objectives. The feedback provided by the model can then be used by educational planners, policy makers and school managers to determine the most appropriate sizes of schools and their respective unit costs and thus enhance the cost-efficiency of the school system.

Conclusion

The magnitude of resources devoted to public education demands that efficient operation of schools at both the aggregate and individual school level is essential. While inefficiency may be tolerated in public programmes where budgets are small, a little improvement in school efficiency could save significant resources given the size of the education expenditure. Thus, the problem of inefficiency in the use of available resources,

compounded by the relatively declining funding of secondary education has necessitated the need to fully exploit and maximize the use of available resources in schools. This will enhance control over the cost of schooling while at the same time, ensuring increased

education opportunities for all children within the school age group.

This paper illustrates how the System theory could be applied as a framework to improve control over the recurrent operational cost of education in public secondary schools. The paper argued that increased operational costs has the capacity to limit access to public education, hence there is the need to improve control over the rising cost of schooling in the face of other daunting challenges and scarcity of resources. If the goal of universal access to education is to be achieved in the country, efficient provisions that will make the best use of scarce resources therefore need to be encouraged in public schools.

From the foregoing, the following conclusions were made:

(i) I System theory serves as an important model for the efficient analysis of school resources; Unit cost of reduction can be reduced through efficient resource mix in schools. Effective cost control can help improve access to secondary education in the face of declining financial conditions. Size factors (enrolment, average-class-size and student-teacher-ratio) can be increased to a permissible limit in order to reduce wastages of limited resources in public schools.

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