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Educational Indicators:
What's To Be Measured?

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EXECUTIVE SUMMARY

Currently, numerous strategies and new initiatives for improving quality of schooling at the primary and secondary levels are being considered and implemented, with strong support from multilateral agencies, including the World Bank and the IDB. These initiatives include increasing availability and quality of teaching materials, in-service training of teachers, improvement of teaching methods, supply of subsidized breakfast and lunches at school, etc. There is little dispute these are important and necessary interventions. However, the design, monitoring and evaluation of the cost-effectiveness of these programs and of the educational sector in general is hampered by persistent deficiencies in the quality and timely availability of educational statistics. The objective of the present paper is to provide a framework for the identification of relevant educational indicators. Which are relevant types of information depends on what one wishes to analyze for which policy need. Accordingly, the paper conceptualizes two typologies. The first identifies different types of operational educational indicators, distinguishing between input, access, output and outcome indicators to show that an appropriate information system requires to cover the whole process from supplying educational services, demand factors and accessibility, to results in terms of educational performance and externalities derived from enhanced human capital formation. The second typology distinguishes various types of policy-relevant analysis, such as the assessment of educational performance and needs, cost-effectiveness analysis of educational programs, impact evaluation and assessment of externalities. The informational needs in terms of indicators are specified for each type of policy analysis. The paper concludes with a specification of priority needs in data improvement.

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1. Introduction

Education is a basic human need and a key factor in development. Investment in education will directly raise the well-being of individuals, but it will also raise their `human capital' and capacity to acquire means for the satisfaction of other basic needs. Education is also seen as a means of reducing inequality, as a mechanism of making other investments more productive and as an avenue for social and political development. These positive `externalities' make educational investment also highly profitable for society. Concerns about the quality of education in developing countries, including Latin America, complicate matters, however. Poor quality education could be a poor investment. Assessment of the impact of educational investments thus requires a close monitoring of the quantity and coverage of educational services as well as of the quality of these services.

The past decade has been a difficult one for education in Latin America and the Caribbean. Public expenditure on education declined in real terms in most countries of the region. The priority given to education by the government has diminished as well, with the share of education in total public expenditures falling from about 15 to 13 percent between 1980 and 1990 and declines in real expenditures per capita being even more significant. Nevertheless, net enrollment rates in primary education increased from 82 to 86 percent between 1980 and 1990 and in secondary education from 37 to 40 percent. Thus, despite the apparent decline in inputs, in most countries one does not observe an actual decline in enrollment rates or in other indicators of educational performance. Progress has not been halted, at best it has slowed down. Good explanations for the apparent weak correlation in trends of educational inputs and outputs are as yet not available. One hypothesis is that one has to take account of time lags (Grosh, 1990), that is the investment in educational infrastructure in preceding decades might explain why some educational indicators continued to show improvement during the 1980s. If the hypothesis is correct, the decline in educational spending in the 1980s should give rise to deteriorating performance indicators in the 1990s. However, we know very little about the nature and size of such time lags to actually prove the point (Izurieta & Vos 1994) and, moreover, the quality and comparability over time of the educational data and indicators can be

questioned. Comprehensive and consistent data on educational expenditures by level and sectors (private and public) are hard to come by.

Moreover, there are major concerns about the quality and internal and external efficiency of educational systems in Latin America. It is generally acknowledged that repetition and drop-out rates in primary education continue to be high in Latin America. Yet, we are not entirely sure how severe the problem is. First grade repetition in the region as reported by UNESCO averages 20 percent, but studies suggest official reports consistently underestimate repetition rates and alternative estimates give rates of over 50 percent for Brazil and over 30 percent for Bolivia, Ecuador and Peru (Schiefelbein 1989). Measurement of educational performance is usually restricted to quantitative measures, like enrollment rates, retention rates, average years of schooling, and so on, but it is difficult to get a good picture of the impact on educational quality of the economic crisis in Latin America. Anecdotal evidence suggest a deterioration in the quality of education in the 1980s, but regular testing of knowledge and skills is not common practice in the region to obtain any systematic picture of changes in educational achievement. Information about the quality of teachers, availability of teaching materials and equipment of schooling facilities is equally scarce and unsystematic.

Currently, numerous strategies and new initiatives for improving quality of schooling at the primary and secondary levels are being considered and implemented, with strong support from multilateral agencies, including the World Bank and the IDB. These initiatives include increasing availability and quality of teaching materials, in-service training of teachers, improvement of teaching methods, supply of subsidized breakfast and lunches at school, etc. There is little dispute these are important and necessary interventions. However, the design, monitoring and evaluation of the cost-effectiveness of these programs and of the educational sector in general is hampered by persistent deficiencies in the quality and timely availability of educational statistics. The objective of the present paper is to provide a framework for the identification of relevant educational indicators. Which are relevant types of information depends on what one wishes to analyze for which policy need. Accordingly, the paper tries to identify different levels of policy analysis in education. Section 2 provides a typology of social indicators to reflect chains of causality which run from inputs in the

form of social services, access to these services and output and outcomes in the form of the impact on living standards and development. Section 3 applies this typology for different forms of policy analyses relevant for education. Section 4 discusses some basic issues in the interpretation of indicators and particularly, some methodological guidelines in linking outputs to inputs in monitoring and evaluating educational programs and projects. The paper concludes in section 5 with a priority list of educational indicators and an assessment of the key data sources and collection methods.

2. Four Types of Indicators

This paper discusses the indicators that seem most relevant in monitoring and evaluating the performance, cost-effectiveness and equity of educational services. The main aim is to provide a guidance on the use of indicators. Performance indicators can facilitate improvements in the design and implementation of educational policies. They can inform us about prevailing problems and hint at some of the causes of the problems. Obviously, as also emphasized in a recent World Bank study (Carvalho & White, 1994), indicators are precisely what the word says - "indicative" - and cannot be a substitute for in-depth analysis and evaluative work.

In the extensive literature on social indicators and poverty measurement the importance of an analytical distinction between types of indicators is stressed. Indicators tend to be classified depending on whether they reflect the means, the process, or the end in achieving the objective of a particular set of development policies, programs or projects. Good monitoring and evaluation should make use of an appropriate balance between different types of indicators that can establish the link between means and ends. Prevailing classifications of indicators are roughly similar, though some important differences exist. Here, it is proposed to distinguish four types of indicators[1]: (i) input indicators; (ii) access indicators; (iii) output indicators; and

[1]. This typology has its roots in studies relating to measurement of the quality of life (e.g. Drewnowski 1970) and the basic needs approach to development (e.g. PREALC 1980, Hopkins & Van der Hoeven 1983 and Vos 1992).

(iv) outcome indicators.

As we shall see, it is difficult to make a clear cut typology and that whatever classification is used it is best to think of a chain of indicators that help us link "inputs" that lead to a certain types of activities and responses of beneficiaries ("access") into achieving immediate program or project objectives ("output"), as well as broader development objectives ("outcome").

Input indicators measure the means or the resources employed to facilitate the satisfaction of needs and, hence, reaching development objectives. Examples in education would include the number of teachers, school buildings, teaching materials supplies and the cost and level of expenditures (public and private) on education. Since absolute numbers may not be very indicative for policy decisions, input indicators are often specified as some match of supply and demand variables, such as pupil/teacher ratios and average cost per pupil. I will rank the latter type of indicators nevertheless as input indicators, since they give an indication of the amount of services (inputs) in relation to some identified need or demand.

Access indicators identify demand factors of potential users and would comprise variables that determine the use and accessibility of the supplied services. Examples of this type of indicators in education are the geographical distance to school facilities, family and cultural background of students, foregone earnings of individuals and households, and direct private costs of education (fees, utensils, uniforms, etc.). Some of these demand factors are essential in textbook analyses of the economics of education, but rarely are given due importance in educational information systems, let alone in the practical application of monitoring and evaluating educational programs.

Output and outcome indicators measure the impact of a particular set of policies or a project on living standards of the population. Improvement in these types of indicators should determine the success of policies and projects as they try to measure the development impact. Output and outcomes should relate to objectives, but there may be different levels of objectives, hence the distinction between *output* and *outcome*. The *immediate* objective of educational policies may be to raise coverage of the educational

system (as measured through enrollment rates), improve its internal efficiency (retention rates) and/or raise the skills and knowledge of graduates (which can be measured through achievement tests). *Output indicators*, as defined here, try to measure to what extent such immediate objectives are achieved. Better education may serve broader development goals, such as higher labor productivity, better health and enhanced capabilities of individuals to participate in modern society. Such `higher' goals could be referred to as *outcomes* beyond the immediate influence of educational policies and programs and in economics are referred to as `externalities'. Below, we turn to this concept in greater detail. Here it is merely emphasized that it if such higher objectives form explicit part of policies (and, in practice, these tend to form key elements in the justification of many educational programs), then it makes sense to try to be systematic and precise in monitoring the extent to which such goals are attained.

It may not always be easy to capture "outcomes" through quantitative indicators, but usually proxies can be found. `Socialization' may be captured through proxies such as newspaper circulation, participation in elections, and so on. Labor productivity may be a more straightforward measurable concept, but it may be difficult to identify how much of productivity increases can be assigned to better education.

The design of a clear cut typology is not easy. Others have used slightly different typologies, and are critically discussed in Box 1. Yet, as also emphasized by Carvalho & White (1994: 9), whatever typology one decides to apply, it is probably best to think of a *spectrum of indicators*, beginning with existing inputs and demands that lead to new inputs and activities, which in turn may influence demand and accessibility to services, eventually leading to project or immediate program results in terms of improved living standards in the form of receiving (more and better) education (outputs)[2] and to an indirect impact (outcome) in the form of better employment, higher productivity and improved health. This type of analytical sequence is illustrated in Figure 1.

[2]. Or health, sanitation, housing, or whatever the particular focus of the project or program.

3. Educational Indicators for Policy Analysis

The usefulness of any set of indicators will be determined by the information needs of the analysis and diagnosis of the existing situation, the preparation of policy decisions and the monitoring and evaluation of policy interventions. In education we will distinguish three levels of analysis relevant for educational policies.[3]

Table 1 presents the taxonomy of types of policy-relevant analyses in education and the key indicators required for the analysis.[4] The taxonomy tries to reflect three main concerns relevant to policy makers about the developmental gains to be derived from educational investment:

BOX 1: COMPARISON WITH OTHER TYPOLOGIES

The **World Bank** (e.g. Carvalho & White 1994) defines *input*, *process* and *impact* indicators in its approach to project monitoring and evaluation. Another typology is that of the **"Logical Framework"** adopted by US-AID and many other aid-donor institutions, which distinguishes three different categories: input or activity indicators, output indicators, and goal and purpose indicators. Input indicators in these two typologies would be more or less identical to the definition given above. The logical framework labels these as activity indicators, but essentially refers to the project or program budget as the basis for the indicators that would identify the cost of inputs.

The World Bank's *process indicators* are meant to measure to what extent the program or project is delivering what it is intended to deliver (i.e. the activities of the project), such as the number of schools built, the number of students trained, and the textbook availability per student. All these would probably be ranked in the Logical Framework as "output" indicators. However, by the definitions of the typology proposed here, these could be either input or output indicators: school buildings and textbook availability would be inputs and number of students trained would be an output indicator. As indicated, the idea of process indicators is to monitor the implementation or delivery of the project or program. However, it seems undesirable to group input and output indicators together. It may be preferable to define a subset of input and a subset of output indicators that inform about the project or program specific delivery of inputs (e.g. schools or textbooks) and its measurable impact in terms of output (school enrollment, skills of graduates, etc.). Even though the construction or improvement of school buildings or delivery of teaching materials may be seen as a goal or "output" of the project or program, as in the Logical Framework, they are clearly only an "input" from a development impact perspective. The classification proposed in this paper takes this perspective as the prime criterion to distinguish between different types of indicators. The identification of project specific inputs, next to overall available inputs is an issue taken up below when discussing which indicators should measure what at which level of analysis (e.g. national, sector specific, or program and project specific). As indicated, *output* indicators as defined by the logical framework are more or less identical to the process indicators in the World Bank nomenclature and could be either input or output in the typology proposed in this paper.

The World Bank defines *impact* indicators as measures of the impact of the project on the living standards of the poor (Carvalho & White 1994: 9). Confining the definition to this segment of the population can be justified on the basis of the World Bank's overarching objective of reducing poverty. The dividing line between certain process indicators and impact indicators is not entirely obvious. The number of newly enrolled students would probably be labeled as a process indicator, but also the number of graduates with enhanced skills due to a program providing improved teaching materials might be seen as a process indicator. The latter obviously

[3]. The taxonomy discussed here builds on that given by Psacharopoulos (1993), but incorporates several modifications and expansions.

[4]. This section will just refer to the relevant key indicators. Details on the definitions of these indicators and some comments on their measurement are given in Appendix Tables A.1a-b.

is also a direct measure of living conditions and thus might as well be an impact indicator. Indicators for *goal and purpose* in the logical framework would resemble the World Bank's impact indicators or the output indicator definition applied here. The Logical Framework would require the identification of these indicators in relation to set of pre-defined targets. Obviously, the usefulness of comparing actual impact or output with targets depends on how realistically the latter can be defined at the beginning of the program or project and on how much we know about the relationship between inputs and outputs. Targets should relate to inputs and thus should be interpreted as "expected outcomes".

The typologies of both the World Bank and the Logical Framework focus almost exclusively on the process of delivery of social services, i.e. the supply side. The demand side process is not well captured in these frameworks. In our typology, *access indicators* are introduced in an attempt to make such factors more explicit. The role of externalities and the linkages between the program's output and the impact on other needs (e.g. between education and health) are also not explicit in the typologies of the World Bank and the logical framework. In our typology, the *outcome* indicators are meant to give indications for the analysis of these processes.

(1) educational attainment as a basic human need in itself;

(2) equity and efficiency in the performance of the educational system, where *efficiency* relates to the cost-effectiveness of the educational system and the use of resources used in education and *equity* to the distribution of resources and benefits among the population;

(3) *externalities* of education, i.e. its impact on productivity, labor market functioning, health and social participation.

3.1 Educational performance and identification of needs

The first level of analysis refers to a fairly standard assessment of the performance of the educational system. The performance is usually measured in terms of indicators of either flows or stocks of educational attainment. These indicators should allow for the identification of the available stock of "human capital" as measured by educational attainment of the population. Deficits in educational attainment, and thus apparent *needs* for improvement, will have to be defined in relation to a policy target. For example, a target of 100 percent literacy would define the illiteracy rate of the adult population as the policy-determined deficit, while universal access to primary education may serve as the benchmark to identify the deficit in the net enrollment in primary schooling, etc. Obviously, this way performance indicators will assist the process of diagnosis of existing needs and definition of priorities in improving education. To the extent this process is to lead to programs of educational reform, obviously more diagnostic information will be needed to identify needs and priorities, including the opinions of stakeholders. These aspects are important, but beyond the scope of this paper. Here the analysis will be restricted to, if you like, the more `technocratic' indicators. Let's review some of the key indicators at this level of analysis.

On the flow of human capital.

The most standard indicators for this assessment relate to variables which - in economist's language - identify the *flow* of human capital formation in terms of coverage and internal efficiency of the system. These concepts are usually captured through (gross and net) enrollment rates and retention rates at various levels of schooling. These indicators form, together with the unit costs per student per level of schooling and population projections, key variables for the budget planning of the educational system. The educational deficit index (the ratio of actual to potential years of schooling of individuals in a particular age group)[5] can be used as a complementary indicator, but in fact is a summary indicator for both coverage and internal efficiency of the educational system.

It is important to distinguish between public and private school enrollment and retention rates, not only to ensure complete coverage of the educational system as a whole, but also to assess the efficiency of alternative delivery systems (see below, Section 3.2 for a further discussion).

On the Stock of Human Capital.

Adult literacy rates and the average years of schooling of the labor force are the most commonly used and relevant indicators to measure the existing stock of human capital formation. Coverage and internal efficiency of the educational system will affect literacy rates over time. Though rarely done, it is important to monitor drop-out and retention rates in the lower grades of primary schools, as it is generally perceived that those not attaining third grade of primary school are likely to be incorporated in the group of illiterates (World Bank 1980). *Female literacy* is generally seen as a key indicator identifying positive externalities of education on health. The underlying hypothesis is that a higher educational attainment of females will lead to lower fertility rates, improved nutritional status of children and increased use of health services.[6]

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[5]. See Psacharopoulos, *et al*. (1993) and Morley & Silva (1994) for applications of this variable using household survey data.

[6]. This link, belonging to the third level of the taxonomy presented in Table 1, may require further investigation in particular applications, as empirical studies on this issue do not abound and are mostly based on international cross-section evidence. Several studies have suggested, for instance, that a reduction of female illiteracy need not immediately lead to a reduction of fertility rates; they may even increase, only to decline after a certain level of educational attainment. See e.g. Cochrane (1979), Psacharopoulos & Woodhall (1985), Behrman & Wolfe (1989) and Behrman (1993) for reviews of the evidence.

The *average (completed) years of schooling* of (sub-groups of) the population is another quantitative measure of the stock of human capital and could be seen as a relevant indicator of educational achievement in the long run. The major shortcoming of this indicator is, obviously, that it only measures the quantity of schooling, not the quality.

On the quality of schooling.

Student learning can be measured through achievement tests of knowledge and skills. National assessment systems can help policy makers identify effective inputs and processes and improve these to achieve measurable gains in student learning. To assess improvements in educational quality, it is important to establish a baseline measurement of learning, probably best through a national assessment system and criterion-referenced tests (i.e. which relate to the educational objectives of the country's educational system).[7] Criterion-referenced tests are useful for the evolution of student learning over time and hence of immediate policy relevance. They may be of less use for international comparisons, unless similar forms of testing are conducted in comparator countries and if one can control for differences in teaching curriculums. In practice there are no standard testing procedures across countries and the experience with national assessment systems in Latin America is limited.[8]

Clearly, this is an important area requiring a lot of additional effort in most countries of the region. Assessing educational achievement as an output indicator is very important for two reasons. Firstly, the quality of education, i.e. the type of skills and knowledge, are eventually the key to understanding links between education and income earning capacity, education and productivity, education and health, education and social participation, and so on. Secondly, to the extent that assessment of student achievement also provides the necessary information to control for the family background of students, teacher and school characteristics, along with costs, it will be possible to assess the effectiveness of alternative educational

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[7]. See Horn, Wolff & Velez (1991) for guidelines on educational assessment systems and an overview of the experience in Latin America.

[8]. Currently, only in Chile and Costa Rica count with comprehensive and systematic evaluation systems of student achievement. In Chile the system (SIMCE) was established in 1980 and has been systematically implemented since. In recent years, educational reform programs (many with support of IDB and/or World Bank) have promoted the implementation of examinations and achievement tests. In this context evaluations have become available or are programmed in Argentina, Brazil, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Dominican Republic, Uruguay and Venezuela. However, all these are incipient systems, not well consolidated and test results are not readily comparable across countries.

inputs and identify cost-effective solutions to improve student performance.[9] Generalizable results are not available, so that educational reforms aiming at improving the cost-effectiveness and the quality of education still require a lot of experimenting until more information and research on the mentioned links becomes available. The small number of available studies that have conducted such second level analysis (see below) show that the mentioned factors may have a substantially different impact in different contexts.[10]

3.2 Efficiency and Equity

The second level of analysis is concerned with the efficiency and equity of the educational system, hence with the relationship between inputs and output or costs and benefits of the educational system and with the question of how the cost and benefits are distributed among the members of society.

Efficiency

There are two sides to efficiency in education: internal efficiency and external efficiency. The external efficiency has to do with the extent to which the educational system generates the necessary skills for a

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[9]. See Horn, Wolff & Velez (1991: Annex 2) for summary results for Colombia, Peru and Brazil (secondary education) and Velez, Schiefelbein & Valenzuela (1993) for a broader review of studies relating to primary education. The latter study concludes that socioeconomic and family background (parents
educational level and socioeconomic status, family income, etc.), as well as education inputs (mainly qualitative: teaching methods, access to textbooks, teacher experience, class room time, distance to school) contribute to the acquisition of cognitive achievement.

[10]. The review of studies by Velez, Schiefelbein & Valenzuela (1993) concludes that there is a general absence of cost-effectiveness analysis. The conclusions about factors influencing student achievement cited in the previous footnote only provide an indication of potential efficient inputs, but since costs were not properly studied, little can be said whether these are *cost-efficient* inputs.

smooth running of the economy and society in a broader sense. We turn to this issue when we discuss the third level of analysis (externalities). Internal efficiency is concerned with the relationship between inputs and immediate goals (output) in education, such as the number of graduates, the quality of education and the earning capacity of graduates. Traditionally much of the economic analysis of education has been concerned with the profitability of educational investment as measured through rates of return and using cost-benefit analysis. The limits to this approach have been widely discussed (Blaug 1970, Psacharopoulos & Woodhall 1985) and cost-effectiveness analysis has gained importance. Cost-effectiveness analysis is broader than cost-benefit analysis as it tries to identify the most cost-effective way to change the combination of inputs so as to maximize output, or to achieve a quantitatively or qualitatively defined output or outcome with least input costs. Thus, output or benefits need not be expressed in the same (monetary) units as required in cost-benefit analysis.

On costs and inputs.

Unit costs per student probably form the first fundamental indicator for decisions in education, which - as mentioned - with information on current and expected enrollment will form the key variable in the budgetary planning process. Such cost must be decomposed by:

(i) schooling level and curriculum type (i.e. primary, secondary, university, etc. and type of secondary education, faculty in higher education, etc.),
(ii) sector (private versus public schools),
(iii) region (e.g. unit costs may differ between urban and rural areas), and
(iv) expenditure and input type (teacher salaries, rental-cost equivalent of school buildings, teaching materials, etc.).

Although it seems rather obvious to work with the indicated breakdowns for budgetary planning cost-effectiveness analysis in education, very often, if not mostly, this type of information is not readily available in the countries of the region. This suggests that many decisions tend to be taken without precise information about unit cost of different levels of schooling, curriculum types or university faculties. Informational deficiencies are particularly severe in higher education (costs as well as enrollment and other crucial indicators).

The breakdown between private and public costs of schooling is also important. Note that there are two concepts of private costs of schooling. The first is the (unit) cost of the delivery of educational services through privately run schools or universities. The second is the direct cost of the individual or household to

enroll into the educational system (either public or private) and relate to the fees, books, uniforms, transportation, etc. Here we will only refer to the former concept, below, under 'access', we turn to the latter.

There is an increasing share of private school enrollment in the region and an ongoing debate to what extent private costing and delivery can play a bigger role in a more efficient educational system. The scarce evidence, mainly for secondary education, shows that private school students generally outperform public school students at lower unit costs in private schooling (Jimenez, Lockheed & Paqueo 1991). However, as argued by Colclough (1993), such results need not justify an unconditional plea for more private education, once equity considerations, including accessibility and direct private costs for the student's family are considered as well (see below).

Besides quantitative and monetary measures of educational inputs, it is also important to incorporate some variables on the quality of the input into the cost-effectiveness analysis. Critical ones which can be captured into indicators seem to be the level of training of teachers and the availability of (adequate) teaching materials.

On benefits and output.

Student learning is probably the most important immediate educational benefit and is best measured through achievement tests as discussed above. Economic analysis of education has typically focused primarily on the labor market outcome, as measured through the earnings of students coming out of the educational system. The relationship between learning, productivity and incomes may be complex, such that these variables will have to be assessed separately when analyzing benefits of education. Improved skills and knowledge likely will improve earning capacity of graduates, but labor market imperfections may lead to a situation where workers are not remunerated exactly according to their marginal productivity. One such imperfection, widely discussed in the literature, relates to hiring practices of employers, which use diplomas and years of schooling to select employees and fix wages and salaries rather than probing actual skills as a screening device.[11] In such situations, from the individual point of view, years of schooling would be an equally good indicator to capture benefits as achievement test results and, further, while education would benefit the individual, society may benefit much less as there would be a less than proportional increase in productivity. The point is not to say that a quality assessment of educational attainment may be less relevant for this reason, but rather that the link between (the quality of) schooling, productivity and income earnings should not be taken for granted and should be adequately assessed within each context.

[11]. See among others Arrow (1973), Oxenham (1984) and Psacharopoulos & Woodhall (1985).

On access and demand.

There may be factors impeding individuals to access the educational system. Indicators relating to such factors are essential in any cost-effectiveness analysis. Traditionally, the economic analysis of the factors which have been labeled here as *access* indicators has focused on the concept of *opportunity costs*, i.e. the foregone earnings of the time spend in the educational system. Measurement of the discounted value of foregone earnings is a difficult matter, however, as much as the individuals will be uncertain about the lost income of an extra year spent in school. Alternatively, one could use current income as a proxy and as part of a broader range of factors influencing household decision to enroll its members into the schooling system and maintain them there. Among low-income groups, decisions to stay in the schooling system or not are likely very much a household decision (rather than an individual choice). Survival strategies may require the use of all family labor to make ends meet, consequently affecting school attendance and drop out. Family income and income generating activities (e.g. farm or other form of household-based production unit) may be relevant variables in determining educational performance of its household members. Further, as mentioned above, the *direct private costs* of education (fees, books, uniforms, transport) in relation to family income may form another factor limiting accessibility to the schooling system. Analysis of household survey data and/or family background data collected at the facility level will help to assess the importance of these variables. These indicators would use actual income and actual spending on education as measures of accessibility.

A concept closer to that of opportunity cost, is that of "willingness to pay" for services and has been applied in household surveys focusing on the measurement of living conditions.[12] Such information is useful because it gives an indication of what people are willing (or able) to invest in education, which is useful for the assessment of a recovery of educational costs through user fees or other financing mechanisms. Information of this sort collected at the household level is also particularly relevant to assess the distributional consequences of the increases (or reductions) of tuition fees and the (likely) effects on school enrollment.

Distance to schools (and social services in general) may be an important factor in itself inhibiting access for poor people, particularly in rural areas with a dispersed population (e.g. Selowsky 1979, Vos 1982). Distance has also been identified as a factor influencing negatively on student achievement (Velez, Schiefelbein & Valenzuela 1993). The cost-effectiveness of an investment in educational services may thus

[12]. The outstanding example is given by the Living Standards Measurement Surveys (LSMS) developed at the World Bank.

strongly depend on that in other, physical infrastructure (roads). Hence, it will be relevant to include distance to the schooling facility (geographical or in terms of time) and/or survey based information identifying distance as an access problem in the set of key educational indicators.

Willingness to pay and distance have to be treated carefully in educational policy analysis. A few recent studies have argued that the information on the willingness to pay for the marginal costs of improvements in school quality will have to be compounded by the distance and transport cost to reach the nearest facility and then may be used as a basis for the introduction of user charges (Gertler & van der Gaag 1988 and Gertler & Glewwe 1990). However, also this qualified notion of willingness to pay may fall short of other important considerations. Equity considerations are likely to be relevant and may form an argument against cost-recovery throughout the schooling system, even though surveys may show a certain degree of 'willingness to pay'. Charging fees at certain levels of schooling (particularly primary) and in certain areas (particularly, communities serving the poorest) may have highly regressive consequences (see Colclough 1993 for a discussion).

Equity

Generally, free or subsidized education is seen to be equitable, particularly for basic education. However, someone has to pay the bill. If educational expenditures are entirely financed through general tax revenue it is important for the equity assessment to estimate who pays the taxes and who benefits from the public expenditure on education. There is a considerable literature on the methodology and application of tax and expenditure incidence studies.[13] The limitations of the prevailing methodologies are well-discussed in that literature, but nevertheless studies of the kind tend to yield an adequate basis to assess the distributional impact of social expenditure and its financing. The incidence of educational benefits should be integral part of the cost-effectiveness debate. It is important to record who attends different levels of schooling, say university, and who does not by socio-economic background and relate it to the allocation of resources in the educational budget by levels of schooling and the overall goals of the educational system. Such an analysis will also assist policy designs aiming at targeting educational subsidies by socio-economic groups. As discussed above, the recording of educational benefits received by different socio-economic groups should be net of the direct private costs they have had to make to gain access to the system.

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[13]. See e.g. Meerman 1979, Selowsky 1979, Foxley, Aninat & Arellano 1979, Vos 1982, 1988, Hicks 1992 and Hausmann & Rigobón 1993.

3.3 Externalities

The importance of externalities in education was already stressed when discussing the difference between output and outcome indicators. The possible existence of externalities has also been a central point of critique of evaluation methodologies of the "productivity" or "profitability" of educational investment through cost-benefit analysis, even when considering social rates of return. At a more aggregate level, traditional approaches on the relationship between education and economic growth (e.g. Denison 1962) have regained momentum through the so-called endogenous growth theory that has stressed the importance of human capital formation and endogenous technological change to explain aggregate economic growth (Romer 1986, Lucas 1988). Thus far, these studies have not been able to demystify the economist's concept of externalities as the catch-all concept for the part of the growth function which could not be explained. They have not provided better tools for policy decisions, such as - to take the example given by Psacharopoulos (1993: 12) - to weigh (a) the positive externalities associated with university researchers discovering a new vaccine and (b) the negative externalities associated with 30 percent of the adult population being illiterate for their entire life, when deciding on the allocation of the education budget.

Yet, even if only at a third level of analysis (Table 1), it is important to study components of what we think are important externalities to education. One possible important externality is the addition to *knowledge*. This may be difficult to measure, but the number of scientific articles per million inhabitants is sometimes used as an indicator (e.g. Behrman 1993). It is, however, difficult to relate such an indicator to immediate social benefits, and even if so, e.g. like reports of discoveries of new vaccines or medicines, it is not so clear at what level to measure this, as such knowledge likely is transferable from one country to another, such that measures only have a meaning in an international context and may provide only a poor guide for national decision making.

A more tangible externality of education is likely the impact on *productivity*. Average labor productivity in the area or population group (e.g. farmers) which has been targeted for improved education could serve as an indicator. It would involve appropriate measuring of productivity before and after the implementation of the educational program. However, as explained in Section 4, such an evaluation would require cautious analysis. Firstly, one would have to control for other factors than education to assess the latter's impact on productivity growth. Secondly, time lags in the process of educational improvement and its impact on labor markets and the production process will have to be taken into account.

Recommendations for greater efforts to improve schooling of females has been derived from various studies showing particularly strong correlations between the educational level of mothers and the nutritional status of children, infant mortality and fertility (Cochrane 1979, Psacharopoulos & Woodhall 1985, Behrman 1993). The assessment of the impact of these externalities would require the use of the appropriate output indicators in health and nutrition. However, in addition, there is probably a need to control, firstly, for lag effects, and secondly, for non-educational factors such as the availability of a broader range of accessible services (drinking water, sanitation, etc.), housing conditions and economic factors (income).

Education is usually also seen as a key instrument to allowing for enhanced social participation of people and hence a better functioning of democracy and society in general. This type of outcome will be even more difficult to measure than the externalities mentioned above. Yet, some proxies could be useful for particular assessments, such as newspaper circulation, participation in elections and so on.

In sum, education may produce important externalities which may be part of the ultimate goals of educational investment. It is important to consider these in the design of educational policies. If such externalities are a crucial element in justifying such investment, it is reasonable to demand such goals are made explicit and, if possible, translate them into measurable outcomes, to allow for an adequate assessment and devote resources for a proper research and analysis of the development impact at this level.

4. Policy Design, Monitoring and Evaluation

4.1 Interpretation of the indicators

The different types of indicators defined in the previous sections form a causal chain for the analysis of the impact of development programs (or, in this case, education programs). In the past, the IDB, as much as the governments in the region, appear to have emphasized input indicators, as the principal measures of success or failure of programs and projects. Obviously, good monitoring and evaluation requires an appropriate balance between all four indicators: input, access, output and outcome. Poor performance of output and outcome indicators may reflect various problems in program design and implementation or adverse changes in external factors. Inputs may not have been delivered, indicating poor implementation. Inputs may have been delivered but without yielding the intended output, indicating inadequate program design, for instance for paying insufficient attention to problems of access to educational services. Outputs may not lead to the desired development outcomes, such as improved education leading to better employment opportunities of the poor due or improved health standards to labor market imperfections,

adverse economic developments or poorer conditions of health services. Apart from adverse external factors, poor performance in this last case may thus be the result of a program design made in isolation and which is not accompanied by appropriate measures to reduce labor market distortions or to provide adequate infrastructure.

The analytical frameworks, educational planning, cost-effectiveness analysis, incidence studies and analysis of externalities, all require to match inputs (supply) and access factors (demand) and relate these to (expected) outputs and outcomes. These frameworks stand as tools for the *design* of educational programs and policies. However, for the *monitoring* of the program implementation a simple tracking of input, access, output and outcome indicators is not enough. Equally,
the appropriate evaluation of the program's impact involves more than simply comparing the relevant input and output/outcome indicators at the start of the program with their values after completion of the program (*before and after*). For the monitoring and evaluation of the impact of educational programs (but these may hold equally for the evaluation of other social services programs) at least four analytical issues have to be dealt with when comparing performance indicators over time to assess impact:

(a) *Time lags*: it may take several years of school construction and implementation of improved teaching programs and several more years of student attendance before the impact on output indicators (immediate goals) becomes measurable and many more years before graduates reach the labor market. The monitoring of inputs will be possible from the start of the program, but the full evaluation of the output (e.g. improvement of student achievement) may only be possible several years after the completion of the program, while the evaluation of the developmental impact (outcome) in terms of e.g. poverty alleviation and productivity increases may not be possible within ten years after the program's initiation.[14] Not all programs need to have gestation lags this long, but clearly the as part of the design of the program a time schedule should be set up specifying at what points in time it is meaningful to start monitoring inputs and outputs and to evaluate the impact of the program.

(b) Evaluation should preferably be *with and without* (rather than before and after),[15] that is one

[14]. Psacharopoulos (1994) gives an example of a World Bank-supported education program which took one year to be designed, justified and get appropriate funding, three years to supply the facilities and to develop and supply improved teaching materials and six years for the first students to graduate. The objectives of the program included that it would contribute to economic growth, alleviate poverty, improve school quality and provide the labor market with the appropriate skills.

[15]. This notion is now widely accepted in the literature on the impact of stabilization and structural adjustment policies. See e.g. Goldstein & Montiel (1986), Mosley, Harrigan & Toye (1991), and Carvalho & White (1994).

should be able to give an appreciation of what the output and outcome indicators would have looked like without the program. To conduct such evaluations requires: (i) to have consistent information about the initial values for the appropriate indicators and beneficiary groups; (ii) to have similar information for a control group of the population, where the control group should have characteristics similar to the beneficiary group, but does not benefit from the program;[16] and (iii) to take account of activities that might take place in the absence of the program. Control groups are used to be able to assess the factors that affect the outcome, but are external to the program. The "without" case may not be the same as the absence of all activity if private contributions may provide some of the services in the absence of public delivery or subsidies.[17]

Using models or costly data collection of control group information to derive the appropriate "counterfactual" of the without case may be justifiable for nationwide programs, but may not be practical for each program with limited coverage. "Before and after" analysis may in such case be second best, but some attempt should be made to account for the influence of external factors. This approach is probably useful at the level of input and some output indicators measuring immediate goals. However, using this approach will probably yield unreliable results for evaluating development impact or outcome, unless one has good understanding of the exogenous factors and the changes therein.

(c) *Targeting and beneficiaries:* A focus on poverty reduction and limited resources has led to a targeting of many social programs, including those in education, to the poor. A program targeted at particular groups of beneficiaries may be subject to two types of errors: some poor people may not benefit from the program (Type I error) and non-poor people may benefit from it (Type II error).[18] The occurrence of these type of errors tend to be closely related to the project design. Efforts to reduce targeting errors may involve high administrative costs and therefore may not be cost-effective (Grosh 1994). In any case, such trade-offs should be analyzed. The implication of targeted programs is that preferably indicators should be available at the level of the target group. These may not be readily available through existing data systems. Use of proxies, such as average income and living standards measures by region or

[16]. See Grossman (1994) and Newman, Rawlings & Gertler (1994) alternative methodologies in choosing control groups and the implications for the interpretation of evaluation results.

[17]. See e.g. Cox & Jimenez (1992).

[18]. See Cornia & Stewart (1992) for an initial conceptualization and who call them F and E errors respectively.

province to identify poverty groups geographically may be subject to considerable Type I and II errors of targeting.[19] Targeting errors (in program implementation or indicator measurement) need to be accounted for, but ultimately the success of the program should be judged by the size and overall distribution of the benefits, not by the extent to which these are concentrated on the poor.

5. Data sources and data collection priorities

This paper has tried to emphasize that an improvement of educational statistics should start off with a clear definition of what needs to be measured. A framework was sketched for selecting and systematizing data for the construction of indicators for policy analysis. An analytical system of indicators is proposed which will enable to monitor the causal chain running from inputs and demand factors to outputs and outcomes. To recapitulate what seem to be the priority indicators in education for basic educational planning and the analysis of cost-effectiveness, equity and externalities:

Inputs:
- unit costs per student (by type of expenditure, by schooling level and curriculum type, by private and public sector);
- physical inputs per student (teachers, teaching materials, class hours, etc. by schooling level and curriculum type, by private and public sector);

Access:
- ability to pay;
- distance to educational facilities;

Outputs:
- enrollment rates (net and gross, by region and sex, and by schooling level and curriculum type, by sector);
- retention and completion rates (by grades, by region and sex, and by schooling level and curriculum type, by sector);
- years of attained schooling of the labor force;
- achievement scores and improvement in student achievement per unit costs (cost-effectiveness);
- educational benefits by income and socio-economic groups (equity);

Outcomes:
- productivity and incomes of graduates.

[19]. See Baker & Grosh (1994) for a comparison of various forms of geographical targeting applied to a variety of social programs in Latin America and their respective degrees of apparent targeting errors.

Obviously, this is just a core set. The data needs may vary depending on the objective of the analysis and evaluation exercise as discussed in Sections 3 and 4.

For the collection of the required data one should relate as much as possible to existing data systems and much of the information is usually already collected through:

a. the administrative records of the Ministry of Education (for input indicators and enrollment and retention rates, i.e. new flow of human capital);
b. population censuses (for output indicators, particularly stock of human capital by socio-demographic characteristics and regions);
c. household survey systems (for access and outcome indicators and updates of population census data).

In principle, these sources should be complementary. Unfortunately, in many countries of the region the potential of these sources do not tend to be employed in full for use in the design and evaluation of educational policies. Usually, the administrative records of the Ministry of Education are the main source of information. However, as shown above, these do not cover the full range of required information and generally are rated to be flawed with measurement deficiencies, some of which were hinted at in the preceding sections. For starters, the use of the other sources of information will allow for a cross-check of the quality of the information (e.g. comparing enrollment rates from the administrative records with the school assistance rates that usually can be derived from population census and household survey data). Unfortunately, such data checks are rarely performed by policy makers.

This is not the place to give a full assessment of data deficiencies, but in broad terms improvements are needed in terms of (i) timeliness of the data; (ii) quality control (among others through data cross-checks as just mentioned); (iii) adequate disaggregation of all indicators and as suggested in Section 3 (e.g. by level, deficiencies in data availability for higher education are particularly severe); and (iv) coverage of data (e.g. access indicators are often not adequately available in standard household surveys or budget surveys; data on private sector education often has inadequate coverage; etc.).

In addition to the data sources mentioned above, there is an urgent need for:

d. *National assessment systems* of student learning. Such systems are now non-existent in most

countries of the region, but given the importance of being able to assess the quality of education the introduction of such systems (either through national testing or sample survey based testing) should be high on the priority list for improving educational statistics. Much would be gained if such assessment systems would pay due attention to the collection of control variables on the school facilities and family background of the tested students.

Further, there is a need for more micro-level information to identify externalities of education. One such source could be:

e. *Tracer studies*. Although externalities are usually strongly featured in the justification of educational programs, we know very little about their actual importance. Tracer studies track beneficiaries for a number of years after graduation and can be assessed on their performance in the labor market (see e.g. Psacharopoulos & Hinchliffe 1995 for a review). Panel household surveys of living conditions could be seen as a broader type of tracer study to study further the linkages between education and income and education and other living conditions. Such studies tend to be costly, however, and should not crowd out means required to improve educational data derived from any of the other data sources.

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Table A.1a

Some Educational Indicators: Output Indicators

Indicator	Type	Definition	Comment
Knowledge and skills level	Output	No standard measures exist. Scores for mathematics, language, etc. from national educational assessments through national certification examinations or sample survey based assessments by grade and educational level could form basis for measuring quality of educational attainment.	Some Latin American countries have experience in educational assessment, but forms of testing differ. There is some controversy about way of testing knowledge and skills. Achievement tests, i.e. examinations keyed to the implemented curriculum, rather than general aptitude seem, however, best instrument to assess learning outcomes and system quality. For further analysis it is important to collect simultaneously to achievement tests, information about student's background and about school and teacher variables. Teaching curriculums and standards may differ across countries, thus similar testing methods need not yield internationally comparable results for the quality of educational attainment. The change in achievement as measured by test scores in relation to the per student cost of educational programmes, could serve as a measure of cost-effectiveness.
Average years of	Output	Ratio of actual years of completed	This measure reflects the number of years of schooling of the

Indicator	Type	Definition	Comment
schooling population 25 years and older		grades in educational system of population of 25 years and older and total population of that same age group.	labor force and could be seen as a proxy of the quantitative *stock* of human capital (most other output indicators are *flow* variables). The indicator only measures the quantity of schooling, not the quality. The indicator can be derived from population censuses and household surveys. Reasonable projections and interpolations can be made using a perpetuary inventory method combining benchmark (census) information, enrolment and survival rates of the schooling system and mortality rates. The indicator may be most useful for measuring over time the outcome of the educational system and for studies on the link between education and income distribution and growth. For manpower planning and labor market studies, the indicator is likely to be too aggregate and it may be more useful to estimate the number of persons with primary, secondary, tertiary education, etc.
Vulnerable youth unemployment	Output	Percentage of persons in age group (15-24) that neither assists school, nor works.	Risk indicator and could point at incipient trend at sharpening of poverty and income inequalities if indicator increases.
Gross enrollment ratio - by level (primary, secondary, tertiary) - by sector (public, private)	Output	Number of students enrolled in primary (secondary or tertiary) school divided by the number of children in the age cohort for that level of education	See also net enrollment ratio. Enrollment rates are proxies for the number of available school space available; they can indicate success of construction effort, but not necessarily are a good indicator of educational performance. Enrollment rates tend to be affected by schools' needs to secure budgets based on enrollment and for that matter may have an overestimation bias.

Indicator	Type	Definition	Comment
Net enrollment ratio - by level (primary, secondary) - by sector (public, private)	Output	Number of students enrolled in primary (secondary) education of primary (secondary) school age divided by the number of children in the age cohort for that level of education.	In countries with relatively high primary enrollment rates (say over 75 percent), the increase in the rate may be assumed to mainly benefit the poor. See also gross enrollment rate.
Adult literacy rate	Output	The proportion of adults (usually 15 years or older) who are functionally literate.	Female literacy is generally assumed to be an important determinant of fertility rates and of infant and child health. In this sense the indicator is an input indicator to the performance of health programmes. The definition of literacy can vary widely across time and places and may be difficult to measure. Deficient questions in censuses and surveys about literacy give rise to problems in reliability of literacy estimates. Persons with less than 3 years of primary education are often seen to have a high probability of falling back to functional illiteracy. School completion rates (to 3rd grade) and years of schooling, may be used as checks on (changes in) literacy rates.
School completion	Output	Percentage of grade 1 entrants	This measure may have problems of interpretation if not

Indicator	Type	Definition	Comment
rate (or *apparent retention rate*) - by level (primary, secondary, tertiary) - by sector (public, private)		remaining enrolled to the final grade of primary (secondary) school.	properly cleaned. Firstly, if no students drop out, but take more time than required to graduate (say, twice as long). Assuming equal size cohorts, then the completion rate could be 100%, even though students take twice as long as they should to complete. Secondly, the measure is not necessarily a good indicator of educational performance. Access problems, independent of the student's performance, like foregone family income, transport problems or incomplete schools in rural areas (in some areas schools only provide grades 1-3), may explain low completion rates. Household survey and population census data on years of schooling provide alternative estimates to education system data for completion rate. Retention rate expresses essentially same as completion rate, but can be more precise than above defined completion rate if data of same cohort of students is available over full school period. Retention rate = $P_{1st,1} \times P_{2nd,2} \times P_{3rd,3} \times P_{4th,4} \times P_{5th,5} \times P_{6th,6}$ where P is promotion rate (number of students promoted from grade k to grade k+1 in year t, as ratio of student cohort that entered first grade in year 1). A related indicator is the desertion rate, defined as: 1 - retention rate.
Third grade completion rate	Output	Percentage of grade 1 entrants remaining enrolled to third grade and	See also adult illiteracy rate and school completion rate.

Indicator	Type	Definition	Comment
- by level (primary) - by sector (public, private)		are promoted to fourth grade of primary school.	
Repetition rate - by level (primary, secondary, tertiary) - by sector (public, private)	Output	Number of students that do not pass to next grade to total enrolled students in any given year.	This indicator should preferably be estimated for each grade. A difficulty may be to clean the enrollment for early dropouts.
Transition rate from primary to secondary education	Output	Percentage of graduates of primary continuing to the first grade of general secondary school in the next year.	Measurement problems can arise, as the denominator may either include enrollers or graduates in the last grade of primary. The distinction is important as in many countries many (most) drop-outs from primary education begin in the last years.
Educational deficit index	Output	*World Bank definition (Psacharopoulos, et al.)*: Ratio of actual to potential number of years of (completed) schooling of individuals of primary and secondary school age (7-17 years). *CEPAL definition (CEPAL 1993):* Percentage of children who are behind with their studies (i.e. drop-outs *plus* repeaters) in population aged 7-14 years.	This variable has been estimated typically from household surveys, though, potentially, could also be estimated from educational statistics if properly broken down by age groups. Alternative measure is UNESCO's efficiency indicator.
Efficiency indicator	Output	*UNESCO:* Ratio of potential number	A potential problem with this measure is that early drop-out,

Indicator	Type	Definition	Comment
		of years of schooling of a cohort of students (assuming no drop-out or repetition) and actual number of years spent by them.	will lead to a higher efficiency measure as it reduces number of years spent in school by the cohort.

Table A.1b

Some Educational Indicators: Input and Access Indicators

Indicator	Type	Definition	Comment
Coverage literacy campaigns/programmes	Input	Participants in literacy programmes as percentage of number of adult illiterates	However, see also school completion rate (to third grade).
Pupil/teacher ratio - by level (primary, secondary, tertiary) - by sector (public, private) tertiary)	Input	Number of enrolled students in primary (secondary, tertiary) education per teacher	See educational expenditures per student.
Educational (public) expenditures per student (primary, secondary, tertiary)	Input	Fiscal expenditures in primary education per enrolled student.	This indicator has to be treated with some caution. Firstly, a distinction between current (principally teachers salaries) and (amortized) capital expenditures (school buildings) may be relevant. Secondly, though most countries have predominantly public school systems, it may be important to check on educational expenditures outside the government budget. Thirdly, assuming most of the educational budget is teacher's salaries and that we measure per pupil costs in real terms, this indicator would essentially express the inverse of the pupil/teacher ratio. Unless there are good reasons to believe that the level of teachers remunerations is a relevant factor in the determination of the quality of education and hence educational performance, the old traditional pupil/teacher ratio may be a better input indicator than the level of per student educational expenditures.

Indicator	Type	Definition	Comment
Educational (private) expenditures per student (primary, secondary, tertiary)	Input	Operation and (amortized) capital costs of private schools and universities per enrolled student.	See fiscal expenditures per student.
Private household (individual) expenditures on education (per student or as share of household/personal income)	Input / Access	Total expenditures of household (individual) on fees, books, uniforms, transportation, etc. related to school enrolment as a share of household (personal) income or in relation to number of enrolled dependents.	Indicator of household's willingness to pay for education and, together with poverty and income data, possible indicator to analyze factors impeding access to public and private schooling systems. Data typically only available from household budget surveys or LSMS-type surveys.
Number of grades per school (establishment) - by level (primary, secondary, tertiary) - by sector (public, private) tertiary)	Input	Number of schools (establishments) with complete number of grades (6) in primary education to total number of schools (establishments).	As indicated under school completion rate, many schools in, usually, rural areas do not have all grades. This deficiency in supply (usually combined with transportation problems) can be an important determinant of high drop out rates in particular areas.
Number of class hours per student - by level (primary, secondary, tertiary) - by sector (public, private)	Input	Number of effective class hours per student per school year	This indicator could be expanded to relate to a given benchmark (e.g. required official number of class hours per school year or some norm of class hour related to achievement objectives)
Number of classrooms per	Input	Number of class rooms per student.	

Indicator	Type	Definition	Comment
student - by level (primary, secondary, tertiary) - by sector (public, private)			
Educational level parents	Access	Average number of years of schooling parents	Relevant indicator for analysis of demand for education, as well as for educational performance (school enrolment and attainment tends to be at least as much dependent on these household characteristics as the quality and availability of educational facilities).
Nutritional status children	Access	Nutritional deficits (weight for height, etc) by age groups	Malnutrition at early ages tends to affect learning abilities.
Housing overcrowdedness	Access	Number of persons per room (or per m^2)	Poor educational performance may be associated with poor housing conditions.
Geographical distance	Access	Geographical distance (or time required) to nearest-by school	This type of indicator may require backup information from household surveys (LSMS type) establishing the extent into which distance (and for that matter poor transportation facilities) is perceived by households/parents/students as an important reason for non-attendance and dropout.
Household income	Access	Per capita income level or poverty incidence.	See also geographical distance. Alternative measures could be dependency rate or number of children in school age that work.
Availability and quality of educational	Input	No standard definitions exist for this type of indicator.	

Indicator	Type	Definition	Comment
material			
Quality of curriculum	Input	This is basically a quality assessment of the teaching curriculum, which cannot be easily captured in simple indicators.	