

Review

Cost indices in open and distance education in Nigerian universities

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The paper focused on general cost indices in open and distance learning (ODL) in Nigeria. Existing literatures at the international level and in the only single mode open and distance learning in Nigeria (National Open University of Nigeria – NOUN) were reviewed to ascertain the factors that affect cost in open and distance learning. The findings revealed neglect of some factors during cost consideration. The cost structure observed requires a proper integration of all the sub-sections in an open and distance learning to be able to have adequate budget system in an open and distance learning institutions.

Key words: Open and distance learning, cost drivers, cost indices, cost function.

INTRODUCTION

Every industry is interested in the cost of production to enable the management determine if the cost of production is justified by its output. Cost in distance education is not different. There is the need to understand what constitutes cost in distance education so as to arrive at appropriate costing models that are required in determining the total cost of education required in setting up a distance education, expanding a distance learning institution and maintaining such institution. A good knowledge of the indices of cost would help to understand and justify the cost that may be required in distance education within a specified period of time, if distance education is to sustain its mandate of access expansion and national development.

The role of government in education is paramount in determining and justifying the indices of cost in education. Nwagwu (2001) critically examined the legal basis for financing higher education, which showed that government has the obligation to provide educational opportunities. This justifies the basis for the role of government

in education in the determination of cost variables. This paper therefore discusses the types of cost in distance education, the cost drivers and cost functions. The paper will be found useful for planners and managers of distance education in resource allocation and budget preparation.

LITERATURE REVIEW

The origin of open and distance learning in Nigeria

Nigeria embraced open and distance learning as a provision for equality and increased access to higher education. It all started in Nigeria when the University of Lagos was established in 1962, one of its traditional objectives being the training of professionals to meet the manpower needs of the country. To achieve this objective, the university was required to provide facilities for part-time studies in the field of Law, Business

Administration, Accounting and Education through correspondence and distance teaching techniques. It was in this light that the Correspondence and Open Studies Institute (COSIT) was established during the 1973/1974 academic session as a unit of the Continuing Education Centre (CEC). Its mission anchored in the tenets of 1961 Ashby Report, which was mainly to provide opportunities for higher education for those already in some gainful employment; to widen and diversify access to a flexible, innovative and cost-effective system of education to the ever increasing number of learners who, either did not have the opportunity of university education or for some other reasons cannot engage in full-time studies (<http://209.85.229.132/search?q=cache:-NiX->).

The institute became autonomous in 1980 and was upgraded as an Institute in 1983 with its own management board, empowered to formulate policies and to supervise its day-to-day activities. Its autonomy was reaffirmed by the university senate in 1997. In December 1997, the name COSIT was changed to Distance Learning Institute (DLI).

Distance learning was nursed at the University of Ibadan about the same time it was conceived in University of Lagos (UNILAG, 2010). The idea of distance education was conceived by the Department of Adult Education of the University of Ibadan in 1972. The programme was presented at the University Senate in 1976 and the National Universities Commission later gave its approval on the condition that it would be a self-training programme. It therefore started as external degrees and later changed to external studies programmes of the Department of Adult Education in 1988 with courses from the parent department and two other departments – Guidance and Counselling and Teacher Education. By 1993 four more departments joined, namely: Special Education, Library Science, Educational Management and Physical and Health Education. In 1998, the programme extended to Faculty of Agriculture. In order to be in line with the global development in distance education, the name was changed from centre for “external studies” to “distance learning centre” in 2002 (<http://www.dlc.ui.edu.ng/history.aspx>).

In 1976 a special training called “The Correspondence and Teachers In-Service Programme (TISEP)”, was established in Ahmadu Bello University to prepare middle level teachers for Nigerian’s primary school. The first independent institution dedicated solely to distance education, the National Teachers’ Institute (NTI) was established in 1978 to give opportunity to unqualified teachers working in the nation’s primary schools to upgrade themselves and thereby increase the number of qualified teachers required for the implementation of the Universal Primary Education Programme that was introduced in 1976 as well as the Universal Basic Education

Programme introduced in 1999.

The birth in 1977 of the National Policy on Education (Federal Republic of Nigeria, 1977) marked the Federal Government Policy statement on alternative form of education. The 1977 National Policy on Education incorporated Government’s position that maximum efforts would be made to increase access to higher education for those who can benefit from it. Such access may be through universities or correspondence courses, or open universities, or part-time and work-study programme. This was further strengthened in Section 9, sub Section 92 of the 2004 edition of the National Policy on Education (Federal Republic of Nigeria, 2004). The edition contains the goals of Open/Distance Education in Nigeria, which include: Providing access to quality education and equity in educational opportunities for those who otherwise would have been denied; meeting special needs of employers by mounting special certificate courses for their employees at their work place; encouraging internationalisation especially of tertiary education curricula; and ameliorating the effect of internal and external brain drain in tertiary institutions by utilizing Nigerian experts as teachers regardless of their locations or places of work.

The national educational goals provided the impetus by which open and distance learning operates in Nigeria. This gave recognition to the need to increase access to university education. In the second republic, the Federal Government of Nigeria established the National Open University (NOU) on 22nd July, 1983, which was backed by an Act of the National Assembly. Unfortunately, this was short lived as a result of the takeover of government by the military in December 1983. Thereafter, on January 1st 1988 the University of Abuja was established as a dual university with the mandate to run both conventional and distance learning programmes. It was the first university in Nigeria to assume such dual mandate. Up-to-date, the university is recognised for this role. In spite of these efforts, the demand for university education was still far higher than its supply. This could have prompted the Federal Government of Nigeria in 2002 to resuscitate the National Open University (NOU) Act of 1983, which was suspended in 1984. This led to the re-birth of the National Open University of Nigeria (NOUN) as it is today. For the established distance education programmes to be effectively managed and meet the set goals, requires adequate knowledge of the indices of cost of open and distance learning. This knowledge would help in the allocation of resources to the different facet within the distance learning programmes.

Indices of cost of open and distance learning

Levin (1983), in his ingredient approach of specifying

Table 1. Cost drivers.

Cost	Direct cost		Indirect cost
	Development	Presentation	Overhead
Capital	Authoring		Building costs
Operating		Staff costs (Tutors)	Sever costs
Recurrent	Authoring a text		Director's salary
Non-recurrent	Text outsourced		

Source: Hülsmann (2000:89).

what the elements that constitute a financial estimate in an open and distance learning (ODL) programme, identified the following:

1. decide what to teach and the activities involved;
2. identify the ingredients that are needed to achieve the set objectives in terms of:
3. human resources
4. premises and accommodation
5. equipment and furniture
6. stocks, supplies, consumables and expenses
7. specify the quantities needed of each item; and
8. find out their respective costs.

Cost is also viewed from the angle of economies of scale, in which the fixed cost is spread over the number of students. Then, the more students an institution has, the less each student has to pay. This goes with the fact that each ingredient costs money. The most pertinent aspect of the economics of scale is the cost drivers. Hülsmann (2000) classified open and distance learning (ODL) cost into capital costs and operating costs. Both capital and operating costs include direct and indirect costs. He further classified direct cost into development and presentation costs and indirect costs as the overhead of the institution. The cost of authoring (text and electronic) is a development cost and it is classified as capital cost. Recurrent and non-recurrent costs are classified as operating cost. The cost of authoring a text could also be classified as a recurrent cost. This happens when reviewing already authored text. The cost of outsourced text is a non-recurrent cost. Presentation costs include staff costs (tutors), the cost of transportation of materials to study centres and cost of maintaining study centres. The overhead costs could be the costs of buildings, major equipment like internet sever and staff salary (non-academic). There is also fixed and variable cost. Capital cost could be a fixed cost or variable cost. Also, variable cost could be operating cost/recurrent cost and it could

be capital cost. This is better presented in Table 1.

In view of this, Hülsmann came up with the following equations:

Total cost equation

Total cost = Fixed costs + Variable costs

$$TC = F + V \times N$$

Where: TC = Total costs; F = Fixed costs; V = Variable cost per student; N = Number of students

Average cost equation

Average cost per student = Total cost/Number of students

$$AC = TC/N$$

$$AC = (F + V \times N)/N = (F/N) + (V+N)/N$$

$$AC = F/N + V$$

Where: AC = Average cost; F = Fixed cost; V = Variable costs per student; N = Number of students. As N increases, AC decreases, other things being equal. This equation provides important guide for cost estimation in ODL programmes.

Based on the economies of scale concept, Rumble (1981) used a graph as presented in Figure 1 to demonstrate the comparative costs of distance and conventional students. The graph showed that fixed costs are constant for campus-based and distance learning systems, while variable costs are lower at a start but quickly reach a break-even point from which stage costs become higher for the conventional system.

The cost curve quickly favours the distance system but as student number annually increases beyond the 30,000

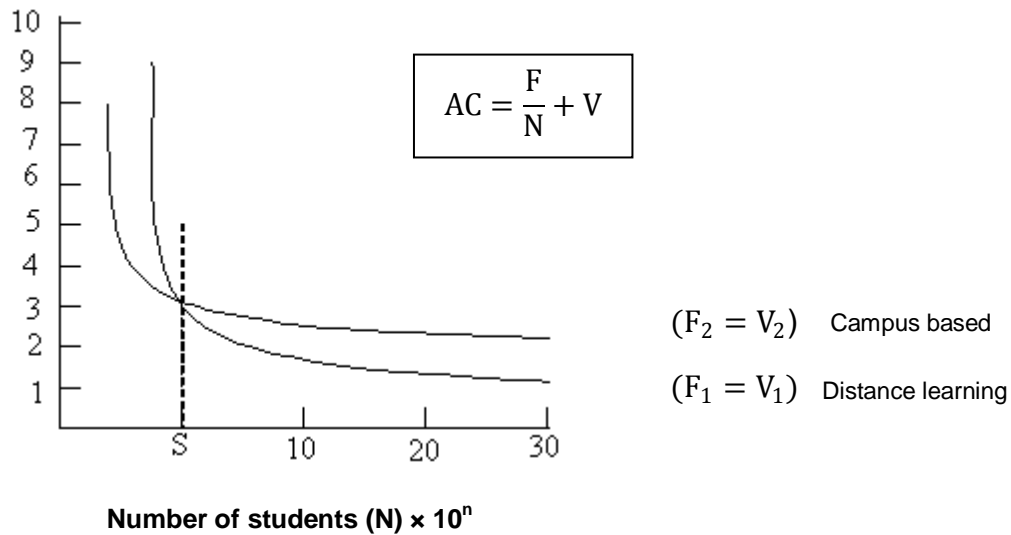


Figure 1. Student numbers and unit costs in conventional and distance systems. Source: Rumble (1981).

mark, the curve tends to flatten out and remain permanently parallel to and significantly below the costs of a conventional system. He concluded that some courses at a distance could be cheaper or dearer depending on the cost-inducing variables.

Rumble (1987) identified four systems – the materials subsystems, the students’ subsystem, the logistical and the regulatory subsystems. In this line, he classified cost as:

- direct costs of development,
- direct cost of presentation (cost of tuition and student support), typical cost drivers such as Tutor Marked Assignments (TMAs), counselling and tutoring,
- Indirect costs (overheads): These costs do not arise directly from a specific course. This includes building (offices), equipment (servers, radio transmitters) or services (cost of the director).

The studies of Wagner (1972), Laidlaw and Layard (1974:75) on the Open University of United Kingdom and Rumble (1982) on a series of distance teaching universities, showed that the costs of a distance teaching system have the following indices:

- high fixed costs;
- low variable costs per student;
- design and production costs of materials which depend on the choice of media.

That the variable cost per student is dependent on the

following variables:

- number of local centres;
- number of courses in production; and
- number of students.

In accordance with the above presentation, Keegan (1999) presented a mathematical cost function as follows:

The cost of the system in any year y: $T + Z$

Where: T = recurrent costs; Z = fixed costs (plant, buildings).

Since $T = F + L\alpha + D\beta + C\gamma + Sx$

Where: T = recurrent costs; F = recurrent fixed costs; L = number of local centre; α = average cost of local centre; D = number of courses in production; β = cost of design and production of a course; C = number of courses in presentation; γ = average cost of presentation of a course; S = number of students; x = average cost per student.

Still on the process of considering the variables that constitute cost in open and distance learning, Hülsmann (2000) summarised Keegan definition of distance education to include the following elements:

1. The quasi-permanent separation of teacher and learner throughout the length of the learning process (this

- distinguishes it from conventional face-to-face education).
2. The influence of an educational organisation both in the planning and presentation of learning materials and in the provision of student support services (this distinguishes it from private study and teach-yourself programmes).
 3. The use of technical media-print, audio, video or computer – to unite teacher and learner and carry the content of the course.
 4. The provision of two-way communication so that the student may benefit from or even initiate dialogue (this distinguishes it from other uses of technology in education).
 5. The quasi-permanent absence of the learning group throughout the length of the learning process so that people are usually taught as individuals and not in groups, with the possibility of occasional meetings for both didactic and socialisation purposes.

Keegan and Rumble (1982) asserted that the variables on which the cost of ODL is based showed that:

1. an annual minimum of enrolments is guaranteed for the distance system. Some indicators favour the distance system being autonomous;
2. the cost associated with establishing an infrastructure for a distance system and the cost of the preparation of initial course materials are such that a mixed system is to be preferred if an annual minimum of enrolments cannot be guaranteed;
3. the annual minimum number of enrolments probably lies in the region of 9,000 to 20,000; and
4. these financial indicators depend always on the choice of media, the extent of student support services, the number of courses on offer, and the costs of conventional education in the country.

The works of Wagner (1972), Carter (1973), Carnoy and Levin (1975), Neil et al. (1979), Rumble (1982), Mace (1978, 1996), Perraton (1982) and Cohn and Geske (1990) showed that:

- distance education system have high fixed costs and low variable costs whereas traditional education has low fixed costs and high variable costs;
- distance education systems need a high level of investment before a single student can be enrolled;
- the cost structures of distance learning systems differ significantly from those conventional system;
- distance education has potential for effecting economies of scale, as the number of students increases, so the average cost declines by spreading the fixed cost over more units;
1. there must be sufficient students if the system is to enjoy economies of scale;

2. the level of cost incurred in preparation of course materials is dependent on the type of media;
3. the fixed costs in distance education are generally related to media sophistication;
4. the variable cost per student is highly influenced by the level of interactivity.

In addition, Perraton (2004) emphasised administration, academic, student services, material production, evaluation, staff training and development, and audio and video programmes as major areas costs are incurred in ODL. Also, Salawu et al. (2010) emphasised course material development, integration of ICT, overhead cost, capital expenditure as the major aspects of open and distance learning where heavy commercial commitments are experienced. These indices serve as a measure on which the cost of distance learning is based.

Major indices in Nigeria open and distance learning

With reference to the available literature on NOUN, which is the only single mode university operating open and distance learning in Nigeria, the researcher observed the following indices as represented graphically in Figure 2.

From the illustration in Figure 2, the cost of ODL in NOUN could be classified into capital cost and operating costs. The capital cost is classified into direct and indirect costs. The direct costs are the costs which are specific to the students or programme of study, while the indirect costs are the costs which are not specific to students or programme of study. From the illustration in Figure 2, the development costs include the cost of developing both print and electronic course materials, therefore, the costs of training course writers, writing, editing, cost of equipment for course material production, cost incurred on high level decision-making (this include the cost of study tour to other ODL institutions and consultants) and cost of quality assurance. The cost of presentation include cost of learner support services, academic staff salaries, facilitators cost, cost of facilities at the study centre, cost of transporting course materials, cost of student assessment (Tutor-marked assignments and examinations) and service costs. The indirect costs under capital cost are the overhead costs. This can be classified as the cost of learner administrative support services which include the salaries of non-academic staff, cost of land and building for administration, cost of administrative equipment, maintenance and utilities, cost on policy, cost of staff and student recruitment and cost of insurance.

The operating cost is also divided into direct and indirect costs. The direct cost is same with recurrent cost, while the indirect cost is the same with the non-recurrent cost. The costs within the recurrent costs include updates

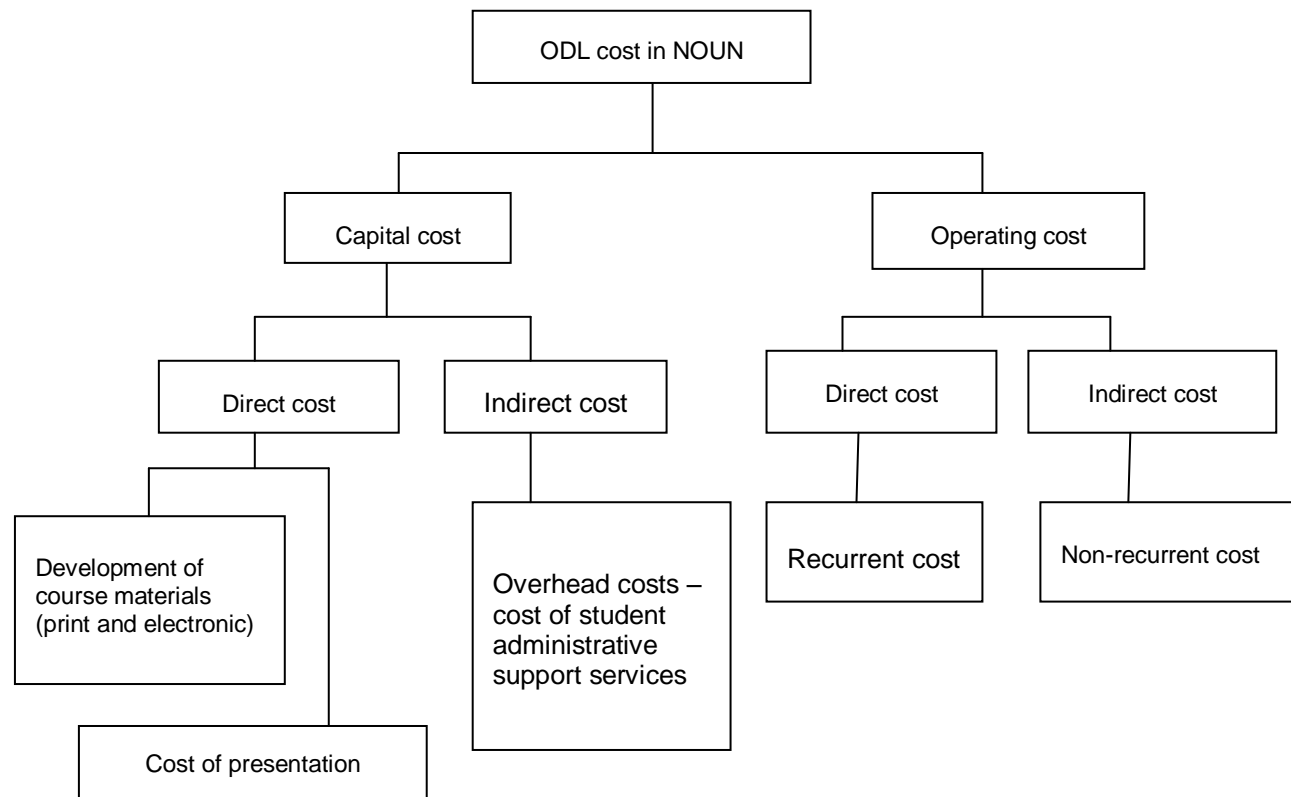


Figure 2. Researcher's conceptual illustration of cost indices in National Open University of Nigeria (NOUN).

of course materials, provision of study centres, matriculation and graduation ceremonies, and costs of services provided by non-staff. The non-recurrent costs include cost of adopted course material.

The cost indices in NOUN corroborate the works of Hülsmann (2000). This implies that NOUN cost indices conform to the general acceptable cost indices in open and distance learning. Therefore, with the categorisation of NOUN expenditure into appropriate cost indices makes the determination of its cost function easy. This will also help to prevent formidable cost function; thereby the desired cost functions like the total cost, marginal cost, capital cost, and operating cost could easily be determined.

CONCLUSION AND RECOMMENDATIONS

The indices of cost in open and distance learning in Nigeria reveal a peculiar cost structure for ODL. It therefore implies that the various sub-sections in an open and distance learning should be considered during fund allocation. These include student enrolment, cost of course material production, cost of students' admini-

strative support services and cost of presentation. The budget allocation should specify these sub-sections to discourage diversion of funds. For example, the fund budgeted for course material production should be well guided because any flux in course material production could cause serious set-back on the academic progress of a distance programme.

REFERENCES

- Carnoy M, Levin HM (1975). "Evaluation of education media: Some issues" *Instr. Sci.* p.4.
- Carter CF (1973). "The economics of the Open University: A comment", *Higher Educ.* 1:285-288.
- Cohn E, Geske TG (1990). *The economics of education* (3rd Edition). U.S.A. Pergamon Press.
- FRN (1977). *National Policy on Education*. 1st Edition. Lagos-Nigeria. NERDC.
- FRN (2004). *National Policy on Education*. 4th Edition. Lagos-Nigeria. NERDC.
- Hülsmann T (2000). *The Costs of Opening Learning: A Handbook* (Vol. 2). Oldenburg: bis.
- Keegan D (1999). *Foundations of distance education* (3rd Edition). U.S.A. and Canada. Routledge.
- Keegan D, Rumble G (1982). *Characteristics of the distance teaching universities*, in G. Rumble and K. Harry (eds). *The Distance Teaching Universities*, London: Croom Helm.

- Laidlaw B, Layard R (1974). Traditional versus Open University teaching methods: a cost comparison. *Higher Educ.* 3:439-468.
- Levin HM (1983). *Cost-effectiveness: A primer*. London: Sage.
- Mace J (1978). "Mythology in the making; is the Open University really cost-effective?" *Higher Educ.* 7:295-309.
- Mace J (1996). *Economics of Education (Vol. II)*. London: University of London External Programme.
- Neil M, Rumble G, Tout A (1979). Some aspects of modelling for recurrent cost budgeting and forecasting in distance learning systems, in W. Dörfert (ed). *Fernstudien an Universitäten*, Klagenfurt: UVD.
- Nwagwu NA (2001). *Issues in the Financing of Higher Education*. Maduewesi E. J. (Ed). *Financing of Education in Nigeria*. Ibadan. XTM Technologies Press Ltd.
- Perraton H (1982). *The cost of Distance Education*, Cambridge: IEC.
- Perraton H (2004). *Handbook B3: Costs and economies of open and distance learning*. Commonwealth of Learning (COL).
- Rumble G (1981). 'Economics and cost structures' In: Kaye A and Rumble G (ed). *Distance Teaching for Higher and Adult Education*, London. Croom Helm.
- Rumble G (1982). The cost analysis of learning at a distance. Venezuela's UNA, *Distance Educ.* 3(1):116-140.
- Rumble G (1987). 'Why distance Education can be cheaper than conventional education', *Distance Educ.* 8(1):72-94.
- Salawu IO, Adeoye FA, Ojo OD, Olakulehin K (2010). Sustaining Indices as measures of service delivery in open and distance institutions in Nigeria. *Turkish Online J. Distance Educ.* TOJDE. 11(1):3.
- University of Ibadan (2010). "A Brief History of the University of Ibadan Distance Learning Centre". Retrieved 22nd March 2010 from <http://www.dlc.ui.edu.ng/history.aspx>.
- University of Lagos (2010). "About us: Distance Learning Institute". Retrieved on March 23 2010, from http://www.unilag.edu.ng/index.php?page=about_dli.
- Wagner L (1972). 'The economics of the Open University'. *Higher Educ.* 2:159-183.