

Chapter 16

Introduction to Economics of Education

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Introduction

This chapter is designed to give readers a general knowledge of economics and education, its meanings, components, concepts as well as the relationship between these. It also explains the interrelationships between the two concepts by identifying how education contributes to economic growth and development.

Economics of education is a combination of two concepts: economics and education. Therefore, it is most appropriate to have a good understanding of the two terms in order to explain the concepts of education properly.

Education is defined as 'the process of acquiring knowledge and functional behaviours required by individuals for decent living in a given society while economics deals with the rational decision of making choices among several competing needs. That is, how someone makes a choice on what to produce, how to produce it and for whom to produce in society. Economics studies human behaviour in relation to making choice among competing needs. In economics, scientific and statistical tools are employed to carry out an analysis of human behaviour in making a rational choice among different alternatives. Economy refers to the interplay of factors that result in the production, distribution and consumption of goods and services in a country.

Eneasator (1996) identified the following, among others, as the scope of economics:

1. Creation of wealth.
2. Equitable distribution of income.
3. Allocation of productive scarce resources.
4. Appropriate use of human capital in a way that ensures full employment.
5. Growth and development of the nation's economy

6. Responsible planning and costing programmes that ensure efficient use of a nation's resources.

Economics of education is a specialized field aimed at establishing a relationship between education and economics through the application of economic concepts and principles to educational planning and administration. Its major concern is application of available limited resources to provide qualitative and quantitative education in a nation. Economics of education explains the relevance of education to learners, and societal resource needs for achieving education process (Akpan, 2002).

Economics of education gives a clearer understanding of why and how investment decisions in education are made. It projects short, medium and long term effects and outcomes of financial outlays on education and how best to design and implement public policies that affect the distribution of educational resources.

The main goal of economics of education is to create room for improved educational efficiency and effectiveness to help improve the knowledge of what drives education outcomes and results so as to better understand the links between education systems and the labour market and maintain a network of professionals.

In other words, economics of education is that branch of Economics that deals with how education is funded as well as how to ensure efficiency in the allocation of educational resources.

Nwadiani (2000) described economics of education as a branch of Education that looks at how educational wealth is created, shared and used for the purpose of influencing education and the economy in general in a way that benefits society. From these definitions, three critical elements emerge and these are the production, sharing and use of available social wealth in the education sector.

Blaug (1972) submitted that the content of economics of education should be drawn from various related areas and disciplines which should be those that were influenced by education.

It was in the opinion of Blaug (1972) that the content of economics of education should cover the following areas: occupational structure of the labour force, labour and employment issues, regional labour movements within a country and labour mobility across international boundaries, the amount of personal

income and its distribution, and the level of investment and economic growth. Within this context, economics of education will embrace such areas of economic activities that portray, expand and justify investments in education.

This chapter of the book discussed the following topics relating to the economics of education, Viz:

- (i) Why do we have to study economics of education?
- (ii) Association between education and economy.
- (iii) Basic concepts in economics of education.
- (iv) Demand for education.
- (v) Education as consumption or an investment.
- (vi) Measuring social and private returns to education.
- (vii) Educational efficiency and productivity.
- (viii) Measuring educational output.

(i) Why do we have to study Economics of Education?

Studying economics of education is very important because of the following:

1. The rising cost of providing education and the pressure on the nation's limited resources make economics of education important as a field of study. It provides strategies for reducing the rising cost of education.
2. It provides economic techniques for streamlining the output from educational institutions to match the manpower needs of the economy. This is to control the rate of unemployment among school leavers.
3. Economics of education explains the investment criteria for education. That is, it provides the basis for investment in human resources (human capital).
4. It analyses the relationship between the private demand for education and supply of educational facilities.
5. The knowledge of economics of education guides educational policy makers in making decisions in view of the economic values of education and its contributions to economic growth. Education, being only one of the sectors of the economy, depends on other sectors for survival and ensures a proper link to other sectors (agriculture, health, defense and administration).

For example, school enrolment could be projected to meet the manpower requirement in these sectors.

6. It tries to answer some questions for the purpose of economic planning: Such questions may include:
 - (i) What type of education do we need and in what variation?
 - (ii) How do we impart knowledge?
 - (iii) Who should benefit from education?
 - (iv) What is the cost of and who should pay for education? Private individuals or the public?
 - (v) How are the manpower produced and how efficiently are they utilized?
7. Economics of education helps educational managers to efficiently utilize limited resources. Its knowledge helps to prioritize the use of the limited resources for educational development.

The political process has an enormous influence on education and increased political influence in education has led to the unplanned growth of our educational system. According to Nwadiani (1992), politics plays a major role in the allocation of resources to education as well as the determination of educational policies, determination of education content and the learning environment.

(ii) Association between Education and Economy

Education and the economy operate in a way that the two are mutually dependent. The criterion for educational investment is basically economic. Budgetary provisions for education are based on economic decisions such as what resources are to be devoted to education and in what quantity. Economic models are adapted and used in education because it requires a lot of money to finance it. The investments by government and private individuals in education are premised on the assumptions that:

- i. An educated person earns more income than someone who is not because the productivity of a man is determined by the quantity and quality of education which he possesses.
- ii. Individual income reflects his level of education and productivity.
- iii. The general economic development of a country is related to an individual's level of productivity.

The relationship between economy and education is best illustrated in figure 1 below:

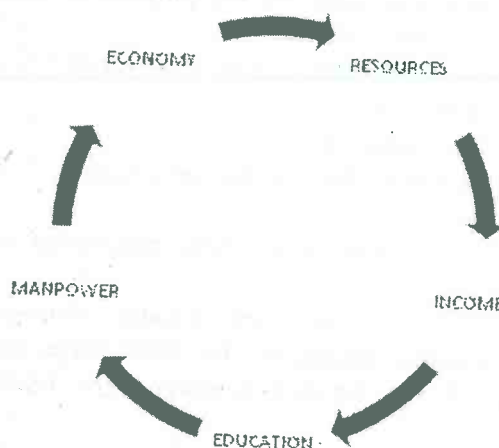


Figure1: Relationship between Economy and Education

Source: Adapted from Akangbou, O.S. (1987). *The Economics of Education: An Introduction*

As seen in figure one, the relationship between economy and education is cyclical.

Economy takes rational decisions on what resources should be used to produce goods and services, how they are to be produced, for which set of people, and how to make efficient use of resources to effect economic growth and development.

The income of a nation, in turn, determines how much resources are devoted to education. In other words, what goes into education determines what comes out of it in terms of the quantity and quality of graduates. This means that a well funded education will bring out good results, one of which is providing manpower that is required for the development of the economy.

Eneasator (1996) was of the opinion that education will raise the level of a country's development when it:

- (i) Increases the productivity level of the literate population.
- (ii) Reduces overall cost of informing and educating individuals.

(iii) Stimulates the desire for learning that can boost economic growth especially skill acquisition which may be more relevant to the economy;

(iv) Strengthens rewards by increasing labour wages.

Because of these positive relationships between education and the economy, the Nigerian government launched mass literacy programmes like the Universal Primary Education, adult literacy, nomadic education and Universal Basic Education (UBE) with a view to universalizing access to education.

(iii) Basic Concepts in Economics of Education.

1. National Income

National Income is a loose term given to the monetary measure of the over-all annual flow of goods and services in an economy. Alternatively, it is called National Product. National Income is the totality of all incomes earned by the factors of production for productive activities in a country in one year. It is measured mostly in two ways:

- (i) The Gross National Product.
- (ii) The Gross Domestic Product.

Gross National Product is the total value of all economic goods and services produced in a country in a given year including net earnings from abroad, that is, the value of exports less imports. On the other hand, the Gross Domestic Product measures the value of all economic activities done within the country in a given year. The main difference between the two measurements is that the G.N.P includes foreign earnings while the G.D.P excludes them. National Income helps to determine the wealth of a nation and can thus be used as an index of economic development and growth of that nation.

2. Per Capita Income

This is the national income per head, that is, an income that can be attributed to each individual of a country.

Mathematically, this is calculated as the national income in a particular year divided by the population for that year.

$$\text{Per Capita Income (PCI)} = \frac{\text{National Income (Y)}}{\text{Population (P)}}$$

The bigger the PCI, the higher the standard of living of the people in a country.

3. Growth Rate

This is the change in any measure of development over a period of time. We shall be concerned with two measures – the growth rates of national income and population.

- (i) **Income Growth Rate:** This is a measurement of the income of a country over a period of time relative to its income at the beginning of the period. The beginning of the period is referred to as the **base year** and the end of the period as the **target year**. In calculating the income growth rate, the base year is the denominator and the difference in income over the period is the numerator, that is, the income in the target year minus the income in the base year.

$$\text{Income growth rate} = \frac{Y_n - Y_o}{Y_o} \times \frac{100}{1} \%$$

Where Y_n = income in period n, i.e., target year

Y_o = income in period o, i.e., base year.

It is usually stated in percentage terms.

- (ii) **Population Growth Rate:** This is the change in the population of a country over a period of time relative to its population at the beginning of the period.

$$\text{Population growth rate} = \frac{P_n - P_o}{P_o} \times \frac{100}{1} \%$$

Where P_n = Population in period n, i.e., target year and

P_o = Population in period o, i.e., base year

If the population in country A increased from 750,000 in 1980 to 800,000 in 1983, we can say that the population growth rate of country A over the 1980-83 period was 6.67%.

This is obtained as follows

$$\begin{aligned} \text{Population growth rate} &= \frac{800,000 - 750,000}{750,000} \times \frac{100}{1} \\ &= \frac{50,000}{750,000} \times \frac{100}{1} = 6.67\% \end{aligned}$$

4. Average Growth Rate

Average is defined as the summation of all units produced or purchased divided by the number of producers, consumers or individuals involved. It is measured in terms of Income and Population

(i) **Average Income Growth Rate:** It is the change in a nation's yearly income over a given period of time.

(ii) Average income growth rate =
$$\frac{\text{Income growth rate (Period o - n)}}{\text{Number of years (period o - n)}}$$

If a country's income growth rate was 14.3% over a period of 3 years, then her average income growth rate would be $14.3\% / 3 = 4.77\%$. That meant the average income in that country grew at 4.77% per annum.

(iii) **Average Population Growth Rate:** This is the annual change in the national population of a country over a period of time relative to the duration of the period.

Mathematically, it is calculated as:

Average population growth rate =
$$\frac{\text{population growth rate (period o - n)}}{\text{number of years (period o - n)}}$$

Based on the illustration given on the population growth rate of country A for the period 1980-83, the average population growth rate of country A was 6.67% divided by 3 = 2.22%. It meant that on the average, the population of country A grew at the rate of 2.22% per annum.

5. Physical and Human Capital

Physical capital refers to the acquisition of machinery, monetary resources and raw materials for the attainment of further development of an establishment or a nation. An annexation to existing stock of capital means an increase in the productive capital of the economy. Human capital, on the other hand, refers to the provision of a skilled labour force which has received requisite educational training. The labour force require adequate training for it to contribute effectively to the rapid growth of the economy. These two types of capital have been found to have contributed immensely to the rapid growth of nations because a country without a skilled labour force cannot effectively develop even when it is endowed with abundant physical resources.

Four similarities are shared by physical and human capital. Firstly, they both increase the productive capacity of a nation. A man without tools, machines or knowledge will not be a productive worker. Secondly, these two types of capital require a long period of time before they pay off. In fact, the stream of returns to educational investment for most people covers a period of 25 to 45 years. Similarly, the stream of returns to a building or machine covers a period of not less than five years. Thirdly, human and physical capital require a lengthy building period. The one for human capital formation is, however, generally longer. Fourthly, these two types of capital depreciate over time.

6. Expenditure and Cost

Expenditure refers to the amount of financial resources that is directly spent by a producer or consumer in the process of producing or purchasing goods or services. Expenditure could be on current or capital items. Current expenditure is the money outlay on goods and services consumed within the current year under consideration. This is sometimes called recurrent expenditure because it recurs regularly, year after year.

Capital expenditure, on the other hand, is the money spent on buildings and equipment which have long life benefits or services over a period of many years. Thus, the difference between re-current and capital expenditure is mainly in the expected length of life of the commodities or services that are purchased. However, expenditure, whether re-current or capital, may not reflect the true cost of the commodity or service. The true cost of producing goods or services includes the cost of all resources used and the alternatives sacrificed for a particular choice.

7. Consumption and Investment

Consumption refers to the use of goods or services that provide immediate satisfaction. For example, the consumption of soft drink. On the other hand, investment refers to the production or use of economic goods or services that would provide satisfaction for a long period of time. In this instance, the purchase of a building, a refrigerator, a television set, etc, is said to be an investment.

8. Cost-benefit Analysis

Cost-benefit is a tool used to appraise an investment in order to correctly determine its yields or returns to any investment project. It involves assessing the costs of the project, the expected benefits from the project and comparing the costs with the benefits to determine the returns on the project. The direct and indirect components of both the cost and benefits are usually taken into consideration.

When the returns are obtained, the next best alternatives are used as a basis for determining the profitability of the project. If the yield of return is greater, then, the investment is worthwhile, if otherwise, it is not worth it.

9. Index Numbers

Index numbers are used to measure the level of change in any activity over a period of time. The beginning of the period, which is designated as the base year, is given a value 100. Here, 100 actually stands for 100% but the percent is not written. The target year's index is calculated relative to the base year. This is obtained as follows:

$$\text{Index in year } n = \frac{\text{Value in year } n}{\text{Value in base year}}$$

Table 1.1 will help us to fully grasp the concept.

Table 1.1: Calculating School Enrolment Index

Year	Enrolment	Index (1975 = 100)
1975	1,200	100
1976	1,250	$1,250 \div 1,200 = 1.042$
1977	1,310	$1,310 \div 1,200 = 1.092$
1978	1,400	$1,400 \div 1,200 = 1.167$
1979	1,100	$1,100 \div 1,200 = 0.917$
1980	1,200	$1,200 \div 1,200 = 1.00$

From table 1.1 above, it can be seen that the index of any year is obtained by dividing the enrolment in that year by year 1975 enrolment. When you look at the result above, you will notice that the enrolment continued to increase from 1975 until 1979 when it

dropped to 1,100. The 1979 index of 91.7 is less than that of 1975, the base year. The change in index is a sign of change in school enrolment during the 1975-80 periods.

Average Cost: This is the addition of all costs of producing or purchasing economic goods and services divided by the total sum of units produced or purchased.

$$AC = \frac{TC}{Q}$$

Where Tc = total cost

Q = units of goods or services and

AC = average cost.

Assuming a pure water factory produced 5,000 units of sachet water at ₦500 the average cost will be 10kobo, that is,

$$AC = \frac{₦500}{5,000} = ₦0.1$$

Marginal Cost: This is the addition to the cost of producing or purchasing one more unit of goods or services. For example, if a company produces 300 units of a commodity and decides to increase its production level to 301 units, the cost of producing the 301st unit is referred to as its marginal cost of production.

$$MC = TC_{n+1} - TC_n$$

Where TC_{n+1} = total cost of producing or purchasing $n + 1$ units

TC_n = total cost of producing or purchasing n units

and MC = marginal cost

Table 1.2: Marginal Cost of Production

Unit	Total cost (₦)	Marginal cost (₦)
11	100	-
12	110	10
13	123	13
14	136	13
15	151	15
16	166	15

17	182	16
18	198	16
19	213	15
20	228	15

The marginal cost of producing the 15th unit will be:

$$\begin{aligned} MC &= 151 - 136 \\ &= \text{N}15 \end{aligned}$$

10. Efficiency and Productivity

Efficiency refers to the difference between the output of a producing entity and the inputs used in producing the output expressed as a ratio. An activity is said to perform efficiently when an amount of inputs yields the highest attainable outputs. It is about using each resource in educational productivity efficiency by making the best use of each given input. The measure of educational efficiency can be presented mathematically as:

$$E_t = \frac{Q_t}{X_{i,t}}$$

Where Q_t = Educational Outputs) in time t

$X_{i,t}$ = inputs in time t , $i = 1, 2, 3, \dots, n$;

and E_t = efficiency of the education system.

Productivity, on the other hand, is the expression of immediate costs relative to their benefits. In efficiency, an attempt is made to see how outputs produced can be kept at the same level even when input level is reduced. In the case of productivity, the objective is to see that future costs are reduced relative to benefits or costs held constant while benefits are increased.

(iv) Demand for Education

The importance of education cannot be over-emphasized. It has proved to be a veritable vehicle for national transformation in human history, a vehicle for individual and societal development. It is with the above knowledge of education that governments at different levels in Nigeria have hugely invested in education. Nigeria commits a substantial amount of her resources to the education of her citizens.

This is because Nigeria has high expectations from education as an instrument of social change and development.

The Nigerian educational enterprise has been growing at a very high rate. Schools have witnessed large enrolments, and the number of schools has greatly increased to meet the demand occasioned by large enrolments. The general belief is that education is the best way of bringing about the desired transformation and modernization of the economy.

Factors Affecting Demand for Education

Four major factors influence the demand for education by individuals:

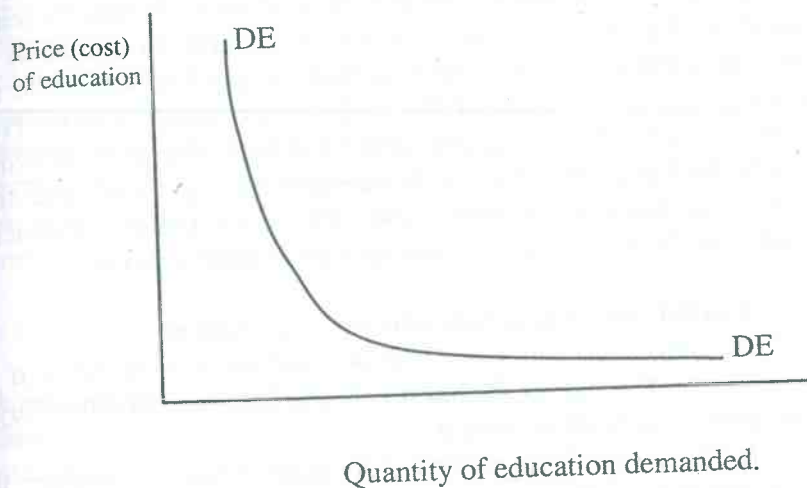
- a. the price to be paid for the educational training.
- b. the benefits to be derived from the training acquired.
- c. the availability of an adequate family income to meet the cost of education.
- d. the availability of non-educational alternatives.

(a) The Price of Education:

The price paid by individuals for a certain amount of education can determine the number that will enrol for that educational programme. The cost of education involves the payment of tuition fees, purchase of textbooks, stationery, transport, uniforms, maintenance allowance, etc. When these are fully paid for by individuals, there is the tendency for the quantity demanded to be lower than when they are highly subsidized. Whenever a government is desirous of increasing enrolment and improving the demand for a particular level of education, the practice is usually the removal of school fees (tuition) and then the free supply of textbooks, uniforms and school bags.

The relationship between the price (cost) and the quantity of demanded education follows the normal demand relationship which states that more education will be demanded at a lower price.

Fig. 2: Demand for education based on the price factor

**(b) Benefits from Education**

The benefits or satisfaction to be derived from the acquisition of a certain amount of education can be categorized as follows:

- i. a higher income level during the individual's working life
- ii. a greater psychological satisfaction with regard to achieving one's life goals or ambition; and
- iii. a greater contribution to the quality of life in the individual's community.

All these forms of benefits exist once an individual has acquired a particular educational qualification. In Nigeria, it would appear that parents have always demanded for more education for their children because of their belief that secondary and higher education increase their chances of earning a better life income. Also, some parents provide university education to their wards because of their desire to be the first among the few families that have doctors, lawyers and engineers in their villages or towns. This is because of the high value attached to such disciplines by the Nigerian society.

(c) Family Income

The per capita income of the people of a nation can determine the quantity of education that they demand. For example, in a

subsistence economy where little income is earned, savings may be too little, and people may not be able to send their children to school because of this. If they want to send their wards to school by all means, they have to save more to afford the price of education and also forgo the contribution of that child to the family's farm. From late 50's to early 60's, it was common for a time table to be drawn up for each child to go to school up to a certain level, get a job and then sponsor his younger brothers and sisters to school. Financing education in those days was always seen as a family venture.

(d) **Availability of non-Educational Alternatives**

An individual chooses the goods and services he buys, if he has the choice. If however, he has no choice, then he will either buy it at whatever price or do without it.

In the case of education, individuals have to consider the various alternatives that are available. To some people, it is believed that instead of investing huge sums of money on the education of their children, it is better to involve them in the family business right from youth. In such cases, the children have low levels of educational attainment. In other instances, parents enrol their wards in skill acquisition and entrepreneurial trainings instead of pursuing higher education, more so, in this era of few job employment opportunities for graduates of higher educational institutions. For some parents, there are no alternatives to higher education: as a matter of policy, it is higher education first before any other considerations. In such cases, those parents' homes or states have turned out to be the area with the highest number of highly qualified persons.

(v) **Education as Consumption or an Investment**

In this section, an attempt is made to justify education as an investment or consumption. Both government and individuals take decisions as to the amount and type of education to demand for and invest in. It is sometimes argued that some people desire education for its own sake while others demand for it for the expected social and economic returns. The fact that more and more education is demanded for by Nigerians over time suggests that individuals and/ or their parents feel that education is a profitable investment.

By definition, consumption refers to the purchase of goods or services to provide immediate satisfaction. Expenditure on education is believed to be a social service that yields no economic returns. Education is seen as a consumption on the premise that land can be developed but labour cannot. Both individuals and governments are involved in taking decisions on the amount of investment to make on education. Government's investment in education is usually referred to as a social investment while that undertaken by individuals is referred to as a private investment.

The Costs of Education

Durosaro (2000) described educational cost as synonymous with educational expenditure. He said the real cost of education is defined as the real resources used in the production of educational capital asset in the form of the educated student. Akangbou (1987) divided education cost into two parts which he called components of the costs of education. The first component is called direct cost, and it is the amount of money spent by governments and private individuals to purchase educational resources. These are the direct monetary expenditures on education by governments and individuals or their parents. The second component is the indirect cost of education which refers to the earnings or income forgone by pupils and students when they decide to undertake an educational training programme. They are called opportunity costs of schooling.

Educational cost may be either private or social in nature. Private costs of education which are borne by individual students and their families are payments of tuition fees, costs of books, uniforms and transport. The social costs of education are borne by the public through the government. These cover all items such as payment of teachers' salaries and allowances, expenditure on books, stationery, transport and other educational goods and services.

Ogbodo (1982) and Oyeniran (2008) placed education cost under capital and recurrent costs. Capital costs cover items such as purchase and development of school land, school buildings, classrooms and laboratories, and other durable institutional equipment. These costs do not recur regularly but they do have implications for recurrent costs in terms of maintenance costs on such fixed assets, usually for not more than one financial year. Resource

inputs, which are recurrent in nature, have to be reviewed periodically. Hence, they fall under recurrent expenditure. They are often called operational costs, since they are necessary to keep the operation going.

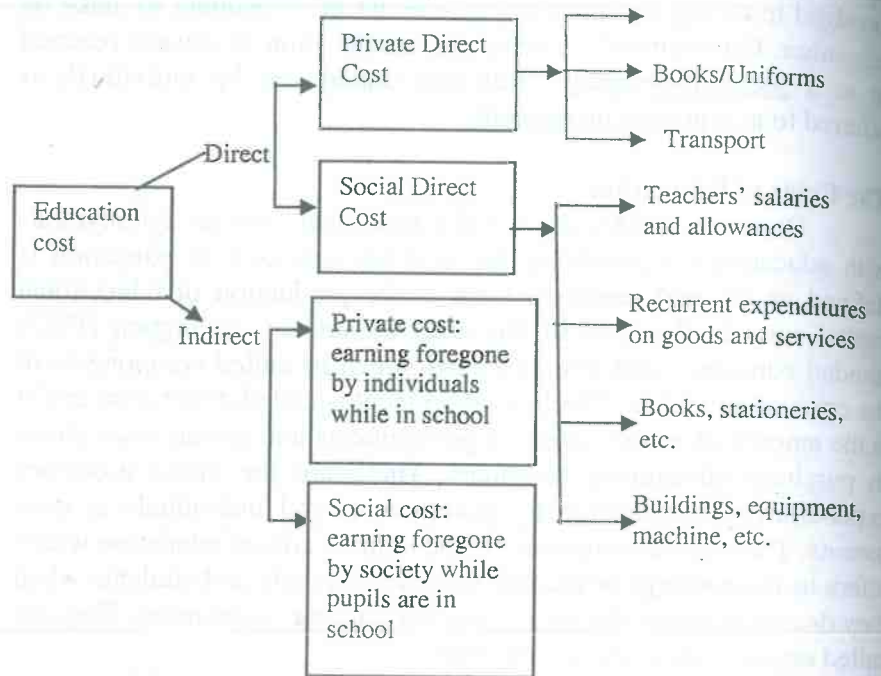


Figure 3: Education Cost Tree

Source: Atolagbe (2011) Public Cost, International efficiency and academic performance of Kwara State public secondary schools.

(vi) **Measuring Social and Private Returns to Education**

Returns on educational investment can be calculated by using any of the following three methods.

- Cost-Benefit Ratio (CBR) method
- Net discounted present value (NOPV) method; and
- Internal Rate of Return (IRR) method.

...have to be reviewed
...recurrent expenditure. They are
...they are necessary to keep the

Books/Uniforms

Transport

Teachers' salaries
and allowances

Recurrent expenditures
on goods and services

Books, stationeries,
etc.

Buildings, equipment,
machine, etc.

...ational efficiency and
...ary schools.

...to Education

...be calculated by using

...and

(a) The Cost-Benefit Ratio Method

BCR is the ratio of the benefits of a project or an investment expressed in monetary terms relative to its costs. All benefits and costs are expressed in discounted present value.

BCR takes cognizance of money realized when a project is executed vis-à-vis the costs of executing the project. The higher the BCR, the better the investment. The general belief is that a project with a higher benefit than its cost is a good one that must be picked among alternative projects.

$$\text{BCR} = \frac{\text{Pv benefits}}{\text{Pv costs}}$$

Where Pv benefit = present value of benefits, Pv cost = present value of costs

It involves basically three steps:

Step 1: Calculate the total amount of money made from working as a graduate over a certain period of time to determine the benefits. For instance, if a graduate earns ₦10.6million in 35years of employment, then the benefits will be ₦10.6million.

Step 2: Determine the total cost of training/ producing a graduate (both private and social costs) that is, under the assumption that it will cost above ₦4.5 million to produce a university graduate by today's standard in Nigeria.

Step 3: Divide the total benefits of ₦10.6million by the total cost of ₦4.5million.

$$10/4.5 = 2.22$$

This means that for every ₦1 invested by the Nigerian society on university education, 2.22 naira will be generated in terms of increased productivity in the future.

(b) The Net Discounted Present Value Method

This method takes into account the changing value of money by assuming a rate at which the cost and benefits from education would be discounted to present day values. In effect, the method tries

to determine what the naira value will be in the future compared with its present equivalent given the rate of discount.

NDPV is calculated by summing the naira valued benefits and then subtracting all of the naira valued costs with discounting applied to both benefits and costs appropriately.

Cost Benefit Analysis will yield a positive NDPV if the benefits exceed the costs.

$$\text{NDPV} = \sum_{t=0} (\text{Benefits} - \text{Costs})_t / (1 + r)^t$$

Where: r = discount rate

t = year

n = analytic horizon (in years)

If the NDPV is positive then the educational project is considered profitable. If it is negative, then it is unprofitable.

Working Example

Let us assume the streams of social costs and benefits of education (B.Ed) degree programme is as shown below.

(a) Social costs	Year 1	Year 2	Year 3	Year 4
Total ₦35,000	₦35,000	₦35,000	₦35,000	₦140,000

(b) Social benefits, i.e., pre-tax earnings differential.				
Age groups	22-25	26-30	31-35	36-40
Amount				
Per Annum (₦)	₦225,000	₦250,000	₦300,000	₦325,000
Age groups	41-45	46-50	51-55	56-60
Amount				
Per Annum (₦)	₦350,000	₦375,000	₦400,000	₦425,000

We can calculate the NDPV if we assume a discounted rate of 5percent. Using the formular for calculating NDPV, we have selected a number of years.

Selecting Year 1 and Year 2 with age group (22-25)

Example 1: NDPV for project year 1

Social Costs = ₦35,000

Social benefits = ₦225,000

$r = 0.05$

Therefore,

$$\begin{aligned} \frac{B_1 - C_1}{(1 + r)^1} &= \frac{225,000 - 35,000}{(1 + 0.05)} \\ &= \frac{225,000 - 35,000}{1.05} \\ &= \frac{190,000}{1.05} \\ &= 18095.23 \end{aligned}$$

Example 2: NDPV for project year 2(same age group)

Social Costs = ₦35,000

Social benefits = ₦250,000

$$\begin{aligned} \frac{B_2 - C_2}{(1 + r)^2} &= \frac{250,000 - 35,000}{(1 + 0.05)^2} \\ &= \frac{250,000 - 35,000}{(1.05)^2} \\ &= \frac{215,000}{1.1025} \\ &= 195012.34 \end{aligned}$$

The NDPV can be calculated for each year from age 22 to 60 when he is expected to retire from service.

Internal Rate of Return Method

The Internal Rate of Return is a capital budgeting method usually adopted to measure and compare the profitability of an investment project. It is also referred to as the discounted cash flow rate of return or the rate of returns. It works on the same principle as the NDPV, but instead of assuming a rate of discount, it derives an internal rate of return that equates the stream of benefits to the stream of costs.

Thus the IRR is calculated as:

$$\frac{B_1 - C_1}{(1+r)} + \frac{B_2 - C_2}{(1+r)^2} + \dots + \frac{B_n - C_n}{(1+r)^n} = 0$$

Where B_1 = Benefits from education in year 1

C_1 = Cost of education in year 1

r = the internal rate of return

The calculation of internal rate of return is usually very tedious, but a "discounted cash flow" is usually worked out with the help of a computer to obtain the internal rate of return required. Even this requires "trial and error" on some of the rates of return.

The logic is that if at a rate of 8%, the computer says:

$\sum_{t=1}^n \frac{B_t - C_t}{(1+r)^t}$ is positive and at 10% it is negative, then the IRR lies between 8 and 10 percent. You can then run another programme using rates between 8 and 10 percent, depending on how large the positive and negative figures are.

(vii) Measuring Educational Output

Educational output is intangible. It cannot be measured in the very same way industrial output such as the number of motor cars or cartons/ crates of drinks are measured. However, it is necessary to look at the objectives of the educational system to be able to determine what it can produce each year.

One of the objectives of educational system is to encourage its citizens to acquire knowledge through schooling. The system is expected to train the citizens by providing them with the knowledge required for each level of education. Thus, any person that is able to complete each of these levels is treated as an output of that system.

The "length of schooling index" of educational output is however flawed because it never introduced quality into the education output. At the end of each level of education, students are required to write some form of examination which may be conducted by external bodies. It has, therefore, been suggested that a better measure of the output of educational systems is that one which takes academic achievement into account.

The "academic performance index" as a measure of educational output applies quality criteria to educational output measurement. When we assess the number of secondary school leavers by their level of academic achievements in WAEC/NECO O/Level examinations, quality is being introduced into the measure of SS 3 completers of secondary schools.

Measuring Educational Inputs

The inputs of education are the teaching and non-teaching staff, physical structures such as buildings and non physical ones like students and educational objectives as well as services like water, electricity supply and other educational consumables.

Measuring these, with the exception of students, does not pose serious problems as the amount spent on each can easily be known. However, the monetary value of students' time devoted to acquisition of knowledge is required. The only way this could be done is to obtain an estimate of income lost while the students are in school. This is the alternative forgone. When the annual value of income lost is known, then the next stage is to aggregate all outputs.

Economists who have studied this problem usually solve it by adding together each input cost and obtaining a social input index. For instance, if teachers' salaries and allowances for year X are ₦120 million, imputed rent on school buildings is ₦10 million, students' time spent in school instead of working for money is estimated at ₦420 million, and all other goods and services including furniture, equipment, stationery, postal services, transport, etc., are estimated to cost ₦78 million, then the total cost of educational production for year X is ₦528 million.

Summary

Economics of education as a specialized area of study is justified by the need for stakeholders in education to be adequately informed about how well educational resources can be utilized in order to meet the educational needs of individuals, communities and the country as a whole. It highlighted the inseparable relationship between the economy and education, because adequate provision of economic resources to fund and finance educational needs will have significant influence on the volume and value of economic outputs. A sustained investment in education can engender a massive returns to investment of time, money and personnel which could in turn benefit the country's economy.

Review Questions

1. What is economics of education? Why is it necessary to study economics of education?
2. Identify and describe basic economic problems that are central to economics of education?
3. Why are the concepts of National Income, Growth Rate and Gross Domestic Product important to management of education?
4. Is Education a consumption or an investment? Justify your position.
5. Describe Cost-Benefit Analysis. How is it measured in Education?
6. Define the terms 'private cost', 'social cost', 'direct cost' and 'indirect cost'. Identify various costs that can be incurred in education under each of the component.
7. The Table below shows National Income and Population of Countries B and D between 1979 and 1984

National Income	Country B	Country D
1979	₦30million	₦36million
1984	₦35million	₦42million
Population		
1979	100,000	104, 000
1984	112,000	118, 000

With the data provided above, calculate:

- (a) the per capita income in countries B and D in 1979 and 1984.
- (b) the growth rate of the national **income** of countries B and D
- (c) the population growth rate of countries B and D
- (d) the average income and population growth rates of countries B and D during the 1979 – 84 period.

8. With good examples, write short notes on the following education costs:

- i. Direct cost of education.
 - ii. Indirect cost of education.
 - iii. Private direct cost of education.
 - iv. Social direct cost of education.
 - v. Private indirect cost of education.
 - vi. Social indirect cost of education.
9. Explain the term “Social demand” for education. What effect has the introduction of Universal Basic **Education** (UBE 2004) on the demand for education in Osun State?
10. You have noticed that the secondary school system in your state is **becoming** inefficient. Overtime, what actions would you recommend to Education Authorities in your state to improve **secondary** school efficiency level?

Sample Research Topics

1. The financial challenges facing educational institutions in a **depressed** economy
2. Funding and operational efficiency of public universities in Nigeria
3. Educational cost as a correlates of internal efficiency of public **secondary** schools in Nigeria.
4. Funding and academic performance of public secondary schools in Nigeria
5. Parental socio – economic background and academic performance of students in rural areas of Kwara State
6. Analysis of factors influencing the **demand** for education in different socio – economic settings in South-west Nigeria.

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