CHAPTER III

TAXONOMY OF COSTS OF EDUCATION
The technique of unit cost has become an important tool to examine the productivity and the efficiency of any educational system. Its use has been growingly realized by the planners, policy-makers and cost analysts in educational planning.\textsuperscript{50} The unit cost analysis facilitates the estimation of operational cost of an educational institution as a whole as well as cost at different levels, by types and streams of education. Cost estimation will furnish the data about the degree of cost effectiveness and the efficiency with which the system operates with respect to resource allocation to education. This estimation of cost will be useful for planners to allocate budget and plan the resources for education. The unit cost analysis enables the planners to identify the least expensive methods to impart the education.

The interest in the unit cost analysis of education started seriously in sixth decades of twentieth century. It was the time when economists developed the interest in the concept of human capital in true perspectives. The pioneer of this branch (Economics of Education), TW Schultz had himself calculated the cost of education in USA and estimated the stocks of human capital during 1940-1957. The analysis of resource utilization in education enabled the government, the policy-makers, the planners and administrators to discover the gaps in functioning of educational institutions. Almost all the educational system of the world, developed or developing are facing the financial crises. The problem becomes more acute as demand for education increases at a high rate of growth on one side and resources may not increase at the same rate of growth on other side. It will be necessary to know how appropriate the available resources are being used, before we suggest how best they can be used. For this, cost analysis of education will be extremely advantageous.

The analysis of the Productivity and Efficiency in the field of education

involves the assessment of inputs and outputs of education. The process of education, its inputs and outputs are interwoven and do not remain constant over a period of time due to different variables. Inputs to education and consequences of education changes over time.\(^{51}\) It is difficult to evaluate the changes, and to assign them unambiguous numerical indicators. The process of teaching and learning change and it is difficult to describe the process of change independently of the changes in the nature of inputs and outcomes. Attempts have been made by experts to identify the input variables and measure the output.

Regarding outputs, Alexander W. Astin\(^{52}\) has applied the standardized test scores of the cognitive and effective domain of the student as a measure of output or outcome of education. Educational system of a country whether developed or developing, is comparable to any inter-industry system of the economy. As inter-industry system is always based on the interdependence of different sector of the economy, education system is also based similarly on the interdependence between different educational activities. All educational processes from Pre-Primary education to Higher Education or Professional Education, taken together, may be taken to constitute a system of close inter-dependence. Each lower grade feeds the next higher one with inputs of students who enter higher grades or classes as semi-finished inputs for further processes.

Richard Stone\(^{53}\) on input-output analysis of education said that in education, human capital inputs is always intermediary for a given level and type of education. All material inputs can be assessed in physical quantities and their


money value should be determined as the flow inputs are concerned. Education may be considered as an integral component of an inter-dependent inter-industry system. Each lower process or grade feeds the next higher process or grade with the input of students, consequently teaching these students to enter as the raw material to be processed further.

A variety of cost functions have been estimated by the economists for different industries. It is assumed that specific size of plant is installed for the production of a specific level of planned output which envisaged to be produced at the minimum cost.\(^{54}\) Once the range of planned optimum output level is likely to be crossed by actual output, firm will build new plants rather than move up the rising portion of average cost for the existing plan. The educational system and its production process have to produce ‘knowledge’. A student enters in educational institution with a ‘stock of received knowledge.’ During his stay in institution, he adds further knowledge to initial stock through the teaching learning process. This addition to the initial stock of knowledge may be termed as ‘knowledge added’ which may be further termed as output of education and the output commodity production in terms of service sector.

Educational system expresses the process of transformation of inputs into output. It warrants devising of quantitative measures of inputs and output of education. To analyze the educational production, labor of teaching and non-teaching staff, capital and school building may be treated as inputs, used in production and relate it to the output of school or college passed outs. Cost of education is divided into two parts namely, recurring cost and non recurring cost.

Cost as defined by Hanson\(^{55}\), “The cost of producing a certain output of a commodity is the sum of all the payments to the factors of production engaged on the production of that commodity. The term cost of production has meaning only


when it is related to output”. Hanson further wrote, the term “cost” is ambiguous, since it has several different meanings for a given output it may be total cost whereas for one unit of output it is average cost. A firm’s costs can be divided into fixed and variable costs or into prime and supplementary costs. Regarding fixed costs and variable costs he wrote ‘fixed costs are those that remain the same over a wide range of output, whereas variable costs are those that increase or decrease with every change of output.’ Opportunity cost is the alternative forgone in order to produce or consume a commodity. The opportunity cost of students is generally treated as the value opportunities or incomes foregone by the students while they are in the educational institutions. It is equal to the amount which they would have earned, had they not attended the college with their educational qualifications, at the time of entry to the educational institutions.

Few economists are of the view that opportunity cost is not only student related foregone cost but it is a social cost that society loses the same amount that could have been added to the GNP of a country. These economists have argued against the estimation of opportunity cost on the ground that in other sectors of economy too this cost exist namely housewives, mothers, volunteers etc. These economists viewed that opportunity cost is zero in under-developed countries, where the problems of unemployment and underemployment exist.

The identification of the “unit” of output in education is a typical problem. But sometimes, unit costs are also calculated with reference to other “units” such as cost per school, cost per classroom, cost per teacher etc. As cost factor is highly sensitive to the number of students, the student is considered the unit. The unit has been defined by an expert in a seminar on ‘Measurement of cost Productivity and Efficiency of Education’ in terms of “certain depth of knowledge per pupil year, weighted with certain physical and moral characteristics”. Experts like Verry also

have measured the output of a university department by the number of graduate and post-graduate students enrolled.

Educational costs may be classified according to the dichotomy and distinction between:

(a) Public and Private Resources.
(b) Institutional and Individual Sources and ownership of Resources.
(c) Social and Private Cost.
(d) Institutional and Individual Costs.
(e) Nominal and Real Costs.
(f) Direct and Indirect Costs.

Private cost refers to costs incurred by the owners and managers of private institutions. Expenditure incurred on this cost is met by non-government revenue. Private cost also refers to the expenses incurred by parents on the education of their wards. The private costs include visible costs and opportunity cost. Visible cost can further be divided as:

(1) Tuition Cost.
(2) Maintenance Cost or Non-tuition Cost.

The Non-tuition cost includes cost incurred on the following:

(1) Books
(2) Stationary
(3) Hostel
(4) Transport
(5) Uniforms
(6) Others

Social cost refers to the cost incurred by society in general and public authority in particular. Further institutional costs may be classified into private institutional and public institutional cost. This cost is also of two types namely visible cost and non visible cost i.e. opportunity cost. The visible cost is recurring and non-recurring in nature. Further recurring costs includes expenditure incurred on:
1. Teacher’s salaries.
2. Salaries of other staff.
3. Scholarships, stipend etc.
4. Depreciation.
5. Other expenditure of recurring in nature.

The non recurring cost includes cost on:

2. Furniture.
3. Equipment
4. Other expenditure which are non-recurring in nature.

Institutional cost may be classified into private institutional cost and public institutional cost. Overall institutional cost may be defined as the aggregate of all expenses incurred by an institution in the production of knowledge added. Direct costs are referred to as those in which money figures, while indirect costs are those that are imputed and monetary transactions do not figure in. Direct cost refers to expenditure incurred by students or their parents on all type of fee, books, stationary etc. Indirect cost refers mainly to earnings foregone or sacrificed by the students. Building costs may provide an example of both direct and indirect cost. Direct cost is the total capital cost paid for the purchase of land and construction of building on the land. However there is opportunity cost, if the building had not been used for this purpose, it would have been used for a different purpose and would have earned rent that becomes opportunity cost of the building.

The concept of factor cost may become the basis of unit cost analysis of education. The factor cost is the amount paid for the factor inputs used in the production process of education. Education is an industry. It is a new slogan when every human activity is economized. Education claims a considerable amount of the national budget and it contributes to the growth of socio-economic development. Factor payments are the prices which are paid for the input resources. These factor input resources includes teachers, supporting staff, building, equipments, furniture, books, stationary, uniforms etc. The services of these factors are purchased at market prices. The salary and pay structure of
teaching and non-teaching staff may be decided by the institutions, government or independent agencies. The pay revision of the teachers and other staff is the consequence of market force prevailing in an economy. Shri Prakash\textsuperscript{58} has commented, “Educational System is inextricably related to the educated manpower at local, regional and national levels both on input and output side and it is inevitably associated with the major shifts of demand and supply functions of human capital”.

Education sector has always provided a considerable number of employment opportunities and so it is a parallel industry. 16,44,000 persons were employed by education sector in a developing country like India in 1960-61, which was half the number of persons who employed in the manufacturing industry of the country.\textsuperscript{59} Education should be treated as one among many sectors of the economy of a nation. Education too should be considered as an integral component of an inter-dependent inter-industry system. Two types of costs have to be incurred by an industry, namely operational cost and capital cost. Operational cost refers to expenditure incurred on raw material, intermediate inputs, wages, salaries, interest and maintenance. Like industry, operational cost keeps the educational system going. Capital cost in the education system contains the expenditure on buildings, land, laboratories, equipments, library and other equipments of permanent nature.

The expenditure incurred by the individual student or by parents on fee, transport, books, stationary, extra coaching or tuition classes, funds like Boys Fund, Vidyalaya Nidhi Fund and other related items add up to the personal costs of education or private costs of education. The socio-economic backgrounds of the

\textsuperscript{58} Prakash S, Educational System of India – An Econometric study Concept, New Delhi, 1977.

students influence the expenditure habits and greatly influence the private cost. Though school education imparted in government institutions is almost fully subsidized, private cost has to be incurred by the parents. As long as student is not the part of the labor-force or earning member of the society, private cost becomes major constituent of educating the child. Taken together institutional cost and private cost, give a comprehensive idea of costs of education and unit cost analysis.

Education sector, the important segment of social sector of economy is the most labor intensive of the entire social sector in any country. As a result large portion of expenditure on education is devoted for salaries of teachers and non-teaching staff. The structure of expenditure of a developing country will indicate the magnitude of this aspect. The development of school education in India is mainly vested in the hands of State Governments. The Kher committee on the pattern of finance and expenditure, long ago has recommended that at least 20 percent of the budget expenditure of the State Government should be devoted to education.

Expenditure and educational growth are not only inter-related but rather inter-dependent. Education acts as the catalyst of socio-economic change by generating appropriate attitudes and growth environment. It has both direct and indirect economic effects that are operationalised through education economy linkage. Educational growth mainly depends upon the availability of resources.

The expenditure on education at every level is financed through different sources in all the countries whether developed or developing. The expenditure on education is normally devoted to the salaries of teaching and non-teaching staff, buildings, equipments, direction, inspection and administration. Therefore, in order to calculate the total costs of education, the costs incurred by different sources and on different heads and associated activities of education must be taken into account. The Organization for Economic Co-operation and Development (OECD) study group on education listed the various elements or items of cost of production. OECD computed the total resource cost of education. It pointed out the resource cost includes the opportunity cost of all resources used in the production of education. The total resource cost of education must necessary contains the following main components:
1. Teaching (staff) Cost.
2. Administration (staff) Cost.
5. Private (personal) Cost.
6. Opportunity Costs or earnings foregone.

Teaching cost means the cost per student incurred on teachers’ salaries. The cost takes into account the total salaries, allowances and other expenditure on the social security. Administration (staff) cost consists of the institutional administration, direction, inspection, accounts and the non-teaching staff. Recurrent cost on common services includes the expenditure on common services like examinations, student facilities, and maintenance of equipments, auxiliary services and contingencies. The miscellaneous costs on the components which cannot be grouped in any of the other cost can be included in this cost. Capital cost contains the expenditure on land, buildings, laboratories, equipments, library and other items of permanent nature. A large amount of money is spent on acquisition of land, construction of buildings, equipments, furniture, library, laboratories etc. The stock of capital is the stock of buildings, equipments and other capital items at a point of time. These items are subject to depreciation and may need replacement after some time. The capital cost can be estimated according to the life span of the item. The expenditure on library, laboratory and equipments is treated as capital cost since they all will be used by the students of successive years.

Private (personal) cost includes the expenditure incurred by the parents of the students or by the students on items relating to education. This includes the expenditure on:

1. Food
2. Maintenance
3. Transport
4. Communication
5. Books and Stationary
6. Tuition or coaching charges
7. Fee and other Academic charges
8. Pre-admission charges, etc.
The cost of food is the expenditure incurred by the parents of the students or by the students on items relating to food. This is the expenditure incurred by the students on their mess bills in the hostels, restaurants or at home. The cost of food of the students who live with their parents may be calculated on the basis of total members of the family.

The maintenance expenditure of the students include expenditure on clothing including school-uniform, laundry charges, footwear, expenditure on medical check ups, cost of medicines, toiletries etc. The cost on transport includes the expenditure on transportation by the students to going to school and back. The cost of communication includes the expenditure on telephones including mobiles also expenditure on postal charges if student is staying in the hostel. The expenditure on books and stationary includes the expenditure on helping books, computer stationary and other allied items. Tuition or coaching expenditure is the major expenditure incurred by the parents on the education of their children. This expenditure may be varied from parent to parent and student to student. Also this expenditure may be varied according to streams of the study and subjects in the stream. Fee and other academic charges include the fee like tuition fee, examination fee, educational tours etc. Pre-admission cost is the expenditure incurred by students in purchasing the admission application forms, attending interviews in connection with the admission into the institutions etc.

Atmanand Mishra\(^{60}\) said that various types of unit cost studies can be undertaken and utilized for comparing and estimating expenditure on future schemes namely:

1. Unit Cost per pupil.
2. Unit cost of a standard building for a type of institution.
3. Unit cost of providing requisite standard furniture.
4. Unit cost of minimum necessary equipment for an institution.
5. Unit cost of direction and inspection.

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60. \(\text{Mishra Atmanand, Education and Finance, Kailash Pustak, Sadan, Gwalior. pp215.}\)
6. Unit cost of transportation.
7. Unit cost of mid-day meals etc.

Mishra developed the following formula for the cost of educating a pupil in a category of institution under a particular management:

Cost per pupil = \( \frac{a(1 - r)}{t} \)

Where,
\( a \) = average salary of teacher.
\( r \) = ratio of non-teaching cost to teachers salary.
\( t \) = pupil teacher ratio.

The average annual cost per pupil on account of teacher costs and on account of non teaching costs may be calculated. The total of the two will give the total average annual cost per pupil. The percentage of non-teaching costs to teaching costs will give the proportion of expenditure on operational expenditures.

Shri Prakash (1996)\(^{61}\) considered labor and material capital inputs in education production and related it to output of school pass-outs. He divided the cost of education into two parts namely Recurring Cost and Non-Recurring Cost. He used the following equation to depict these two components of cost:

\[ E = nC. \]

Where,
\( E \) = Total Educational Expenditure
\( n \) = Enrolments
\( C \) = Overall Unit Cost

\[ E = E(1) + E(2). \]

Where,
\( E(1) \) = Total Recurring Expenditure
\( E(2) \) = Total Non-Recurring Expenditure

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E (1) = n [C (1)]
E (2) = n [C (2)]

Where, C (1) and C (2) are total Recurring and Non-Recurring Cost respectively.

Non-Recurring Cost will generally coincide with the fixed cost which is incurred once for all and total expenditure on such items may not vary with output. Consequently the unit cost of non-recurring nature is expected to decline rapidly with enrolments. Unlike the non-recurring unit cost, recurring cost tends to change with enrolments, though the change in size is measured by output.

Svennilson, Edding and Elavin have given a formula for assessing the cost of education. This is reproduced by Mukerji\[^{62}\] as:

\[U_1 = P_1 \times e_1 \times t_1 \times w_1 \times (1 + K_1).\] Where,

\[U_1 = \text{Unit Cost of Education}\]
\[P_1 = \text{Population in the age group for which cost is to be calculated}\]
\[e_1 = \text{Enrolment ratio}.\]
\[t_1 = \text{Ratio of teachers to students}.\]
\[w_1 = \text{Average annual salary of teachers for the age group}.\]
\[(1 + K_1) = \text{Ratio of total cost of teachers}.\]
\[K_1 = \text{Relation of teacher costs to other than teachers costs}.\]

The concept developed by the authors is similar to producing a capital goods and calculating its cost. Authors considered “educated person”, produced through educational process is like a capital good used for developing the economy

of an industrial organization. The educated manpower will make the contribution to economic growth and development of a country through education.

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. The problem of measuring the efficiency of education is compounded when we ask ourselves “What output should we measure?” Educational system of a country has no single well defined function, and so it has no well-defined indicator of output.

The measurement of output of a given cycle of education as the number of pupil who complete this cycle, may be the appropriate approach for measuring the efficiency of education. Though, it is a narrow approach for measuring the educational efficiency because drop-outs too acquire some of the skills which the system meant to teach them.