

ASSESSING EDUCATION AT MULTIPLE : LEVELS OF THE EDUCATION SYSTEM

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Abstrak *Keefisienan sistem pendidikan menjadi tumpuan dalam perancangan pembangunan negara kerana pendidikan bertindak sebagai pemangkn pembangunan lestari. Tumpuan kepada keefisienan didorong oleh keperluan pembangunan pendidikan dan sumber tenaga manusia merupakan sektor yang memerlukan sumbangan kewangan kerajaan terbanyak. Keperluan sumbangan kerajaan yang besar ini akan menjadi sebagai kekangan kepada negara-negara sedang membangun kerana berhadapan dengan dua keadaan iaitu pertambahan penduduk dan juga keperluan mendapat lebih ramai pekerja yang berkemahiran. Antara pendekatan yang dapat diamalkan apabila sesebuah negara menghadapi tekanan pertambahan permintaan social dan ekonomi untuk pendidikan ialah: mendapat sumber kewangan tambahan atau sumber kewangan baru bagi tujuan tersebut. Membekal perkhidmatan pendidikan dengan kualiti yang lebih rendah atau mengurangkan akses pendidikan; dan meningkatkan keefisienan sistem pendidikan. Bagi negara membangun, aktiviti meningkatkan keefisienan bertujuan untuk mengawal kos dan bertindak sebagai organisasi Pusat dalam perancangan, membekalkan perkhidmatan dan menilai program pendidikan dan latihan menjadi amalan. Kertas kerja ini bertujuan untuk membina penunjuk bersoifat kuantitatif bagi keberkesanan dan keefisienan pendidikan, dan menggunakan indikator pendidikan dibentuk daripada pembolehubah di bawah kawalan pentadbir atau perancang pendidikan. Penilaian indikator ini dapat menerangkan bagaimana sistem pendidikan itu berfungsi dan langkah yang akan diambil oleh perancang berusaha untuk meningkatkan kualiti sistem pendidikan.*

INTRODUCTION

In the last two decades there has been a great increase in the attention paid to efficiency issues in regard to the role that education plays in development (Psacharopoulos and Woodhall, 1985; Windham and Wang, 86; Aschaver, 2000). This increased attention has been brought about by the constrained fiscal condition under which most developing nations are forced to operate and the heightened demand for resources from the education and human resource sector, other social service sectors, and from the infrastructure sectors (Tsang, 88; Gallagher, 93).

The education sector has been used as a major vehicle for promoting national, social, economic and distributional objectives. These objectives were stipulated in the long-term plan – the Overall Perspective Plan I and II (1971 – 90 and 1991 - 2000). They became the main thrust of Malaysia's New Economic Policy (NEP) and National Development Policy (NDP). Malaysia's educational strategy has consistently been backed-up by substantial budgetary allocations. Over 1981 – 1998, the Government allocated between 17.7 to 19.6 percent of its total recurrent expenditures, and between 12.9 to 17.1 percent of its development expenditure. Higher expenditures are due both to the wide coverage of the education system and to higher student's unit costs. These improvements in opportunities and educational quality resulted in a high share of GNP spent on education. The education share of GNP for the last three decades is within the range of 4.5 to 6.0 percent (World Bank, 2000). However, the development and performance of Malaysia's national education system in the past three and a half decades have not been without difficulties and constraints. Fiscal problems and other socio-economic and political constraints that affect

the nation's general development plan had also affected the implementation of her education programs (World Bank, 98 and 99). The share of recurrent expenditures on education declined as a result of the relatively faster growth of other sectors. Apparently, resources for education come at sizeable opportunity costs in terms of optional resource use. Indeed these constraints underscore the need not only for a careful and detailed planning for education focused on the identified purposes but also for a careful evaluation of the education system vis-à-vis as stipulated by the National Development Policy, and also in achieving the objectives stipulated by the National Education Philosophy.

As the Malaysian education system matures, the challenges it faces are also changing. The emphasis is to shift away from planning of large physical programs, now well in hand, towards more sophisticated problems of technological choices, cost-effectiveness and marginal resource allocation that require greater flexibility and a stronger managerial orientation. Quality concerns now tend to focus on the skills and knowledge implications of Vision 2020 and on closing the achievement gap between urban and rural areas. The access problem has both a quality and an equity dimension. Efficiency in management of resources is assuming increasing importance, as the search for excellence as a relative lack of financial constraints have led to a tendency to select costly options, which may not be sustainable given the already high level of recurrent expenditures.

THE ASSESSMENT OF DEVELOPMENT AND PERFORMANCE

The assessment of development and performance of the Malaysian education system leading to the formulation of education plans has been based primarily on economic criteria instead of on the basis of social and educational considerations and priorities. Such input criteria as the amount of dollars allocated in the investment plans and in executing the recommendations of the plans have dominated much of the theme of the assessment procedures. These procedures act as a priori to the formulation of subsequent plans and agenda for action. In addition, the rate of construction or improvement of physical facilities, percentage of schools and classrooms erected, laboratories and teachers quarters built, overhead costs and per pupil expenditure, and a host of unlimited items along similar priorities and needs have frequently become the operative criteria in judging the development and performance of the education system.

The major resource allocation and fiscal policies are heavily dependent on such input variables as briefly outlined above. However, the general and overall policies of the education system if they are to respond effectively to the larger societal needs and national goals as enshrined in the National Development Policy, must be guided by a more succinct, informative and variable sets of data, that is variables in terms of input-output. This is based on the assumption that while the inputs of the education system can be described and operationalised in objective terms, the products or outcomes of the educational investments can be measured, quantified and described in a manner that would reflect the objectives of the system and the national objectives as stipulated in the National Educational Philosophy and National Development Policy.

The measurement of selected indicators of outputs will invariably reflect the achievement of a wide range of educational objectives. To provide an accurate picture of the performance indicators, Educational Planning and Research Division of the Ministry of Education undertakes the collection of school based data with the aid of computerized procedure. The data collected are aggregated at the district's based data for Peninsular Malaysia and at

division level for Sabah and Sarawak. The data are finally summed up to arrive at the district, division, state and national figures. The purpose of this paper is to identify appropriate quantitative indicators of educational effectiveness and efficiency and to discuss how such indicators should be used in assessing education at multiple levels of the education system.

DEFINITIONAL AND METHODOLOGICAL ISSUES

The nature of the concept of efficiency as currently used by most economists, and the advantages and disadvantages one encounter in applying the concept to an activity as internally complex and contextually diverse as education should be analyzed with care. The paper will discuss four major forms of efficiency analysis applied to education: benefit-cost, cost-effectiveness, cost-utility and least cost models. The paper will also discuss limitations that exist in attempts to apply the economists' models of cost and productivity in education. Further, the paper will concentrate on identifying appropriate quantitative indicators of educational effectiveness and efficiency and how such indicators should be used in assessing education at multiple levels of educational system.

The concept of efficiency, is infect, a relatively new emphasis within the lexicon of economics. It is a metaphor borrowed from engineering relationships. Only in the last fifty years has great attention been directed toward the issues of measurement and empirical testing of the deductively derived theories of neo-classical economics. This new emphasis on quantification has been to raise the issues of the operationalization and measurement of economic variables. The economist can no longer be satisfied simply by stating that under a given budget, efficiency exist, and for a producer when the marginal cost of an output from a production process equal the output's marginal revenue product or for a consumer when the ratio of the marginal costs of all consumption items to their marginal utility are equal.

In any technical process, efficiency exists where the desired mix of outputs (effectiveness) is maximized for a given level of inputs (cost) or where inputs are minimized for a desired mix of outputs. The concept of effectiveness (how well or to what extent the desired outputs are achieved) is subsumed in the concept of efficiency (effectiveness relative to cost). The term effectiveness is used when indicators represent outputs or output proxies (input or process variables and outcomes) and efficiency when the indicators represent a comparison of effectiveness with costs.

If the definition of efficiency is specified in terms of physical quantities only, one has a definition of technological efficiency. When one modifies the concept to take into account utility, or monetary measures, a definition of economic efficiency is derived. Economic efficiency is defined as existing when the value of all outputs is maximized for a given cost of all inputs or where the cost of all inputs for a given value of all inputs. Both the efficiency concepts, technological and economic, appear both rational and intuitively obvious. However, what is less obvious is how to measure inputs and outputs so that one may know when efficiency exists and, to know what value (costs of prices) to assign to inputs and outputs to avoid biasing the identification of efficiency.

In a competitive market situation all firms must strive to achieve efficiency because the inability or unwillingness to do so will mean that their competitors can lower prices and drive the inefficient firms out of the market. Efficiency in a competitive market is therefore a self-monitoring and self-equilibrating process. Since firms in a competitive market are by

definition, small relative to the total market, the individual firms have no effect on the cost of inputs or prices of their products. Thus, economic efficiency can be defined in a non-arbitrary manner. Unfortunately, the conditions of competitive market are increasingly rare in general and simply do not exist in regard to the education and training systems of most nations. Education in developing nations is either a monopoly function of government or exists as a major financier and regulator of the educational activity.

In shifting from a model of a competitive market to one of a bureaucratic management or regulatory system, one loses the self-monitoring and self-equilibrating characteristics that assured efficiency in the competitive situation. Economists and non-economist have questioned the propriety of transposing the efficiency concept from a technical setting to a social or behavioral one. Is it justified to transpose the concept of competitive efficiency to a non-competitive context? In the last ten years we have seen a rapid escalation in attention paid to efficiency issues related to educational finance and management; and this increased attention has occurred in both socialist and market economies. The increased attention to efficiency has resulted more and better educational benefits are obtained for a given level of expenditure.

In proceeding to establish efficiency terminology, it is useful to discuss the concepts of production and utility that underlies the practical discussion that follows. The production process for education, for which the major factors are depicted consisting of four main parts: inputs, process, outputs, and outcomes (Refer Figure 1 and Annex 1). Inputs are the resources used in the production activity and may be divided into the general categories of student characteristics, instructional material and equipment characteristics and facilities characteristics.

The term characteristic refers to the availability of a resource, its nature and quality, and its manner and rate of utilization. For example, teacher characteristic would relate to teacher's mastery of the subject matter for which the teacher is teaching. The effect of subject matter competence on education production function process will depend on the existence of some measurable level of competence, its nature (the areas of skill mastered) and quality (the degree of competence).

The process stage of education refers to the means by which educational inputs are transformed into educational outputs. Often the term educational technology is used to refer to specific process of promoting educational outputs (example: classroom lecture/discussion, small group instruction, self-study with text-books, and self-study with programmed instruction). The interaction of inputs and processes determine educational costs.

Educational managers should be able to design the instruction/learning systems by considering alternative inputs and processes simultaneously. However, with serious limitation exist in terms of the availability and quality of inputs, educational manager in most developing nations would not be able to design the instruction/learning system by considering alternative inputs and process simultaneously.

Figure One : Major Factors in the Education Production Process

<u>Determinants</u>		<u>Effects</u>	
<u>Inputs</u>	<u>Process</u>	<u>Outputs</u>	<u>Outcomes</u>
Student Characteristics	Forms of Instructional Organization	Cognitive Achievement	Employment
Teacher Characteristics	Alternative Technologies	Improved Manual Skills	Earnings
School Characteristics	Use of Teacher and Student time	Attitudinal Changes	Status
Instructional Materials and Equipment Characteristics		Behavioral Changes	Attitudinal Changes
Facilities Characteristics			Behavioral Changes

Reasons for teacher-centered lecture or discussion, as the means of educational technology is neither an accident nor a result of unfettered choice. This mode of classroom instruction has emerged because, first, many educational budgets allocate 80% or more on expenditures to teacher salaries, and second, because teacher and student ratios are such that a lecture format is seen by most teachers as the only means by which the teacher can deal with large number of students for whom they are responsible. Teacher training systems advocate greater use of small group and individual instruction, but the teacher's own classroom experiences as a student and the reality of classroom management demands the structured teacher-centered forms of classroom organization.

Figure One shows the effect side of the efficiency model that involves both outputs and outcomes. Outputs are the direct and immediate effects of the educational process. They include cognitive achievement, manual and skill development, attitudinal change, and behavioral changes. The outputs are used in judging the equity and fairness of educational system. Comparisons of such measures as student means and standard deviation among socio-economic, location, or other classification have an ameliorating, neutral, or reinforcing effect on initial social disadvantages of given groups. Outputs, when compared to educational costs, can be used in measuring internal efficiency as a measure of how well the education institution or system achieves its stated goals (Refer Table One and Two). It is calculated by the ratio of outputs to cost. If both output and cost can be quantified in monetary terms a benefit/cost ratio can be derived. To be efficient, benefit must exceed the cost (i.e. the benefit cost ratio must be greater than 1.0). If the effects of an activity cannot be stated in monetary terms, it is possible to derive a cost-effectiveness ratio. Least-cost analysis involves the lowest level of conceptual sophistication of any of the analytical models for measuring educational efficiency.

INDICATORS OF EFFECTIVENESS IN EDUCATIONAL PRODUCTION

Efficiency is defined in terms of both inputs and outputs. However, the discussions related to schools are confined to input and process measures as indicators of effectiveness. They are included because the preferred output and outcome measures of educational effects are frequently absent. Analysts are therefore forced to attempt to evaluate a school or program only on the basis of inputs and processes. School quality definitions are as likely to refer to inputs and processes as they are to outputs or outcomes. For the purpose of this discussion, variables that are not within the control of the school administrators or planners such as home and community variable will not be discussed.

Indicators of effectiveness

Education indicators tell something about the functioning of the education system and provide information about the state of affairs the whole education system or important component of it. Indicators obtained are from variables that are within the control or influence of the school administrators or planners or educational authority. The quality of school or other educational institutions are determined by the cost, quantity, and/or quality of inputs. The most commonly studied input is the teacher and the teacher's characteristics.

The characteristics of teachers that form the basis for the commonly used indicators of teacher quality are:

- formal education attainment – relate to quality of formal education;
- teacher training attainment - preparation of individual;
- age/ experience – as a proxy for maturity or experience;
- teacher specialisation with teacher requirement (shortage of teachers trained in science or mathematics);
- teacher's verbal ability;
- teacher's attitude towards the classroom process
 - attitude towards children
 - attitude towards community, the school administrators, their fellow teachers, and the teaching profession;
- other indicators include:
 - student/teacher ratio (the average share of teacher's time available to a student);
 - teacher/class ratio (if the ratio is less than 1 suggests that double session exist);
 - teacher per school ratio; and
 - teacher instructional hours per week

Facilities:

It is common within the conduct of educational census to collect data as to whether a school has laboratory, an administrative office, a workshop, student laboratories, etc. These census normally cannot provide information about the quality and utilization of the facilities. Observation at school sites will reveal that significant variation in the nature of provision and utilization of specific facilities for instruction or other purposes can exist even within a single special use-category.

School facilities and characteristics have been used as proxies for quality or potential effectiveness. However, data such as student per school, student per classroom are measures for the availability of space. Student per school is an indicator only when one knows something about the normal physical size of the school in a country, the nature of instructional process, and the distribution of population. For example, rural schools are almost always smaller, and smaller schools because of the existence of economies of scale, are more costly per student.

Equipment and educational materials

The availability of educational materials has received increased attention because of growing evidence that it is an important correlation and probable determination of classroom achievement (Lockheed, 87). The discussion of equipment inputs as indicators of educational quality or effectiveness parallels that has just been discussed under facilities inputs.

Process indicators

Analysis of educational process looks at interaction that takes place among inputs under different forms of classrooms technologies (instructional system). The discussion will emphasize three aspects of analyzing the educational process:

- 1) the analysis of administrative behavior;
- 2) the analysis of teacher behavior related to time allocation; and
- 3) the study of specific student behavior related to time on task and utilization of resources provided to schools.

The process variables if they are to be measured properly, normally require observational or survey data collection. However, the assessment through observation and inquiry systems especially in the non-cognitive domain that involves feelings, attitudes, interest, values and aspiration, the results have somehow raised questions of reliability, validity and practicability. Instrumentation on these areas has been confronted with questions stemming from problems of definition, faking of responses, quantification, and interpretation of results. Further, the above procedure of assessment is subject to the issue of high inference as against low inference approaches. In spite of their supposed limitations and weaknesses, the instrument types evolved for non-cognitive assessment can be rich sources of information if carefully constructed and validated.

Administrative behavior

The administrative process indicators would be those of the administrator's interaction with teachers, pupils, parents and communities. Contacts with parents have three important aspects: to encourage parental support of educational activities of the family's children; to promote parental and community involvement in the education process; and to interact with community concerning problems of school discipline and poor student performance.

The promotion of parental and community involvement has three desired outcome:

- 1) utilization of home resources in the educational process;
- 2) involvement of community members in instructional and instructional support roles; and
- 3) participation of parents and community in providing financial support to the school.

Teacher time allocation

The allocation of teacher time in education may be viewed as divisible into three broad categories of activities:

- 1) administrative tasks;
- 2) instructional task; and
- 3) monitoring and evaluation tasks.

The measurement of time distribution among these three categories is a useful indicator of the teacher role in the education process.

The administrative tasks of the teacher include contacts with parents and the community, classroom organization and record keeping, and maintenance of student discipline. The monitoring and evaluation tasks include the designing and conduct of class tests and school examinations, grading, decisions on student remediation and progression based on the evaluation procedures. However, the one to which the greatest proportion of time should be allocated, and most complex task is instructional responsibility.

The time allocation of the teacher's instructional activity can be classified as (1) form of instructional group with whom the teacher works – full class, sub-group or individuals; (2) the use of educational materials in preparation, instruction, review, and remediation – use of reference books, textbooks, maps and charts. The time allocation will allow evaluation on implicit technology used in the classroom. Teachers are provided with materials and equipments that are designed to promote a student or material centered instructional approach, on the other hand a time-allocation analysis may reveal that the teacher, through his or her own behavior, has maintained a teacher-centered operation that violates the condition of the new instructional alternatives. Thus, in evaluation of pilot or experimental educational approaches, it is possible to conclude that a new approach has failed to improve student performance when, in fact, closer study of teacher behavior might reveal that the new approaches was never implemented in the form the instructional designers has planned.

Student time allocation

The measurement of individual student behavior or reconstruction of time allocations is subject to wide variety of structures. Student interaction with the teacher and other students are categorized as:

- 1) full class interaction,
- 2) small group with teachers presence,
- 3) small group without teacher present,
- 4) individual tutorial with teacher, and
- 5) working alone.

The second dimension of behavior is in the form of material used such as:

- 1) no materials used,
- 2) textbooks,
- 3) instructional support materials, and
- 4) audio-visual equipment.

Time allocation data on students are not direct indicators of effectiveness or efficiency but do provide information about whether the instructional process is using resources properly and what the probable effects of instruction will be. Besides, each form of interaction elicits

different pattern of student behavior such as independence, leadership or cooperation based on time allocation data.

Output indicators

Educational output is not easily defined because of its character and an analytical construct. Effectiveness can only be indicated by what the school produces. Educational outputs being the immediate effects of educational activity will be discussed in four categories:

- 1) attainment effects,
- 2) achievement effects,
- 3) attitudinal/behavioral effect, and
- 4) equity effects.

Attainment effects

The simplest measures of attainment effects are those provided by educational enrolment statistics. From these statistics one can compare over time the number of students by grade or level of education, by program type (academic vs vocational), and by subject specializations (science vs art), that are normally used in upper secondary or post-secondary levels. These statistics may be used for comparison over-time at the system, state, district, school, and classroom level or for comparison among states, division, district, and schools or classrooms either within or among the program and specialization types.

Increased attainment can be considered a positive indicator of effectiveness since a desired output of education in producing more graduates. On the other hand, educational attrition or repetition that reduce attainment can be considered as negative indicators.

To measure educational effectiveness, attainment and achievement data are required. This is because high attainment rates can be achieved by lowering attainment standards. Conversely, high standards for attainment can result in higher levels of attrition repetition.

Achievement effect

Achievement effects are perhaps the most commonly used of output measures. A systematic collection, storage and analysis of the mass data on student achievement would allow for comparative evaluations of performance between and within groups, regions, and other related criteria. Analysis information based on different levels of schooling and examination such as Standard Six Assessment Examination, Lower Secondary Assessment Examination, the Malaysian Certificate of Education and the Higher Certificate of Education would definitely provide as useful measure of the general performance of the education system (Refer Table Three). In spite of the fact that there are inherent limitation in the usage of the testing instruments in measuring cognitive aspects of educational outcome, a continuous, systematic and careful analysis of this outcome variables would offer valuable information in the effort to evaluate objectively the effectiveness of the entire education system vis-a vis the achievement of the National Development Policy.

Attitudinal/Behavioral effects

Output measures of educational effectiveness are dominated by focusing on the attainment and achievement issues. However, the other important aspect of the schooling outputs from the assessment perspective is the effective or non-cognitive outcome of the schooling process. This is an area for which information is scarce and yet its importance cannot be overstated. While there are numerous attempts by individual research scholars, local and

overseas, to capture and gather information in this area, their collection of the data generally serves the academic circle more than it serves the policy makers and planners.

The educational goals in the area of attitude changes, attributes and values are technically complex and are difficult to define. Assessing schooling outcomes in the area of change and trends in personal attributes, social attitudes, values and norms can be problematic especially with regard to whether or not there is an increase or decrease in the scores on any of the dimensions measured.

Equity effects of equality measures

Equity effect can be expressed in terms of attainment measures, achievement measures, or attitude/behavioral measures. Equity effects are normally expressed on terms based on two dimensions: statistical measures of dispersion and measure of group differences. The first dimension of equity measures would include the range of distribution, the mean deviation, the standard deviation, Lorenz Curves, and Ginni coefficients. The second dimension of equity would compare groups identified by characteristics such as a gender, age, ethnicity, location, size of schools, socio-economic status, etc., in terms of measures of mean, mode, and median values as well as in terms of group differences in the dimension of equity measures. For example, one could compare mean achievement between males and females, or compare the range of scores for the two groups.

Statistical measures of dispersion are indicators of inequality not inequity. Equity interpretations requires subjective judgments concerning whether the inequalities are justified or acceptable. Equity is best understood as denoting a judgment of "fairness" or "justice". The measurement of educational output equality is important because of equality is a basic indicator for making judgment of equity and the variation in output equality can affect student and teacher motivation (Refer Table One).

Outcome indicators

The outcomes are the result of the interaction of educational outputs with a great variety of external influences. These external influences may include the determinants for admission to higher levels of education and training, the supply and demand of the labour market, or the multitude of planned and accidental influences that shape the individual's attitude and behavior. Thus, we can say that educational outcomes are determined by many other factors than the nature and quantity of educational outputs.

The discussion of educational outcomes will serve as the basis for identifying external efficiency. The outcome measures related are:

- 1) admission to further education and training,
- 2) achievement in subsequent educational and training,
- 3) employment,
- 4) earnings,
- 5) attitudes and behavior, and
- 6) externalities.

Admission to further education and training

As for graduates from each level of training, the two major alternatives that one faces are to seek immediate employment or to continue education and training. Further, as the level of

educational attainment increases, the opportunity costs of education also increase in terms of forgone opportunities for employment and earnings.

Using the student's progression to further education or training as a measure of educational effectiveness involves several danger of misinterpretation. First, the choice to continue may be a function of educational proximity than of past performance. The high rate of educational progression in urban areas are, in part, a function of better achievement but also a function of greater availability of opportunities within the immediate areas. Second, admission standards may vary over time or among locations such that it is difficult to identify effectiveness with educational progression rates. A third source of misinterpretation that can result from the use of progression rates as indicators of educational effectiveness is the problem of costs. The decision to continue one's education is not based solely on one's level of intellectual or social preparation; it is an investment decision that must consider costs as well as probable benefits. The fourth and final major source of possible misinterpretation of progression rates relates to the differential value of further education.

Employment

Educational effectiveness is related to how well education has prepared them for employment. As an indicator of educational effectiveness, employment is, however, only a partial measure. The analyst needs to know the type of job and productivity of the school leavers in the job to assess the full effectiveness of education. Employment rates still are commonly used measures in the assessment of educational institutions or system's effect on the economy.

The calculation of employment rates is normally done by dividing the number of employed workers by the size of labor force. The active labor force is defined as the sum of the employed workers and all others who are actively seeking employment (Refer Table Three). Computation of employment index is faced with a problem because neither the number nor the proportion of unemployed workers who are actively seeking employment remains constant over time. This is because during economic improvements with more jobs available, individuals who are not actively seeking will begin to do so, while during periods of lower economic activity, some labor force participants abandon hope of finding employment and leave the active labor force (world Bank, 1998). The result of this phenomenon is that changes in the index of employment are less than proportional to changes in the index of the economic activity.

The most useful data in relation to how well education prepared for employment can be achieved through tracer study. The analysis of tracer study data on education-employment linkages can be summarized in terms of : (i) the decision to continue or discontinue education; (ii) the decision to accept immediately available employment or engage in job search behavior; and (iii) the decision to accept a specific form of employment. Another indicator of educational effectiveness is "job search". A school leaver is expected to select a form of employment that maximizes the net benefits over time. The analysis is based on the assumption that the individual has adequate patience and resources to forgo immediate benefits in some occupation for more substantial but delayed benefits in other occupations.

Earnings

Of all measures used to indicate the effectiveness of education, the earnings measure is second only to achievement. Since the popularization of human capital models in the 1960s, the earning measure has attained a consensus of acceptance among economists as a primary outcome measure for education. The three reasons that support the above arguments are:

- i. the logical and empirical obviousness of earning as a goal of individual educational choice. An increasing majority of students are pursuing their education as a means of increasing their personal economic advantage;
- ii. monetary earnings are an unidimensional numeraire. Earnings have a unit of measurement that have a similar meaning across location and time;
- iii. earning figures are readily available and individuals are willing to report their earnings.

Attitude and behavior

The attitudes and behaviors that are viewed as educational outcomes are those concerning education itself, towards social issues and understanding, toward issues of human rights and responsibilities, towards political participation, and the effect of education on consumption behavior.

Education has the potential to save substantial sum of public monies through reducing unemployment, and propensities of anti social behavior. Further, education of individuals increases the social productivity of material capital, increase employment and earnings of individual, and to use information in making consumer choices, and to allocate consumption decisions to increase individual utility over time.

Externalities

The externalities of education are the basis for identifying the "social" benefits and cost of education. Eight major externalities of education, namely: increased social mobility; change in the distribution of earnings or income; change in attitudes and values; improved political participation and leadership; lower unemployment; improved mix of manpower skills; enhancement of the productivity of physical capital; and increased quantity and quality of research.

Externalities enter into the analysis of educational effectiveness and efficiency. The outcome of education can be a legitimate measure to be included in society's judgement of educational effectiveness. Thus, the use of the externality concept to categorize outcome variables between those relevant only to the societal collective is crucial since effectiveness or efficiency studies are designed for evaluation and improvement of the decision process of the individuals and the society.

CONCLUSION

The concern over the efficiency issue is for two reasons. First, education and human resource development form the single largest category of public expenditure. The current size of expenditure on education will be under great pressure in the remainder of this century both from population increases and demand for more and better trained workers.

The three financing alternatives when faced with increasing social and economic demand are: to obtain new levels and sources of funds; to accept poorer quality and/ or reduced access; and to increase the efficiency with which the existing and future resources are used. For a developed nation, the efficiency enhancement activities cease to be simply a means of controlling costs and become instead the central organizing operations in planning, delivery, and evaluation of education and training programs.

The ministry of Education is constantly seeking ways to improve educational quality. Various measures are being taken such as closely monitoring examination results and analyzing them to diagnose problems. The analysis will focus on teachers, teaching methods, educational resources and curriculum implementation. On the quality dimension, the analysis will be looking at the gradual closing of attainment and achievement gaps across rural and urban areas through the provision of better facilities and equipments.

Summary of Indicators

INPUTS

A. Teacher Characteristics

- Formal education attainment
- Teacher training attainment
- Age/Experience
- Attrition/turnover
- Subject specialization
- Ethnicity/nationality
- Subject mastery
- Verbal ability
- Attitudes
- Availability measures

B. Facilities

- School size
- Classroom size
- Student per school
- Student per class
- Classroom per school
- Availability of special use facilities
- Utilization of special use facilities
- Condition of facilities

C. Equipment

- Availability
- Utilization
- Condition

D. Curriculum/Education Materials

- Availability of textbooks and support materials
- Utilization of textbooks and support materials
- Articulation of curriculum

E. Administrative capacity

- Educational attainment
- Administrative training
- Age/experience
- Organizational context and incentives

PROCESS

A. Administrative Behavior

- Frequency, extent and purpose of external administrative visits
- Frequency, extent, and purpose of internal administrative visits

- Nature, frequency, and result of contact with community

B. Teacher Time Allocation

- Administrative tasks
- Instructional tasks
 - Preparation
 - Instruction
 - Review
 - Remediation
- Monitoring and evaluation

C. Student Time Allocation

- Time on task
 - interaction with teacher
 - interaction with peers
 - interaction with materials and equipment
- Time off task

OUTPUT

A. Attainment

- Progression rates
- Attrition rates
- Repetition rates

B. Achievement

- Examination results
 - Absolute levels
 - Average
 - Scores relative to other groups
 - Mastery levels
 - Achievement gains
 - Effect sizes
- School grades
- Attitude and behavior

C. Equity Effects

- Range
- Quartile deviation
- Mean deviation
- Distribution among criterion levels
- Lorenz curve
- Ginni coefficient
- Group differences

OUTCOMES

A. Admission to further study

B. Achievement in further study

C. Employment

- Initial occupational choice
- Lifetime occupational choice
- Aggregate employment rates
 - Level
 - Rate and direction of change
- Job search period
 - Extent
 - Results

D. Earnings

- Initial
- Lifetime probabilities
- Hedononic and equalizing effects

E. Attitude and behaviors

- Social responsibilities
- Social views and opinions
- Political orientations
- Religious obligations
- Moral orientations
- Consumer behaviors

F. Externalities

- Increased social mobility and social inclusion
- Change in distribution of earnings and income
- Change in personal values
- Improved political participation
- Reduced unemployment
- Improved mix of manpower skills
- Enhanced productivity of physical capital
- Increased quantity and quality of research

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