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# The Social and Economic Impact of Illiteracy

ANALYTICAL MODEL AND PILOT STUDY

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## Executive Summary

Since 1948, the acquisition of basic skills such as reading and writing have been considered an inalienable human right. Nevertheless, the persistence of illiteracy remains one of society's greatest shortcomings.

The World Declaration on Education for All (Jomtien, 1990) constitutes one of the world's broadest agreements in the field of education, reaffirming the right of every person to receive an education which satisfies his or her basic learning needs throughout life.

With the Dakar Framework for Action (Senegal, 2000), the international community once more established illiteracy as a priority issue, setting a number of goals for the year 2015. It is believed that many countries will fail to achieve these goals.

Illiteracy not only limits the full development of individuals and their participation in society, but also has repercussions throughout life, affecting a person's family environment, restricting access to the benefits of development, and hindering the enjoyment of other human rights.

While states and civil society organizations have made significant efforts to address the problem, results have fallen short of the mark. In light of that fact, and acting in accordance with the recommendations issued by PRELAC<sup>1</sup> in 2008, ECLAC and the UNESCO Regional Education Office for Latin America and the Caribbean have developed a research project which approaches the issue from a new angle – one with an intersectoral component: the costs of illiteracy to individuals and society.

The ultimate purpose of the project is to add economic and social arguments to the ethical and moral case for literacy. These inputs can be used to strengthen literacy policies by involving new stakeholders, such as ministries of finance and economic planning, thus ensuring that all actors are committed to educational change.

This paper will begin with an overview of the concept of illiteracy, as well as its main individual, intergenerational, social, and economic consequences, in order to establish a comprehensive analytical framework. A methodology will then be proposed to estimate the employment and income gaps which illiteracy generates, using three case studies as examples: Ecuador, The Dominican Republic, and the Brazilian state of São Paulo. The final section of the document offers a number of conclusions, as well as a discussion of future challenges.

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<sup>1</sup> Regional Education Project for Latin America and the Caribbean. Recommendations adopted at the Second Intergovernmental Meeting of PRELAC, Buenos Aires, Argentina, 2007.

## 1. Evolution of the Concept

Recent statistics for 25 Latin American and Caribbean countries <sup>2</sup> show that, as of 2007, 8.6% of the population aged 15 and older is completely illiterate. This is equivalent to approximately 35 million people <sup>3</sup>. It should be noted that illiteracy in seven of these countries exceeds 10%; two have illiteracy rates in excess of 20%. These data pertain to complete illiteracy – that is, census and household survey respondents who state that they can neither read nor write.

This measurement technique is the subject of much international debate. Data gathered by such means underestimate the actual status of the population, and fail to reflect individual reading, writing, and mathematical skills in different contexts of social performance (UNESCO-UIS, 2009).

Today, the issue is approached not only in terms of complete illiteracy, but also functional illiteracy. The latter is measured by assessing reading, writing and mathematical skills in the various domains of social life which influence individual identity and insertion into society. From this perspective, literacy involves not only reading and writing, but also the acquisition of the skills necessary for effective and productive performance within society (UNESCO, 2006).

The World Declaration on Education for All, issued in Jomtien in 1990 and ratified in Dakar in 2002, has enriched the concept. The Declaration defines literacy as a basic learning need to be addressed throughout life, enabling individuals to develop the knowledge and skills necessary to fully participate in society. It is intertwined with concepts such as citizenship, cultural identity, socioeconomic development, human rights, equity and the need to create “literate environments” for its survival and development (UNESCO, 2006).

This broader understanding of the concept and problem of illiteracy creates enormous methodological challenges in terms of measurement. In the 1960s, experts abandoned the literate-vs.-illiterate dichotomy in favour of an approach which views literacy as an ongoing process, encompassing everything from the development of basic abilities to more complex linguistic and communication skills which unfold in a variety of social contexts.

Today, the most advanced methodologies measure literacy in terms of reading skills and comprehension at various levels of difficulty, as well as numeracy and the use of these skills in different social environments and realities (LAMP, 2009).

In Latin America, unfortunately, there are not enough data on the reading, writing and numerical skills of the population to make adequate comparisons based on the criteria mentioned above.

One pioneering study on the subject was carried out by OREALC-UNESCO between 1995 and 1997, in Argentina (Buenos Aires), Brazil (São Paulo), Colombia (Bogota), Chile (Santiago), Mexico (Mexico, D.F., Merida and Monterrey), Paraguay (Asuncion and neighbouring communities) and the Bolivarian Republic of Venezuela (Caracas). One of the main findings of the study was that there are, in fact, statistical differences within the adult population in terms of proficiency with continuous texts (prose), schematic texts (documents) and the use of numbers (mathematics).

According to this study, 50% of individuals who have completed only six or seven years of education are ranked in the bottom two tiers of literacy skills. In most countries, in order to reach the fourth tier, which is characterized by high labour market insertion, an individual must complete 11, 12 or more years of education (Infante, 2000).

<sup>2</sup> UIS database, available at <http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx>; for the Bolivarian Republic of Venezuela (2005), CEPALSTAT.

<sup>3</sup> The size of the affected population was estimated on the basis of CELADE population forecasts for 2007, with the exception of: Aruba (2006 census), Cuba (ONE), the Netherlands Antilles, Jamaica, Suriname and Trinidad and Tobago. Source: <http://esa.un.org/unpp/index.asp?panel=2>.

<sup>4</sup> Of the Latin American countries tested, only Colombia, Chile and Uruguay cleared the threshold.

These findings are supplemented by other international studies focusing on only a few countries in the region. Such studies include tests administered by the Programme for International Student Assessment (PISA), Trends in International Mathematics and Science Study (TIMSS), International Adult Literacy Survey (IALS), Adult Literacy and Life Skills (ALL), Progress in International Reading Literacy Study (PIRLS) and Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación (Latin American Laboratory for the Assessment of Education Quality, or LLECE).

Another recent study highlights the importance of reaching a basic international literacy threshold (Hanushek and Wobmann, 2007). The study defines this threshold as a score of 400 on international PISA tests. This is equivalent to the minimum standard of proficiency accepted by OECD countries. The authors conclude that, in a significant number of developing countries, over 40% of the population qualifies as “illiterate”. In Latin America, this group includes countries such as Argentina, Brazil, Colombia and Mexico <sup>4</sup>.

Given the lack of data with which to adequately study these issues – data such as those collected through the LAMP programme and similar instruments – UNESCO and ECLAC classify persons with five years or less of formal education as illiterate (UNESCO, 2006, and ECLAC, 2008).

## 2. Effects of Illiteracy

The World Declaration on Education for All (Jomtien, 1990) states that education begins at birth and continues throughout life. Consequently, the social effects of illiteracy are present throughout the entire life cycle.

During early childhood, the effects of illiteracy can be seen within the family unit and the primary socialization process.

Recent research in the fields of psychology, nutrition and neuroscience suggest that the first five years of life are critical to the development of intelligence, personality and social behaviour. It is during this period that millions of cells are born, grow and become interconnected. When this process of growth, development and interconnection does not take place adequately, child development is negatively affected (UNESCO, 2004).

The quality and intensity of these processes are influenced by a family’s social environment and cultural capital. During the first few years of their lives, children of illiterate parents probably have few opportunities to learn communication codes, or to learn to read and write.

The educational capital of the household is essential to a child’s physical and social development. Such development is unquestionably limited among children whose parents have not acquired basic reading and writing skills, or have lost them through disuse.

Illiteracy among adults increases present and future socioeconomic vulnerability, and is a significant factor in the reproduction of such vulnerability through children.

Illiterate persons face greater obstacles in terms of social insertion, not only on a personal level (social inclusion difficulties, precarious work, high rates of disease, etc.), but also within the family (child nutrition, hygiene, health and schooling, among others) and at a societal level (lower productivity, high health care costs).

Illiterate adults face serious employability issues, given their low level of knowledge and expertise. This is attributable to a lack of formal schooling, caused either by an early departure from school to enter the labour market or the loss over time of the ability to read and write.

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<sup>4</sup> Of the Latin American countries tested, only Colombia, Chile and Uruguay cleared the threshold.

In addition, illiterate persons have little awareness of their rights and duties, and may thus be inclined to accept precarious, low-quality employment contracts.

The impact of adult illiteracy can be divided into the following categories: health, education, economics and social integration and cohesion.

With regard to health, research shows that illiteracy significantly limits an individual's ability to understand messages and absorb knowledge necessary for self care – particularly among women. This has a negative impact on household health, hygiene and nutrition (UNESCO, 2006). The effects of this phenomenon are reflected within the household (both in general terms and in the mother-child relationship), at the workplace and in sexual and reproductive behaviour.

With regard to education, illiterate parents tend to have lower educational expectations and aspirations for themselves and for their children. Poor families often place work before education, due to the opportunity cost of the latter. Thus, children of parents who have failed to complete primary education tend to do the same. A close link has also been found to exist between parents' schooling and the academic performance of their children. As noted by Carneiro, Meghir and Parey (2007), the greater a mother's schooling, the fewer behavioural problems her children will exhibit, and the lower their repetition rate will be.

When parents are uninvolved in their children's education, the latter are more likely to display behavioural problems, have poor grades, repeat school years and even discontinue their formal education.

From an economic perspective, literacy and schooling have been shown to significantly affect individual income (Riveros, 2005). In Latin America, income and schooling are strongly correlated. Young people who do not complete primary schooling are less likely to obtain jobs good enough to avoid poverty (Goicovic, 2002).

In terms of social integration and cohesion, illiterate persons are often denied the social recognition they deserve, and suffer from low self-esteem, display little autonomy and possess little ability for critical thinking (UNESCO, 2006). They also become victims of "deception" (Lind, 1996). Illiterate persons have limited opportunities to become acquainted with and make use of the individual rights to which they are entitled by law, or to participate actively in the attainment of the collective rights that are essential to human dignity.

### **3. Conceptual Framework**

#### **3.1 Education and Human Capital**

Over the last few decades, knowledge has become the key ingredient of the new production paradigm, and education has become an essential factor in the modernization of production systems and the economic behaviour of individuals.

Human capital theory is premised on the notion that education is an investment which produces income in the future. Consequently, differences in productivity arising from differences in education are reflected in wage gaps.

Human capital models emphasize the effect of education on individuals: demand for education is a function of rational human behaviour, and education provides the technical knowledge necessary to increase individual productivity. This, in turn, leads to higher employment income.

The importance of human capital theory lies in its portrayal of education as an investment which not only has a positive impact on individuals (in terms of income), but also on society as a whole, increasing employment, economic growth and social equity.



The private returns of primary education appear to be high in less developed countries. According to Psacharopoulos and Patrinos (2004), such returns are equivalent to 25.8% in countries with a per capita income below US\$755.

In short, the social and economic costs of illiteracy are high. An analysis of the costs and benefits of investing in literacy is therefore relevant from a decision-making standpoint.

Notwithstanding the importance of this issue, very few studies have directly analyzed the returns of initial literacy teaching (reading and writing). This is partly attributable to the measurement difficulties involved<sup>5</sup> - particularly in terms of individual follow-up. In Latin America, however, a considerable amount of aggregate data can be obtained from household surveys and the educational systems of the region.

### 3.2 Education as a Determining Factor in Economic Growth

Just as human capital models highlight the positive impact of education on individual income, at a national level education increases the human capital of the work force, as well as its productivity, and spurs growth.

The effects of education on the economy as a whole have been noted not only by economic growth models, but also by micro-economic studies which highlight the social effects of increased education. Fuller, Gorman and Edwards (1986) posit an institutional model of increased education and its aggregate economic and societal effects, emphasizing quality of education (including literacy rates) over quantity or years of schooling. Bedi (1997), working with data from Honduras, notes that the quality of learning has a significant impact on individual income, and underscores the importance of this factor as a driver of growth in developing countries.

Ever since the appearance of Solow's long-run growth model, economic growth models have emphasized the importance of human capital in the economic growth of countries (Romer, 1992, and Lucas, 1988). A country's output depends on its human capital, which is determined endogenously, and "knowledge" is a public good which spreads over the economy as an externality (Psacharopoulos and Patrinos, 2007).

Most studies on the effect of education on economic growth employ regression estimates which express per capita GDP as a function of schooling (measured in terms of years of schooling or the enrolment rate), as well as a number of other economic growth variables<sup>6</sup>.

## 4. Methodology

For purposes of this study, completely illiterate persons are survey respondents who state that they can neither read nor write, or who state that they have not been enrolled in or passed the first year of primary education.

As for functional illiteracy, years of schooling are employed as a proxy, using different levels for comparative purposes: less than four years of schooling, incomplete primary education or less than six years of schooling, incomplete lower secondary education or less than nine years of schooling, and incomplete upper secondary education or less than twelve years of schooling.

As noted above, the consequences of illiteracy are observable throughout a person's life. It is among adults, however, that these consequences are most apparent, and adults are the main drivers of the process. Hence, the general universe of illiteracy on which this pilot study focuses consists of persons over 20 years of age.

<sup>5</sup> Hanushek and Zhang (2006) measure "literacy teaching" more directly, using International Adult Literacy Survey (IALS) data.

<sup>6</sup> For a review of the literature on the subject, see Krueger and Lindhal (2001).

Due to time constraints and insufficient access to reliable secondary sources, this paper will focus only on labour and income, restricting the universe studied to members of the working-age population (WAP) who, in answer to household surveys, state that they have completed up to twelve years of schooling (full secondary education) and are not full-time students.

This paper employs an exclusively cross-sectional approach, analyzing only the social and economic impacts observed during the year studied. The task of performing a longitudinal assessment – that is, an analysis of impacts likely to occur in the future, based on the probability of educational success of the school-age population as of the baseline year – is left to future studies.

Estimates of the effects of illiteracy are based on concepts of relative risk and gaps – that is, the increased likelihood of negative consequences among illiterates and/or their descendants, compared to literate persons. Trans-generational effects (effects on descendants) are not addressed in this study.

Relative risk and gaps are not the same thing as the impact achieved by social programmes aimed at mitigating the problem. The former correspond to the differential probability of having a problem between different populations (illiterate and literate). The latter, in contrast, reflects the effectiveness of an intervention in the affected population (that is, those who have those problems), compared to the population for which no intervention has been made. When reliable data for relative risk estimation are not available, the impact estimator can be used as a proxy, provided that allowance is made for the bias that may be introduced.

## 5. Pilot Study Results

The methodology proposed in this study was applied as a pilot exercise to three cases: the Dominican Republic, Ecuador and the Brazilian state of São Paulo.

### 5.1 Illiteracy and Employment

The link between schooling and unemployment differed in each case. In Ecuador, the unemployment rate trended upward in a relatively stable manner as schooling increased, with variations occurring only among individuals with five to seven years of schooling. A similar trend was observed in the Dominican Republic, with variations occurring among persons with four to six years of schooling. In the state of São Paulo, on the other hand, variations were greater, both among those with the least amount of schooling and those with the highest level of education.

In the three cases studied, completely illiterate persons over 15 years of age who do not attend school, or who attend school and work, represent 5.9% of the population in Ecuador, 9.8% in the Dominican Republic and 5.3% in the state of São Paulo. Persons with less than four years of schooling represent 15.6%, 24.2% and 14.1% of the population, respectively.

An analysis of the number and percentage of persons who attain each level of schooling, and who describe themselves as employed on household surveys, shows that, among persons aged 15 and older who do not attend school or who attend school and work, the higher the level of schooling, the higher the employment rate. This is expressed as a correlation of  $r = 0.81$  in Ecuador,  $r = 0.83$  in the Dominican Republic and  $r = 0.95$  in São Paulo. The opposite is true only among persons who have completed secondary education, in the case of Ecuador and the Dominican Republic, and among persons with over nine years of schooling, in the case of São Paulo.

## 5.2 Quality of Employment

The working assumption of this study is that quality of employment is lower for illiterates than it is for literates. This assumption is borne out not only by a dichotomic comparison, but also as education increases. Supplementary indicators such as employment contract and type of work were employed to determine whether illiteracy has an impact on this variable.

Among the employed population, illiterate persons are the least likely to have an employment contract. This is true in all three countries studied. With four years of schooling, the likelihood of having a contract doubles in Ecuador; in the Dominican Republic it increases by only 30%; in São Paulo there is no significant increase.

Completely illiterate Ecuadorians and Dominicans are 53.6% to 79.6% less likely to have an employment contract than their literate counterparts. No data are available for São Paulo.

In terms of formal employment, notable differences exist between literate persons with less than four years of schooling and illiterate ones with the same level of education. Completely illiterate Ecuadorians and Dominicans are between 53.6% and 79.6% less likely to have an employment contract than their literate counterparts. No data are available for São Paulo.

With regard to the type of work performed by employed persons over 15, illiterate persons are more likely to occupy the most precarious employment category: non-professional, non-technical self-employed workers. In Ecuador and the Dominican Republic, illiterate persons account for over 60% of this group.

## 5.3 Income, Illiteracy and Schooling

A worker's income is strongly correlated with his or her years of schooling and experience. In the three cases studied, income was observed to trend upward until the age of 40. After that point, it increased at a slower rate, or even stopped rising altogether, save for persons with four or twelve years of schooling in Ecuador and twelve years of schooling in the Dominican Republic. The income of such individuals continued to rise past the age of 60.

While absolutely illiterate persons (zero years of schooling) and functionally illiterate persons (six years of schooling) end their working lives with an average income similar to or slightly higher than that of their first years of employment, persons who reach lower secondary education (8 to 9 years of schooling) or complete their upper secondary education (11 to 12 years of schooling) end their working lives with an average income two to three times higher than that of their early years. The income of those with greater schooling invariably outstrips that of the illiterate.

## 5.4 The Costs of Illiteracy

Illiteracy reduces the income an individual could potentially receive over the course of his or her working life. Lacking the necessary skills and schooling, illiterate persons are barred from better-paying positions or jobs.

In all of the cases studied, the labour income of illiterate persons differed significantly from that of literate persons. As was to be expected, differences increased in proportion to the schooling gap between the two groups:

- Among persons with no more than four years of schooling, those who could neither read nor write earned between US\$200 and US\$700 less in 2006 than those who could.

- The aforementioned gap was US\$100 to US\$150 wider for persons with less than one year of schooling than it was for those with four.
- A comparison between persons with no schooling and persons with six years of schooling reveals a gap of US\$440 to US\$1,100.
- A per capita gap of US\$678 to US\$1,557 exists between persons with no schooling and those who have completed lower secondary education.
- The greatest difference was observed between persons who have completed upper secondary education and persons with no schooling; the gap in this case is 4.5 to 6 times larger than that which exists between persons who can read and write and persons who cannot.

The variations observed in these comparisons are another reminder that opportunity costs depend on the characteristics of the labour market in each country.

An analysis of the aggregate loss of potential income suffered by those with zero years of schooling, compared to those who achieve various levels of functional literacy, shows a progressive increase. This increase ranges from 15% to 39% when persons with no schooling are compared to those with four years of schooling; it is 2.5 to 3.8 times larger when the former are compared to those who complete lower secondary education; and it increases fivefold when persons with no schooling are compared to those who complete upper secondary education.

Finally, an estimate of the potential cost of illiteracy over the course of a working life shows that these values are multiplied by 8.7 to 11 between the completely illiterate and those who can read and write, and are 7.4 to 8.8 times higher compared to the various categories of functional literacy. Lost productivity would thus be equivalent to US\$25 billion in Ecuador and the Dominican Republic and US\$209 billion in the state of São Paulo.

## 6. Conclusions

The results submitted in this paper are preliminary, and are intended as a contribution to the study of the costs of illiteracy – a key aspect of the broad range of issues the concept entails.

From a methodological perspective, an estimate of the impacts of illiteracy on employment and income, developed by comparing groups of persons (the literate and the illiterate) on the basis of household survey data, appears to be a relatively simple and reliable approach.

The challenge in the future will be to develop instruments and procedures for the analysis of other consequences of illiteracy, such as its impact on productivity and/or other aspects of quality of life, as well as its intergenerational effects.

The results of the pilot study, while preliminary and therefore not definitive with regard to the specific situation of each country, suggest that the impact of illiteracy on quality of employment, as well as the loss of productivity caused by its effect on labour income, is sufficiently significant to make its eradication not only a social objective but an economic priority.

The challenge is to turn the problem into an opportunity. The eradication of illiteracy would produce net gains; it is not an expenditure, but rather an investment. The direct impact of literacy teaching would generate the resources necessary to cover its cost, by increasing human productivity. This would be the case even without factoring in externalities, such as the investment a literate population would attract.

The concept of functional illiteracy must be universalized and further implemented. The general population – and, quite often, decision makers – tend to think of literacy only in terms of reading and writing. The concept of skills has not yet taken hold; the issue is not viewed as a continuum, nor is consideration given to social, linguistic and cultural environment.

There is also a tendency to approach the problem in terms of individual effects and responsibility, overlooking the environment and responsibility of institutions, as well as their policies regarding the illiterate population.

Failure to take these issues into account makes it more difficult to appreciate the social and economic impacts of illiteracy policies, as well as the benefits of creating environments conducive to learning communication skills and numeracy throughout life.

The region suffers from a serious shortfall of data with which to develop a broader definition of illiteracy – one which takes into account different levels of performance or skill. Consequently, the research trend has been to employ years of schooling as a proxy. This approach entails a significant estimation error, however, given the low reliability of base data collection, the issue of quality of learning during early childhood and the variability of educational models.

The challenge facing Latin America is to improve the assessment and statistical methodologies employed to address the problem, as well as to increase the body of knowledge on the issue.

A joint effort on the part of governments, think tanks and international agencies may constitute an effective strategy with which to address the issue in all of its complexity. The implementation of LAMP or similar programmes would be a significant step in this direction. Case studies or comparative studies within and between countries would also help to achieve a broader understanding of the problem, as well as the requirements which public policies on illiteracy must meet.

## Introduction

Since 1948, the acquisition of basic skills such as reading and writing have been considered an inalienable human right. Nevertheless, the persistence of illiteracy remains one of society's greatest shortcomings.

The World Declaration on Education for All (Jomtien, 1990) constitutes one of the world's broadest, most representative agreements in the field of education, reaffirming the right of every person to receive an education which satisfies his or her basic learning needs throughout life. One of its objectives was to reduce adult illiteracy rates by at least fifty percent by the year 2000.

With the Dakar Framework for Action (Senegal, 2000), the international community once more established illiteracy as a priority issue, setting a number of goals for the year 2015. It is believed that many countries will fail to achieve these goals. The world is therefore in debt, and its commitment is still required.

Illiteracy not only limits the full development of individuals and their participation in society, but also has repercussions throughout life, affecting a person's family environment, restricting access to the benefits of development, and hindering the enjoyment of other human rights.

While states and civil society organizations have made significant efforts to address the problem, results have fallen short of the mark. This failure is largely attributable to strategies and methodologies that are ill suited to current reality, as well as the lack of an intersectoral vision and a disconnect between literacy policies and other social and educational policies.

In light of the above, and acting in accordance with the recommendations issued by PRELAC<sup>7</sup> in 2008, ECLAC and the UNESCO Regional Education Office for Latin America and the Caribbean have developed a research project which approaches the issue from a new angle – one with an intersectoral component: the costs of illiteracy to individuals and society.

The ultimate purpose of the project is to add economic and social arguments – which are not always given their due – to the ethical and moral case for literacy. These inputs can be used to strengthen literacy policies by involving new stakeholders, such as ministries of finance and economic planning, thus ensuring that all actors are committed to educational change.

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<sup>7</sup>Regional Education Project for Latin America and the Caribbean. Recommendations adopted at the Second Intergovernmental Meeting of PRELAC, Buenos Aires, Argentina, 2007.

This paper will begin with an overview of the concept of illiteracy and its various definitions, as well as its main individual, intergenerational, social, and economic consequences, in order to establish a comprehensive analytical framework. An analytical model and the methodology for its implementation will then be proposed, in order to estimate the employment and income gaps which illiteracy generates. Three pilot studies will be used as examples: Ecuador, The Dominican Republic, and the Brazilian state of São Paulo. The final section of the document offers a number of conclusions, as well as a discussion of future challenges, taking into account the most recent thinking on illiteracy and literacy.

## I. Historical Background

### 1. Evolution of the Concept of Illiteracy

In 1948, the acquisition of a broad range of skills was officially recognized as a fundamental aspect of human rights and personal fulfilment. These skills include reading, writing and numeracy (UNESCO, 2006). Ten years later, at the UNESCO General Conference in Paris, the term “illiterate” was defined as someone who is unable to read and write a simple statement about his or her daily life.

This criterion has become the standard approach for national censuses. Since then, the official yardstick for illiteracy has been the reply of census respondents when asked whether they can read and write (Infante, 2000). Those who state that they are unable to do so are classified as complete illiteracy.

The literate/illiterate dichotomy oversimplifies the issue, however, reducing literacy to a minimal group of reading and writing skills, without taking into account the gradual manner in which such skills are acquired, or their use in different social contexts. Its usefulness from a policy and practical standpoint has come into question, as it misrepresents the challenge literacy entails (Fransman, 2008).

During the second half of the twentieth century, as formal education became widespread and major literacy campaigns got underway, the concept of illiteracy began to change. In the mid-1960s, the concept of functional illiteracy began to gain acceptance, and literacy objectives became more complex, shifting toward the acquisition and development of the communication skills needed to participate in social life and production.

The close relationship between literacy and national economic development was first noted at the World Congress of Ministers of Education, held in Teheran in 1965. “Functional literacy” was defined as a learned ability which allows individuals to function in a variety of roles (citizens, parents, workers, members of a community), thereby improving productivity (Bujanda & Zuñiga, 2008).

The concept of functional literacy became the cornerstone of the Experimental World Literacy Programme (EWLP). This programme, created at the 1966 UNESCO General Conference, focused on the acquisition of basic skills through experience and work-oriented learning. Literacy programmes during this period were usually associated with economic initiatives; their role was to help achieve the objectives of those programmes and motivate the population (Bhola & Valdivieso, 2008; Torres, 2006; UNESCO, 2006).

In September 1975, an International Symposium for Literacy was held in Persepolis to assess the results of the literacy policies of the 1960s.



The number of illiterates was found to be constantly growing, and the impact of literacy programmes was judged to be far short of what was required. According to the Declaration of Persepolis, this “reflects the failure of development policies that are indifferent to man and to the satisfaction of his basic needs” (UNESCO, 1975: p. 149).

This critical assessment paved the way for new thinking in the field. The new discourses which had been developing since the late 1960s questioned the idea that literacy should be associated almost exclusively with human production output.

Paulo Freire contributed to the development of an analytical approach which distinguishes literacy as a mere technical skill from literacy as a group of practices situated within and defined by social relationships and broader cultural processes. This perspective highlights the various uses of literacy in daily life: civic and political rights, work, trade, child care, self learning, spiritual development, recreation (Bujanda & Zuñiga, 2008; Fransman, 2008).

The Declaration of Persepolis led to a change in the way literacy was interpreted. It was no longer to be seen as a technical skill whose sole purpose was to ensure economic productivity. The concept of functional literacy took on a new meaning; it was now defined as a broad, diverse range of activities for which literacy is required, in order to ensure that a group or community can function effectively and continue to employ reading, writing and numeracy as a path to individual and collective development (UNESCO, 2006, p. 164).

Since then, definitions of illiteracy and literacy have broadened to accommodate new theoretical approaches and the challenges created by new technologies.

Current literature in the field recognizes the existence of different types of illiteracy, including functional illiteracy. According to Torres (2008), the term “functional” tends to be defined in two ways: as the ability to read and write effectively – which is associated with the completion of a given number of years of schooling – and as the link between literacy and job training or the performance of production activities (Torres, 2008).

Despite a lack of consensus regarding the term “functional” (due to the broad range of activities to which the term may be applied), there is general agreement that the functionally illiterate cannot fully develop their potential, given the demands and requirements of contemporary society (Roy-Singh, 1990; Lowe, 1978; Perrota, 1990; Fernandez, 1988; Flecha, 1993).

The countries of Latin America have followed the recommendations of UNESCO, developing functional illiteracy indices based on schooling. According to UNESCO (2006) and ECLAC (2008), three to four years of effective primary schooling are required to absorb the minimum reading and writing skills needed for adequate development in life (ECLAC, 2004b, Londoño, 1990).

After studying functional illiteracy in seven Latin American countries, however (Argentina, Brazil, Colombia, Chile, Mexico, Paraguay and Venezuela), Infante (2000) concludes that more years of schooling are required to achieve these skills. She argues that at least seven years of schooling are needed to develop basic abilities. In most countries, the development of strong skills in all areas requires 11, 12 or more years of schooling (Infante, 2000).

## **2. Literacy: Approaches in a Knowledge Society**

The World Declaration on Education for All, issued in Jomtien in 1990 and ratified in Dakar in 2002, situated literacy in a broader context: the satisfaction of basic educational needs. According to UNESCO, “These needs comprise both essential learning tools (such as literacy, oral expression, numeracy, and problem solving) and the basic learning content (such as knowledge, skills, values, and attitudes) required by human beings to be able to survive, to develop their full capacities,

to live and work in dignity, to participate fully in development, to improve the quality of their lives, to make informed decisions, and to continue learning” (UNESCO, 2006).

This “renewed vision” defines literacy as the development of oral and written expression and communication. Language is viewed from a broad perspective (speaking, listening, reading, writing). Learning these skills is a lifelong process which involves both traditional and modern instruments (paper and pencil, keyboards, digital technology, etc.) (Bujanda & Zuñiga, 2008; Torres, 2000).

Thus, the traditional literate/illiterate dichotomy has been abandoned in favour of a concept of literacy as a continuum, covering everything from the learning of basic skills to more complex linguistic and communication abilities that are closely intertwined with life environments and situations.

Several UNESCO meetings and publications have now converged upon the term “literacy”<sup>8</sup> as a means of conveying this broad, multifaceted, ongoing process. It is “the ability to identify, understand, interpret, create, communicate, compute and use printed and written materials associated with varying contexts. Literacy involves a continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society” (UNESCO, 2005).

According to this new vision, the social environments in which interpersonal practices and interactions take place are essential to understanding and developing literacy as both a personal skill and a prerequisite for the development of society (Bujanda & Zuñiga, 2008).

Literacy thus includes oral comprehension and expression, reading, writing, critical thinking and numeracy. It also includes the cultural knowledge necessary for a speaker, writer or reader to recognize and use language that is appropriate to a given social situation. “For an advanced technological society... the goal is an active literacy which allows people to use language to enhance their capacity to think, create and question, in order to participate effectively in society” (Bawden, 2002: p. 365).

Given the number and diversity of environments in which these skills are acquired and put in practice, the programmes and materials employed to teach them must also be diverse and targeted. This requires a plurality of methods and strategies. The content of these materials should be determined by the circumstances of their users, local knowledge and experience and the specific characteristics of each environment and culture (UNESCO, 2004c).

New assessment tools are also required to evaluate the skills acquired and their use in different social and cultural contexts.

### 3. Measuring Illiteracy

As noted above, the concept of literacy has evolved over time, as have the educational strategies employed in its attainment. A definition centred on a basic understanding of language has been set aside in favour of one which emphasizes comprehension, reading and writing in different communicational contexts and situations.

Literacy assessment models are also evolving, shifting from a dichotomic approach (the literate/illiterate census model) to one which includes tests based on standards that recognize the levels of literacy as part of a continuum. These instruments take into account the range of functional skills required in different situations – for example, reading a legal contract or a newspaper, or using a computer – as well as the fact that, in the final analysis, the most

<sup>8</sup> “Literacy” is the official UNESCO translation of the Spanish term *alfabetización*. (UNESCO, 2006).

important indicator is the ability to understand the meaning or meanings of a text and form a critical opinion (UNESCO, 2005).

Nevertheless, there is still a gap between the current concept of illiteracy and its measurement. The concept is complex in terms of its meanings and dimensions; it includes not only skills, but also the social environments which influence them and affect their development or cause their loss. The operational definition by which illiteracy is measured, however, focuses on personal skills or attributes (“the ability to identify, understand, interpret, create, communicate, compute and use printed and written materials associated with varying contexts”, or completion of a number of years of schooling), neglecting the environments and contexts in which individuals demonstrate their abilities (Bujanda & Zuñiga, 2008). Unless so-called “literate environments” are made operational and included in measurement exercises, they will remain invisible to those responsible for making decisions and implementing literacy strategies.

One area of significant progress has been adult education. The methodologies used in this field seem to have been more successful at integrating literacy with the social environments of individuals. UNESCO seeks to measure literacy skills through the Literacy Assessment and Monitoring Programme (LAMP) developed by its Institute for Statistics <sup>9</sup>. It has developed a Non-Formal Education Management Information System (NFE-MIS)<sup>10</sup> to support the monitoring and evaluation of non-formal education and measure their impact on quality of life.

LAMP surveys a sample population of adults (aged 15 and older) to assess the full spectrum of illiteracy (from the most basic skills to those required to participate fully in a learning society). Its comparative approach allows it to contribute to the design and supervision of both national and international programmes. LAMP also strengthens statistical capacities in the field of literacy surveys and assessment. These enhanced capabilities can be used to improve literacy policies and strategies (UNESCO, 2008).

In 1971, the Association for the Evaluation of Educational Achievement (IEA) conducted the first study of reading comprehension. The fact that it was divided into two smaller studies – one focusing on literature, the other on cognitive skills – reflects the divorce which existed between these two aspects of reading. This gap was to be remedied in later studies, which merged the two aspects in the term “literacy”.

The early 1990s witnessed the development and implementation of two new reading evaluation instruments: the IEA Reading Literacy surveys (1991) and the International Adult Literacy Study (IALS, 1994). These new instruments were the first to focus on both literacy and reading literacy, analyzing comprehension and the social functions of reading. They included the reading of texts in real and functional contexts – “documents” (non-continuous texts) and other evaluation materials, such as maps, figures, tables and forms. These are “texts we should know how to use in order to function in the world, and without which we would face social exclusion” (Lafontaine, 2001).

According to Lafontaine (2001), the PISA and PIRLS <sup>11</sup> studies of the late 1990s marked the beginning of a new period in the measurement of reading abilities – one characterized by complete transparency in the reporting of the theoretical framework which validates the instrument, as well as the choice of domain structure, evaluation modalities and the scales with which results are presented.

The latest measurement techniques include reading evaluation and comprehension of texts with varying degrees of difficulty, numeracy and the study of these skills in different social contexts and realities (LAMP, 2009).

A recent document addressed to civil society organizations highlights the need to define literacy and literacy evaluation as a continuum, abandoning the traditional literate/illiterate dichotomy: “This transformation will ensure that all citizens are

<sup>9</sup> [http://www.unesco.cl/medios/biblioteca/documentos/Programa\\_monitoreo\\_evaluacion\\_alfabetización\\_lamp.pdf](http://www.unesco.cl/medios/biblioteca/documentos/Programa_monitoreo_evaluacion_alfabetización_lamp.pdf)

<sup>10</sup> <http://unesdoc.unesco.org/images/0014/001457/145791e.pdf>.

<sup>11</sup> The Progress in International Reading Literacy Study (PIRLS) is a comparative study of the importance of reading among children aged 10. It is sponsored by the International Association for the Evaluation of Educational Achievement (IEA).

given better opportunities to acquire and develop learning capabilities and participate in literate society. New data must be gathered that reflect this vision. Current literacy statistics often significantly underestimate the scope of the problem. National literacy surveys focusing on young people and adults are needed, in order to produce new data on the number and characteristics of persons who face the challenge of becoming literate” (ICAE & FISC, 2009).

## **4. The Impact of Literacy**

Several studies have found that adult literacy courses and literacy teaching improve self-esteem, personal autonomy, creativity and critical thinking. Given their intrinsic value, these benefits may produce others directly or indirectly related to literacy, as stated by the UNESCO report on Education for All. Such benefits include improved health and increased political participation or social integration (UNESCO, 2005).

One of the most widely studied benefits of literacy is its impact on self-esteem (Stromquist, 2008). Studies have been carried out on this subject in a number of countries, including Brazil, India, the United States and several African countries. Adult literacy programmes have been found to have a positive effect on the self-esteem of participants (Abadzi, 2003; Beder 1999; Bingman, 2000; Egbo, 2000; Farrell, 2004; Greenleigh Associates, 1968; Lauglo, 2001; Stromquist, 1997; Young et al., 1980, 1994). These benefits are particularly significant among women (Stromquist, 2008).

According to a global assessment by UNESCO (The EFA Global Monitoring Report Team, 2005), the benefits of successfully completed adult literacy programmes are comparable, in cognitive terms, to those offered by the educational system. More research is necessary, however – particularly with regard to the long-term effects of such programmes (Oxenham & Aoki, 2002). It should also be noted that, unlike standard schooling, adult literacy programmes offer specific benefits, such as political awareness, autonomy, capacity for critical thinking and the opportunity to participate in community life.

Very few studies directly address the economic rate of return of initial literacy (learning to read and write). This is partly attributable to the greater measurement difficulties which many of its benefits entail, given the psycho-social and symbolic nature of the results obtained <sup>12</sup>. While opinions may differ, there appears to be consensus regarding the fact that literacy offers returns both for its direct beneficiaries and for society as a whole. This is clearer still when functional literacy is considered. The acquisition of the skills necessary to adequately participate in society is a learning experience – inside or outside of the formal educational system – which produces amply documented economic benefits, as will be explained below.

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<sup>12</sup> One of the most direct measurements of “literacy” is found in Hanushek and Zhang (2006). This study is based on International Adult Literacy Survey (IALS) data. See also: The EFA Global Monitoring Report Team (2005) and Robinson-Pant (2006).

## II. Illiteracy in Latin America and the Caribbean

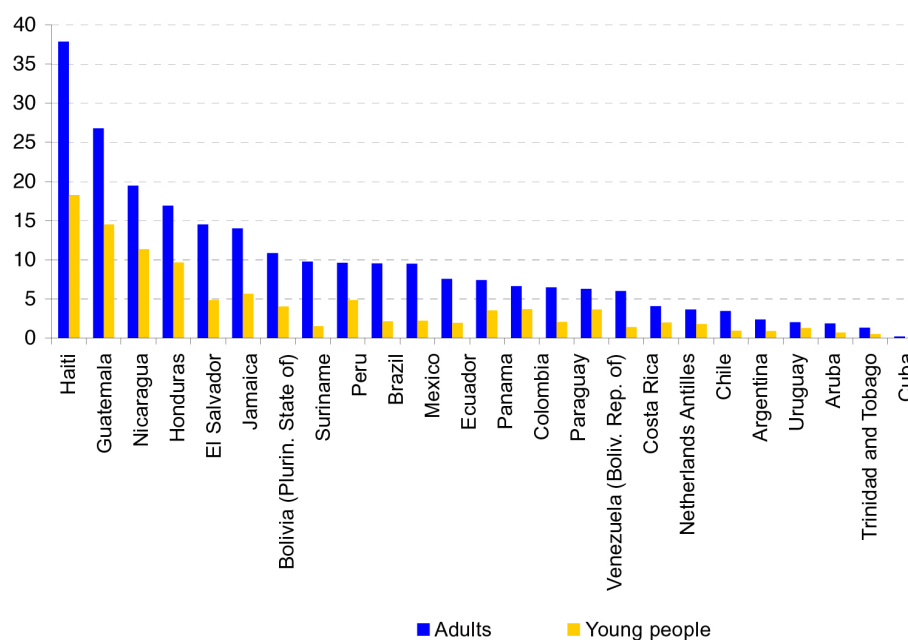
### 1. Educational Coverage and Achievements

As noted above, the term “illiterate”, formerly associated exclusively with the inability to read and write, has changed over time, as have the methodologies used to address the issue. Nevertheless, despite the acceptance of different types of illiteracy, so-called complete illiteracy remains a key element in the maps and indices used to measure the problem (Letelier, 1996).

According to available data <sup>13</sup> for 25 Latin American and Caribbean countries, nine percent of the population aged 15 and older was completely illiterate as of 2005- 2007. This is equivalent to 36 million people <sup>14</sup>. In seven of these countries, illiteracy exceeds 10%; in two, it exceeds 20%, as shown in figure 1.

Nevertheless, thanks to an increase in the coverage of formal education systems in the region over the last 20 years, the illiteracy rate of the population aged 15 to 24 now stands at 2.9% – although it exceeds 10% in three of the 25 countries for which data are available.

**FIGURE 1**  
**COMPLETE ILLITERACY AMONG ADULTS (AGED 15 AND OLDER) AND YOUNG PEOPLE (AGED 15 TO 24), 2007**  
(Percentages)



Source: UNESCO Institute for Statistics – UIS – education database, available at <http://stats.uis.unesco.org> ; for the Bolivarian Republic of Venezuela (2005), CEPALSTAT.

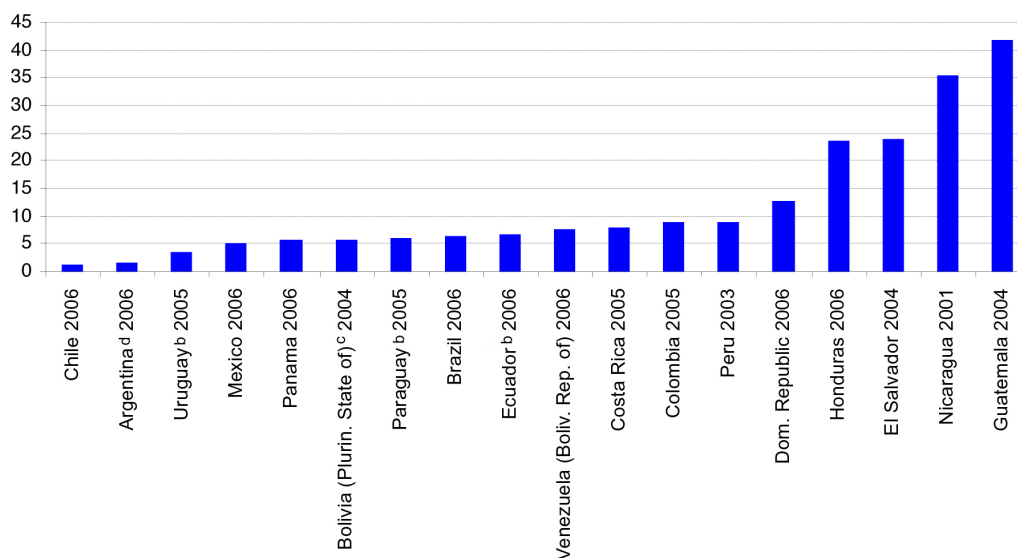
This decline in illiteracy among adults and young adults appears to be directly related to the success of efforts to universalize primary education. Educational quality aside, empirical evidence in the 18 countries of the region for which data are available shows that 93% of young people aged 15 to 19 have completed primary education (ECLAC, on the basis of household survey data). This average includes countries that differ significantly from one another. In four countries, the rate of primary school completion exceeds 94%; in ten others, it hovers between 85% and 95%; in four others, it is below 85%. Nevertheless, the fact that approximately three million young people in Latin America and the Caribbean remain unable to read or write serves as a reminder that illiteracy is not exclusive to older adults.

As shown in figure 1, the situation in the region varies considerably from country to country. Haiti has the highest rate of complete illiteracy, followed by the countries of Central America, with the exception of Costa Rica, which, together with certain Southern Cone and Caribbean countries, has one of the lowest complete illiteracy rates in the region.

Universal completion of primary schooling would not only significantly contribute to the realisation of the right to education, but would also help reduce extreme poverty, promote equity and social inclusion and strengthen the rights of citizens (Villatoro, 2007).

Target 3 of the second Millennium Development Goal is to ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling. As shown in figure 3, conditions in the region vary considerably, and the countries of Central America face the greatest challenge in terms of ensuring that their entire populations complete primary and secondary education (UNESCO-OREALC, 2007).

**FIGURE 2**  
**PERSONS AGED 15 TO 19 WHO HAVE NOT COMPLETED PRIMARY EDUCATION**  
(Percentages)



Source: ECLAC, on the basis of special household survey tabulations.

<sup>a</sup> 2006, or the closest year for which data are available.

<sup>b</sup> Urban areas.

<sup>c</sup> Eight major cities.

<sup>d</sup> Greater Buenos Aires.

<sup>13</sup> UIS database, available at <http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx>; for the Bolivarian Republic of Venezuela (2005), CEPALSTAT.

<sup>14</sup> The size of the affected population was estimated on the basis of CELADE population forecasts for 2007, with the exception of: Aruba (2006 census), Cuba (ONE), the Netherlands Antilles, Jamaica, Suriname and Trinidad and Tobago. Source: <http://esa.un.org/unpp/index.asp?panel=2>.

Following is an analysis of the region in light of three indicators: the net primary school enrolment rate, the percentage of grade one entrants who reach grade five (survival rate to grade five) and the percentage of pupils who complete primary school.

a) Net enrolment rate: As of 2002, the (simple) regional average for this indicator was 93%. At the outset of the current decade, most countries displayed relatively high enrolment levels. In fact, in virtually every country and territory considered, at least 80% of children of primary school age were enrolled. Furthermore, in 20 of the 25 countries for which data are available, the net enrolment rate exceeded 90%. Significant progress was made in the region during the preceding decade; in 1990, the net enrolment rate was 86%. The rate of progress in the region exceeds the global average, which was 82% as of 1990 and 84% as of 2000 (United Nations, 2005). According to UNESCO data <sup>15</sup>, the (simple) regional average climbed to 93.9% in 2006.

b) Survival rate to grade five: This indicator consists of the percentage of a cohort of grade one entrants who reach grade five, given certain assumptions used to reconstruct the flow of the cohort (United Nations, 2005). In Latin America and the Caribbean, “only 10 of the 32 countries and territories that were examined have a survival rate to grade five of over 90%. To a large extent, this reflects relatively high repetition rates in the early years of primary education, which, in many of the region’s countries, then translate into higher school dropout rates” (United Nations, 2005).

**TABLE 1**  
**PROBABILITY OF PRIMARY SCHOOL COMPLETION AS OF 2015**  
**(POPULATION UNDER FIVE AS OF 2002)**

Country	Percentage of population aged 20 to 24 with complete primary schooling or more <sup>b</sup>	Probability of primary school completion
Argentina <sup>a</sup>	97,5	97,8
Plurinational State of Bolivia	77,0	88,8
Brazil	85,6	93,1
Chile	96,0	98,2
Colombia	88,4	95,4
Costa Rica	87,2	94,3
Ecuador	90,8	95,3
El Salvador	72,8	82,1
Guatemala	55,9	76,9
Honduras	66,7	78,3
Mexico	89,7	96,0
Nicaragua	62,5	69,5
Panama	89,8	96,1
Paraguay	80,7	88,0
Peru	88,6	95,0
Dominican Republic	81,0	89,2
Uruguay <sup>a</sup>	97,1	97,5
Bolivarian Republic of Venezuela	90,0	94,7
Total	86,4	93,6

Source: UNESCO, 2004, La conclusión universal de la educación primaria en América Latina: ¿Estamos realmente tan cerca?, Santiago de Chile.

<sup>a</sup> Urban areas only

<sup>b</sup> Data for population aged 20 to 24, which typically entered primary school around 1990 (MDG baseline year).

<sup>15</sup> UIS database, available at [www.uis.unesco.org](http://www.uis.unesco.org).

c) Primary school completion: Using special household survey tabulations, UNESCO, in collaboration with ECLAC (UNESCO, 2004b), has estimated the probability of primary school completion for the population under 15 in 18 Latin American countries. Only 86.4% (weighted average) of the population that entered primary school around 1990 completed the cycle. On that basis, 93.6% are expected to complete primary education as of 2015. This means that slightly over 6% will fail to do so.

## 2. Quality and Competencies

The countries of the region have made considerable efforts to increase the number of years of mandatory schooling, expand the coverage of their educational systems, improve their infrastructure, design new curricula and train teachers, among other objectives. Educational quality issues persist, however, and have a disproportionate impact on the most vulnerable individuals and groups (UNESCO, 2007).

Providing quality education is a constant aspiration for all educational systems, and a common priority for society as a whole. Nevertheless, the diversity of results, and their relationship with socioeconomic class, underscore the link between the former and the inequality displayed by our region. The markedly inferior education of the poorest sectors brings social and economic differences into sharp relief.

As education has become more accessible to the population, the importance of quality has become more apparent. Recent research by UNESCO/OREALC (2007) has identified five requirements for a quality education: equity, relevance, pertinence, efficacy and efficiency.

Equity goes beyond equality to include a distinction criterion which, rather than encouraging uniformity, seeks to provide individuals with means according to their particular needs, ensuring that the same educational opportunities are available to all. Equity should consist of three levels: equity of access, which means that schools should be available and accessible to all; equity of learning means – that is, the resources employed in educational processes, and the quality of such processes; and equity of results, which requires the democratization of access to and ownership of knowledge. Necessary educational content must be identified, seeking a balance between common interests and personal, social and cultural diversity.

Relevance involves the what and why of education – its content and purposes. The latter include human development and respect for fundamental rights and freedoms. Nevertheless, education also reflects the political and social vision of a specific environment and historical context. Content is selected on the basis of objectives. It is a function of both the pupil's environment and the world at large. This brings to mind the four pillars of education mentioned in the Report to UNESCO of the International Commission on Education for the Twenty-first Century, published in 1997: learning to know, learning to do, learning to live together and learning to be<sup>16</sup>.

Pertinence involves the need for education to be significant for each and every individual, regardless of family or geographic origin, interests and personal capabilities, in order to ensure that all human beings fully participate in society as autonomous and free individuals with established identities. It means putting students at the center of the educational process. This, in turn, means that adaptability is essential. Education must be open and flexible. Pertinence also requires a profound transformation of educational practices. The pedagogy of uniformity must give way to a pedagogy of diversity, where teachers play a key role.

Effectiveness and efficiency, while more quantitative in nature, are no less important. They bear directly upon the results of education. Both involve measuring the extent to which objectives are being fulfilled in relation to the resources invested. This includes answering the following questions: To what extent are the needs of the illiterate

<sup>16</sup> UNESCO, 1997. "Learning: The Treasure Within". Report to UNESCO of the International Commission on Education for the Twenty-first Century. Paris, France.



population being addressed? Are educational resources and processes allocated and organized in a manner that encourages pertinent, relevant learning? Services must be provided in accordance with existing needs, and educational processes must be configured in a rational and coherent manner. This is particularly important when implementing literacy policies – which are often underfunded – and lifelong education programmes. Effectiveness and efficiency are closely associated with funding.

Using standardized test scores as an approximate indicator of cognitive skills, studies have systematically shown the impact of improved academic results on lifelong income. They have also demonstrated the relationship between a country's human capital and its economic development (UNESCO, 2005).

International educational achievement tests have now made it possible to include learning quality in such studies. Math and science scores are an indicator of the future productivity of a country's labour force. This underscores the relationship between an educated population and poverty reduction (UNESCO, 2005).

In Latin America and the Caribbean, a variety of indicators are used to measure educational quality: learning results, as reflected by various national or provincial standardized tests; international tests, such as PISA, TIMSS and SERCE<sup>17</sup>; or general knowledge surveys of the population, such as IALS. Some of the results of these tests are summarized below.

## 2.1 Programme for International Student Assessment (PISA)

The Programme for International Student Assessment (PISA) is an OECD initiative designed to evaluate reading, math and science skills every three years, beginning in 2000. The test examines the performance of 15-year-old students, regardless of educational and/or grade level. They are evaluated at age fifteen in order to assess their performance near the end of their mandatory schooling, or at least after they have completed the first cycle of secondary education (OECD, 2006).

The test evaluates the use of knowledge and skills in everyday situations. It does not evaluate curricular content per se, but rather the degree to which a country's educational system prepares students to continue learning throughout their lives and participate actively in society as citizens (Acevedo, 2005).

The 2006 evaluation, like the previous cycles (2000 and 2003), covered reading, math and science, attaching special priority to science<sup>18</sup>. The programme has been implemented in 57 countries, six of which are in Latin America (Argentina, Brazil, Chile, Colombia, Mexico and Uruguay). The science results obtained in these countries can be divided into six levels. Level 1 is comprised of students whose science skills are so limited that they can only be applied to a few situations, whereas level 6 is made up of students who can consistently identify, explain and apply scientific knowledge to a variety of complex real-life situations (OECD, 2007).

Hanushek and Wobman (2007) emphasize the importance for countries of reaching a certain threshold of basic literacy on the international scale. In their view, this threshold should consist of a score of 400 on PISA tests.

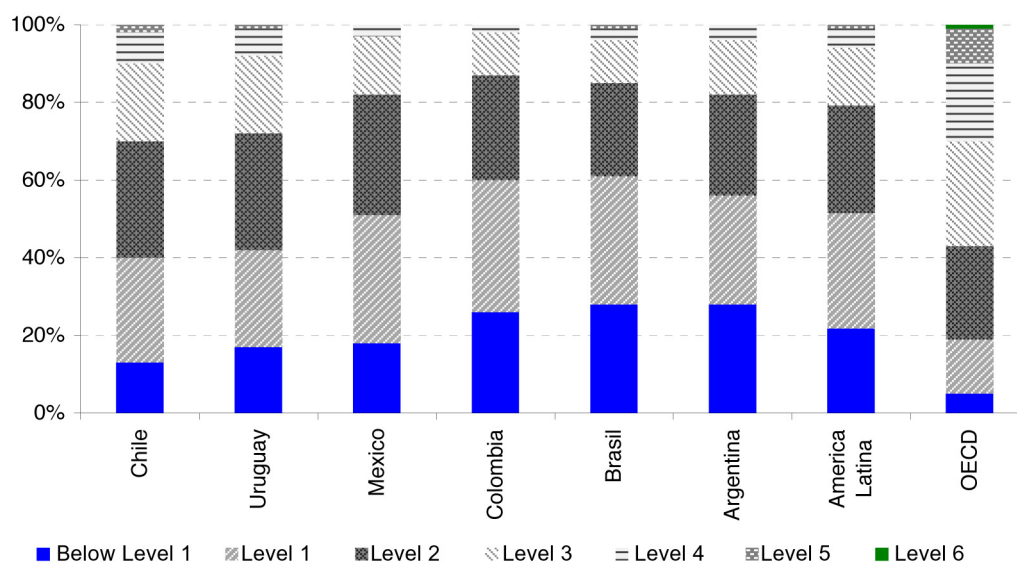
These authors conclude that, in a significant number of developing countries, over 40% of the population may be considered "illiterate". In Latin America, this group includes countries such as Argentina, Brazil, Colombia and Mexico<sup>19</sup>. In other words, most pupils can perform only basic reading tasks, such as extracting information from a text using only one criterion or condition. They can understand the content of a text only if it deals with a familiar subject, and they are able to establish only simple connections between the text and other topics or knowledge.

<sup>17</sup> PISA = OECD Programme for International Student Assessment; TIMSS = Trends in International Mathematics and Science Study; SERCE = Segundo Estudio Regional Comparativo y Explicativo de la UNESCO/OREALC (Second UNESCO/OREALC Comparative and Explicative Regional Study).

<sup>18</sup> The evaluation of skills in this case does not involve assessing content. Rather than verifying the acquisition of information or skills, the programme seeks to confirm the presence of certain capacities, abilities and aptitudes which, taken together, enable a person to solve real-life problems and situations (OECD, 2006).

<sup>19</sup> Of the Latin American countries tested, only Colombia, Chile and Uruguay cleared the threshold.

**FIGURE 3**  
**SCIENCE SCORES BY LEVEL**  
(Percentages)

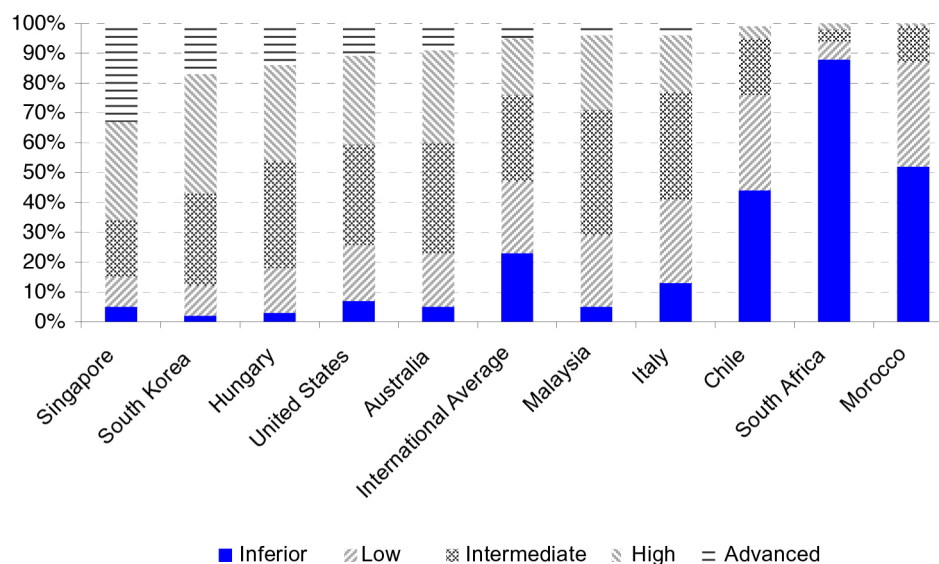


Source: OECD (2007), PISA 2006, Science Competencies for Tomorrow's World, Vol. 2: Database.

## 2.2 Trends in International Mathematics and Science Study (TIMSS)

TIMSS is an international test administered by the International Association for the Evaluation of Educational Achievement (IEA). It evaluates knowledge in math and science at different points in the academic cycle (grades 4, 8 and 12) every four years (1995, 1999, 2003 and 2007).

**FIGURE 4**  
**SCIENCE ACHIEVEMENT LEVELS, TIMSS 2003**  
(Percentages)



Source: MINEDUC, Departamento de Estudios y Desarrollo, on the basis of TIMSS 2003

The number of participating countries has increased with every evaluation. Twenty-six countries participated in 1995; that number rose to 38 in 1999, and 49 in 2003. That year, specific states from four countries also joined the programme. Of the 49 participating countries, 25 administered the exam in grades 4 and 8; 23 administered it in grade 8, and one did so in grade 4. Chile is the only country in Latin America for which TIMSS data were reported in 2003, although Argentina, Colombia, El Salvador and Mexico have participated in previous years.

## 2.3 International Adult Literacy Survey (IALS)

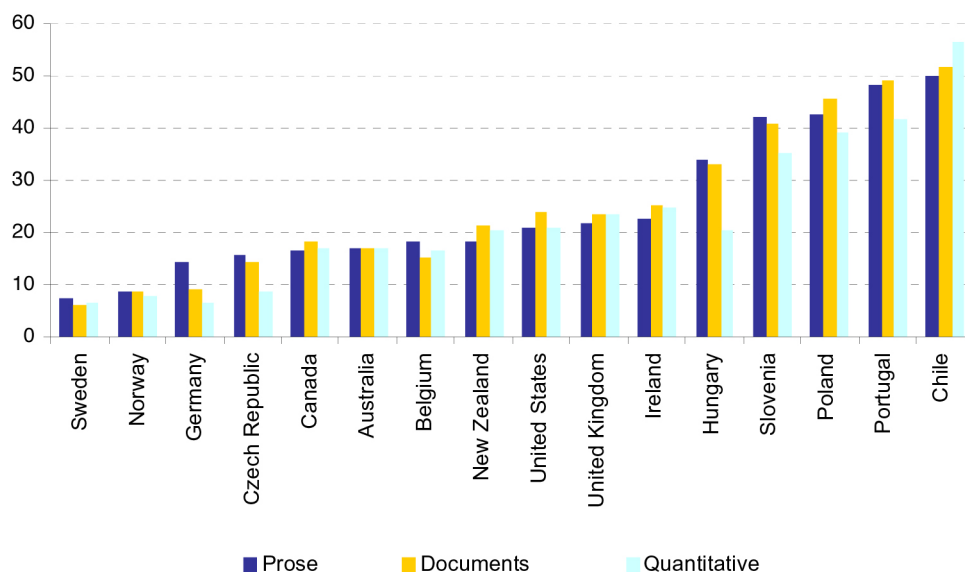
IALS, carried out by OECD with the participation of Statistics Canada and the United States Educational Testing Service, assessed the literacy of representative samples of the population over 15 in a number of countries. Its central premise is that literacy is a continuous variable, rather than the dichotomy it has traditionally been believed to be, and that it is linked to the basic competencies needed to function in society.

The basic skills assessed were divided into three categories: prose, documents and quantitative skills. The first stage of the survey was carried out in 12 OECD countries, between 1994 and 1996. The second stage was implemented in 1998, and included 10 additional countries. The only Latin American country surveyed was Chile.

The results revealed that Chile was far short of the standards required for adequate insertion into the global economy. Over half of its adult population lacked the skills necessary to understand the materials assigned to level 1 (Bravo and Contreras, 2001), the most basic level of the survey.

The survey also revealed that official illiteracy rates vastly underestimate the effective literacy rate of the population. The case of Chile is instructive: while traditional statistics list only 4% of the population over 15 as being unable to read or write, over half of the population received an IALS classification of level 1, which may be considered roughly equivalent to functional illiteracy. The situation of other countries in the region is probably similar, although no data are available on effective literacy in those countries (Larrañaga, 2007).

**FIGURE 5**  
**LEVEL 1 POPULATION IN PARTICIPATING COUNTRIES, 2003 POPULATION AGED 16 TO 65 (IALS)**  
(Percentages)



Source: Bravo and Contreras (2001), excerpted from OECD (2000), *Literacy in the Information Age* (16 of the 22 participating countries).

IALS was followed by the Adult Literacy and Life Skills (ALL) survey, which received advisory support from UNESCO. The first stage of the survey was carried out in 2003. It included six countries, none of them Latin American. In order to gather literacy data at the global level, UNESCO has developed a Literacy Assessment and Monitoring Programme (LAMP), implemented by its Institute for Statistics (UIS). The programme is currently undertaking pilot projects in the autonomous territory of Palestine, El Salvador, Kenya, Morocco, Mongolia and Niger

## 2.4 UNESCO Regional Research

UNESCO also developed a regional research initiative, in order to assess functional illiteracy using quantitative and qualitative approaches. Empirical data were used to profile the population on the basis of its reading skills, which were then compared with certain social and professional abilities ostensibly required in urban areas.

The research took place between 1995 and 1997, in urban areas in seven countries: Argentina (Buenos Aires), Brazil (São Paulo), Colombia (Bogota), Chile (Santiago), Mexico (Mexico D.F., Merida and Monterrey), Paraguay (Asuncion and neighbouring communities) and Venezuela (Caracas).

One of the most important findings of the study was that the adult population of these countries can, in fact, be divided into statistically diverse levels of literacy, based on its mastery of prose, documents and mathematics. Every member of the adult population proved to be classifiable according to the skill categories established by the survey, thus belying the traditional, dichotomic notion of illiteracy. Everyone is illiterate to a certain degree. The level of illiteracy depends on an individual's years of schooling, the types of information to which he or she has had access and the degree to which specific communication codes have been mastered (Infante, 2000).

The literacy levels mentioned above are not uniform categories. Their meaning may vary according to context. Four different realities are involved: the use of spoken language, the use and function of writing, its distribution within society and the cognitive strategies that each individual, in accordance with his or her culture, develops to deal with written codes and the need to resolve concrete problems that present themselves in writing (Infante, 2000).

Research in the countries mentioned above shows that 50% or more of persons with six or seven years of schooling remain within levels 1 and 2 of the survey. Eleven, twelve or more years of schooling are required to reach level 4, which is comprised of persons with skills in every area, and is characterized by high labour market insertion (Infante, 2000).

UNESCO has also played an important role in assessing the level and quality of education in the countries of the region. The OREALC/UNESCO Latin American Laboratory for the Assessment of Education Quality (LLECE) has carried out pioneering studies with the objective of measuring educational achievement and its determining factors. The organization has also helped launch many of the region's educational achievement evaluation systems.

One initial comparative and exploratory study of Latin America was carried out in 1992, with the participation of Argentina, the Plurinational State of Bolivia, Chile, Costa Rica, the Dominican Republic, Ecuador and the Bolivarian Republic of Venezuela (UNESCO/OREALC, 1994). Results showed low educational performance and significant achievement gaps, linked with socioeconomic class, between students.

In 1997, LLECE carried out the Primer Estudio Internacional Comparativo de Lenguaje, Matemática y Factores Asociados (First International Comparative Study of Language, Mathematics and Associated Factors) in thirteen Latin American countries: Argentina, the Plurinational State of Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, the Dominican Republic, Honduras, Mexico, Paraguay, Peru and the Bolivarian Republic of Venezuela. Deficiencies were found in most of the participating countries, and significant gaps were identified between the country with the best results – Cuba – and the rest of the region. Most of the countries tested failed to reach level 2 (UNESCO/OREALC, 1998).

**TABLE 2**  
**NATIONAL EDUCATION EVALUATION SYSTEMS**  
**IN LATIN AMERICA AND THE CARIBBEAN**

Argentina	Periodic Operativos Nacionales de Evaluación (National Evaluations – ONE) carried out in the country's 24 states since 1993. ( <a href="http://diniece.me.gov.ar">http://diniece.me.gov.ar</a> ).
Plurinational	Subsistema Nacional de Medición de la Calidad de la Educación Preescolar, Primaria y Secundaria State of Bolivia (National Preschool, Primary and Secondary School Education Quality Measurement Sub-system – SIMECAL) administered tests between 1995 and 2002.
Brazil	Sistema de Avaliação da Educação Básica (System for the Evaluation of Basic Education) periodically administers two complementary exams: SAEB, since 1990, and Prova Brasil, since 2005. ( <a href="http://provaBrasil.inep.gov.br">http://provaBrasil.inep.gov.br</a> ).
Chile	Periodic national tests administered by Sistema de Medición de la Calidad Educativa (Education Quality Measurement System – SIMCE) since 1988. PERT test administered before creation of SIMCE (beginning in 1982). ( <a href="http://www.simce.cl">http://www.simce.cl</a> ).
Colombia	Sistema Nacional de Evaluación de la Educación (National Education Evaluation System) has administered SABER exams nationally since 1991 ( <a href="http://menweb.mineducacion.gov.co:8080/saber/">http://menweb.mineducacion.gov.co:8080/saber/</a> ).
Costa Rica	División de Control de Calidad y Macroevaluación del Sistema Educativo Costarricense (Costa Rican Educational System Quality Control and Macroevaluation Division), which oversees the Sistema Nacional de Evaluación de la Calidad de la Educación (National Educational Quality Evaluation System). Its functions include administering national secondary school bachillerato exams (high school achievement tests), as well as the exams administered at the end of each General Basic Education cycle, among others. ( <a href="http://www.dcc.mep.go.cr">http://www.dcc.mep.go.cr</a> ).
Cuba	Instituto Central de Ciencias Pedagógicas (Central Institute for Pedagogic Sciences – ICCP). Sistema de Evaluación de la Educación en Cuba (Cuban Education Evaluation System) currently under development. ( <a href="http://www.iccp.rimed.cu">http://www.iccp.rimed.cu</a> ). Dominican Republic Tests administered nationally by Dirección General de Evaluación y Control de la Calidad de la Educación (General Directorate for the Evaluation and Monitoring of Education Quality) as part of a sub-system for the evaluation of educational achievement created in the early 1990s. ( <a href="http://www.educando.edu.do/sitios/gestion_calidad/">http://www.educando.edu.do/sitios/gestion_calidad/</a> ).
Ecuador	Sistema Nacional de Medición de Logros Académicos (National System for the Measurement of Academic Achievement – SIMLA) administered APRENDO tests nationally between 1996 and 2000, and carried out a fifth evaluation initiative in 2007 as part of the current Sistema Nacional de Evaluación y Rendición de Cuentas (National Evaluation and Accountability System). ( <a href="http://www.educacion.gov.ec/proyectosConvenios/aprendo.php">http://www.educacion.gov.ec/proyectosConvenios/aprendo.php</a> ).
El Salvador	Evaluations performed by Sistema Nacional de Evaluación de los Aprendizajes (National Learning Evaluation System – SINEA) since 2002. PAES exam administered since 1997. ( <a href="http://www.mined.gob.sv/">http://www.mined.gob.sv/</a> ).
Guatemala	Periodic national tests administered by Sistema Nacional de Evaluación e Investigación Educativa (National Educational Evaluation and Research System – SINEIE) since 1998. ( <a href="http://www.mineduc.gob.gt/digeduca/index.asp">http://www.mineduc.gob.gt/digeduca/index.asp</a> ).
Honduras	Various evaluations performed by Sistema Nacional de Evaluación de la Calidad de la Educación (National Education Quality Evaluation System – SINECE) since 2000. ( <a href="http://www.se.gob.hn/">http://www.se.gob.hn/</a> ).
Mexico	Instituto Nacional para la Evaluación de la Educación (National Institute for the Evaluation of Education – INEE) administers Exámenes de la Calidad y el Logro Educativos (Educational Quality and Achievement Exams – EXCALE) every four years. ( <a href="http://www.inee.edu.mx/explorador/queSonExcale.php">http://www.inee.edu.mx/explorador/queSonExcale.php</a> ).
Nicaragua	National educational achievement test administered by Dirección de Evaluación de Políticas, Programas y Proyectos (Policy, Programme and Project Evaluation Directorate) since 2002. ( <a href="http://www.mined.gob.ni">http://www.mined.gob.ni</a> ).
Panama	Sistema Nacional de la Calidad de los Aprendizajes (National Learning Quality System – SINECA) performed first evaluation in 2005. ( <a href="http://www.meduca.gob.pa/">http://www.meduca.gob.pa/</a> ).
Paraguay	Annual academic performance tests carried out by Sistema Nacional de Evaluación del Proceso Educativo (National Educational Process Evaluation System – SNEPE) since 1995. ( <a href="http://www.escuelaviva-mec.edu.py/snepe.php">http://www.escuelaviva-mec.edu.py/snepe.php</a> ).
Peru	Educational achievement evaluations performed by Unidad de Medición de la Calidad Educativa (Educational Quality Assessment Office – UMC) since 1996, using CRECER tests and national exams. ( <a href="http://www2.minedu.gob.pe/umc/index.php">www2.minedu.gob.pe/umc/index.php</a> ).
Uruguay	Tests administered since 1996 by ANEP División de Investigación, Evaluación y Estadística (Research, Evaluation and Statistics Division), through its Departamento de Evaluación de Aprendizajes (Learning Evaluation Department). ( <a href="http://www.anep.edu.uy/sitio/anep.php?identificador=154">www.anep.edu.uy/sitio/anep.php?identificador=154</a> ).
Bolivarian Republic of Venezuela	National evaluations performed by Sistema Nacional de Medición y Evaluación del Aprendizaje (National Learning Assessment and Evaluation System – SINEA) in 1998 and 2003.

Source: OREALC/UNESCO, Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación (LLECE), <http://llege.unesco.cl/esp/>.

**TABLE 3**  
**DISTRIBUTION OF STUDENTS BY PERFORMANCE LEVEL**  
*(Percentages)*

Country	Mathematics		Reading		Science
	Grade 3	Grade 6	Grade 3	Grade 6	Grade 6
Level IV	11,2	11,4	8,4	20,3	2,5
Level III	14,3	32,4	21,6	26,8	11,4
Level II	28,3	40,8	37,7	35,5	42,2
Level I	36	13,9	25,5	16,5	38,7
Below Level I	10,2	1,5	6,7	0,9	5,2

Source: UNESCO/OREALC/LLECE, 2008.

The Segundo Estudio Regional Comparativo y Explicativo (Second Comparative and Explicative Regional Study, or SERCE – UNESCO/OREALC/LLECE, 2008) measured the performance of students in grades 3 and 6 in math, reading and science in 2005/2006, and analyzed the main factors associated with the results obtained. The study covered Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Panama, Paraguay, Peru, the Dominican Republic and Uruguay, as well as the State of Nuevo Leon (Mexico).

The study classifies students in four performance categories. Level I is the lowest, level IV is the highest. Table 2 details the performance, by grade level, of each participating country.

In mathematics, 10.2% of the region's third-grade students (over one million boys and girls) were unable to perform at the lowest level expected for their grade level <sup>20</sup>. Forty-one percent of students in the Dominican Republic and 15% to 17% of students in Guatemala, Panama, Paraguay and Peru were classified as below level I. Results improved substantially in grade 6, where only 1.5% of students failed to reach level I.

With regard to reading skills, 6.7% of students in grade 3 were classified as below level I. The situation was most critical in the Dominican Republic (31.4%), Ecuador (14.6%), Guatemala (14.4%), Paraguay (11.5%) and Panama (11.2%). As with mathematics, reading performance improved dramatically in sixth grade, with fewer than 1% of students failing to reach level I.

Five-point-two percent of students failed to reach level I in science. The Dominican Republic was, once again, the most critically affected country, with 14.3% of boys and girls failing to reach the lowest level.

As for associated factors, preliminary results suggest that schools play a significant role, "explaining" approximately 30% of reading results, 40% of math results and 47% of science results, setting aside family socioeconomic and cultural characteristics. School environment was found to be the "most important variable" in terms of student performance. The study emphasized the importance of harmonious and positive human relationships in school in creating environments conducive to learning.

<sup>20</sup> The study classifies students in four performance categories. Level I is the lowest, level IV is the highest.

**TABLE 4**  
**DISTRIBUTION OF STUDENTS BY PERFORMANCE LEVEL**  
*(Percentages)*

Country	Mathematics		Reading		Science
	Grade 3	Grade 6	Grade 3	Grade 6	Grade 6
Argentina	10,5	1,5	6,3	1,8	5,3
Brazil	10,3	1,5	6,3	0,6	n.p.
Chile	5,1	1,4	1,6	0,3	n.p.
Colombia	8,6	1,0	5,0	0,4	2,6
Costa Rica	2,6	0,1	1,5	0,2	n.p.
Cuba	1,1	0,2	0,6	0,3	0,3
Dominican Republic	41,3	5,7	31,4	4,1	14,3
Ecuador	14,3	4,2	14,6	4,5	n.p.
El Salvador	10,3	2,0	5,3	1,0	3,8
Guatemala	17,3	2,8	14,4	2,9	n.p.
Mexico	5,2	0,5	3,7	0,2	n.p.
Nicaragua	12,1	2,3	7,0	1,0	n.p.
Panama	16,0	3,3	11,2	2,0	6,3
Paraguay	15,9	3,9	11,5	3,9	7,2
Peru	15,2	2,4	9,2	2,2	7,0
Uruguay	5,8	0,7	4,7	0,5	1,7
Nuevo Leon	2,3	0,3	1,7	0,2	2,6
Total, LAC	10,2	1,5	6,7	0,9	5,2

Source: UNESCO/OREALC, 2008: Segundo Estudio Regional Comparativo y Explicativo.

N.p. = Non-participant.

### III. Conceptual Framework

#### 1. Illiteracy, Vulnerability and Social Insertion

Studies agree that illiteracy results from the simultaneous interaction of a number of factors. Chief among these are poverty, malnutrition, health problems, child labour, migration and lack of access to continuous teaching and learning environments. These inequalities influence the social vulnerability of individuals, and vary significantly depending on gender, age, ethnicity and geographic location.

Vulnerability may be defined as a vector made up of two opposing factors: on the one hand, the conditions (variables) that comprise the (economic and social) environment; on the other, the capability/will to face those conditions, both individually and collectively. The latter determines the degree to which difficulties can be overcome (ECLAC, 2006).

The degree of control exercised by individuals and families over various types of resources or assets is directly linked to their level of social vulnerability. By mobilising these resources and assets, they can exploit the opportunities available at a given point in time, improving or maintaining their well-being in the face of threatening circumstances (Katzman, 1999).

The vulnerability of illiterate persons damages their self-esteem and increases the likelihood that they will feel afraid, insecure and defenceless – all of which limits their individual response capability and their ability to make use of the solutions offered by society and social organizations. In short, illiterate persons are more vulnerable, in both senses. They are also at greater risk, and less able to face adversity.

Their vulnerability is exacerbated by the difficulty of building significant social networks, as well as the subordinate position they must occupy in environments where reading and writing are a form of power. These two skills have traditionally been – still are – key mechanisms for the development of increased social capital by individuals and families.

The skill development and increased opportunities for social ties that education entails facilitate social inclusion for its beneficiaries. Social inclusion in this sense should be understood as a dynamic, multifactorial process that allows people to achieve a minimum standard of well-being. It may be viewed as an expanded form of integration. Rather than focusing exclusively on a structure to which individuals must adapt in order to be included in the system, it pushes the system to adapt to a plurality of actors and individuals. Inclusion involves not only improving access to integration channels, but also promoting greater self-determination for the stakeholders involved (ECLAC, 2007).

Furthermore, “education is the best means of overcoming poverty. First because major educational progress generates appreciable intergenerational returns, given the very significant effect of parents’ educational level (especially mothers’) on the educational performance of children. This path to improving the educational climate of the home (whose future heads are currently in school) produces a favourable effect on the educational performance of the children and young people of the next generation, reduces drop-out and grade repetition rates and increases the number of years of schooling completed, while allowing students to be in the

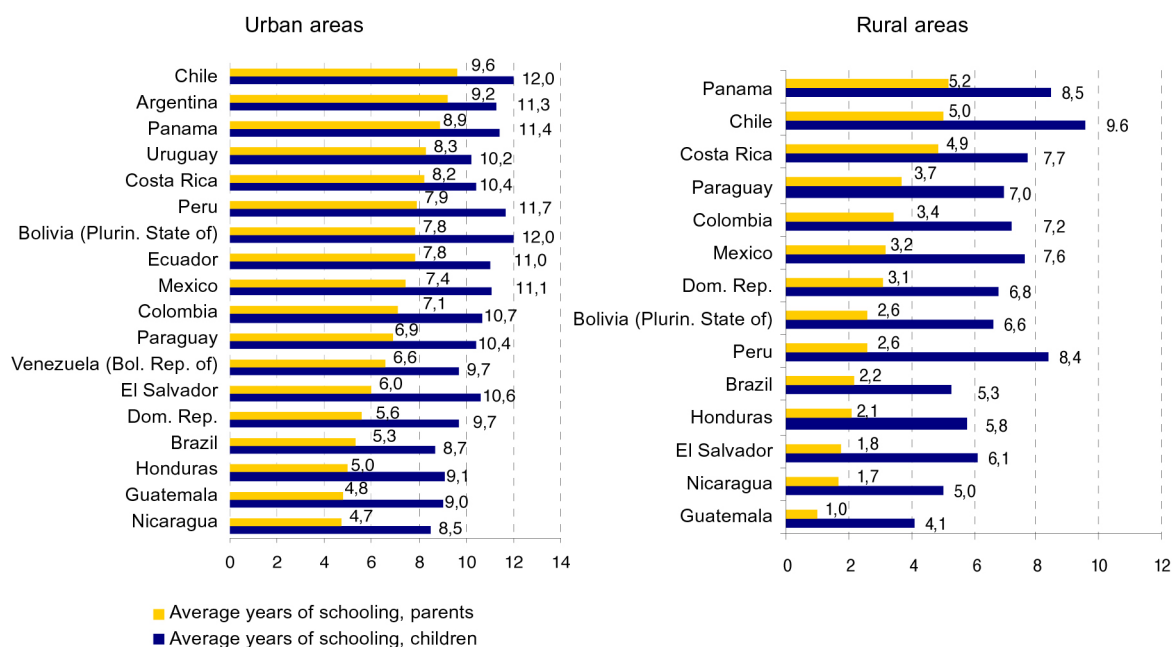


grade appropriate for their age. Second, there is a clear correlation between increasing education among poor women and better health conditions for their families in the future, since women's schooling is a determining factor in reducing infant mortality and morbidity, improving family health and nutrition and bringing fertility levels down. Education also makes social and occupational upward mobility possible for those coming out of the educational system. The higher the level of formal schooling, the lower the probability of remaining poor or falling into poverty" (ECLAC, 2007).

According to studies by ECLAC (2004b), approximately 75% of urban youth in Latin America have parents with less than 10 years of schooling. Young people in rural areas enjoy even fewer opportunities; over 80% of parents in this population have less than six years of schooling.

The fact that educational opportunities – and, hence, access to steadier, better-paying jobs – are largely hereditary is a key factor in the reproduction of inequality. The challenge is to break the cycle.

**FIGURE 6**  
**LATIN AMERICA: AVERAGE YEARS OF SCHOOLING**  
**OF YOUNG PEOPLE AGED 20 TO 24 AND THEIR PARENTS**



Source: : ECLAC (2004). Una década de desarrollo en América Latina, 1990-1999. <sup>a</sup> National total

Moreover, dangerous health practices constitute one of the high-risk behaviours most closely associated with illiteracy. Such behaviours directly affect mortality, disease and accident rates among illiterates, as well as their fecundity, in the case of women. They also indirectly affect their children, increasing their vulnerability.

## 2. Human Capital Theory and Literacy

Over the last few decades, knowledge has become the key ingredient of the new production paradigm, and education has become an essential factor in the modernization of production systems and the economic behaviour of individuals.

Human capital theory is premised on the notion that education is an investment which produces income in the future. Consequently, differences in productivity arising from differences in education are reflected in wage gaps <sup>21</sup>.

Human capital models emphasize the effect of education on individuals: demand for education is a function of rational human behaviour, and education provides the technical knowledge necessary to increase individual productivity. This, in turn, leads to higher employment income.

According to human capital theory, an individual's decision to invest in education is similar to the decision to invest in physical capital. "When deciding whether to invest in education, individuals weigh the future benefits they will obtain if they continue the process, as well as the costs of the investment (for example, the opportunity cost – wages lost due to time spent in school – and the direct cost, i.e. tuition). They will continually ponder whether the current net value of costs versus advantages is positive..." (Destinobles, 2006).

The importance of human capital theory lies in its portrayal of education as an investment which not only has a positive impact on individuals (in terms of income), but also on society as a whole, increasing employment, economic growth and social equity.

Following Mincer's initial projections (1974), the predictions of human capital theory have been examined by a large body of empirical literature. Most studies on the contribution of schooling to productivity and earnings consist of (microeconomic) estimates of the returns of education (Hanushek and Wobman, 2007, pp.6). These studies measure the contribution of additional years of schooling to earnings, estimating the marginal returns of an additional year of education and/or the returns of different levels of schooling – primary, secondary and higher education.

The private returns of primary education appear to be high in less developed countries. According to Psacharopoulos and Patrinos (2004), such returns are equivalent to 25.8% in countries with a per capita income below US\$755.

As noted by ECLAC in Social Panorama of Latin America 2006, the returns of education <sup>22</sup> in 13 countries of the region averaged 14% for all levels of education; average personal income rose by 14% with every additional year of schooling. Returns increased in proportion to educational attainment. The returns of primary education were 8%, compared to 12% for secondary education and 18% for post-secondary or higher education. While the average rate of return remained unchanged between 1990 and 2002, it dropped for primary and secondary education. This suggests that less value is assigned to unskilled labour. Innovation and technological development have raised the market value of skilled workers who are better equipped to handle new technologies. This is reflected by the higher returns of tertiary education – 15% to 18% (ECLAC, 2006).

Studies also suggest that quality of learning is more important than any other factor. Basic skills, such as the ability to read and to comprehend everyday events, have a greater impact on individual earnings than do years of education (Hanushek, 2007). These findings support the idea of functional literacy/illiteracy.

Moreover, Hanushek and Wobman (2007) argue that, rather than enrolment, quality of education – measured in the form of cognitive skills – is the factor most closely linked with income and economic growth.

<sup>21</sup> See the early works of Mincer (1958, 1974), Becker (1964 and 1975) and Schultz (1960 and 1961), as well as the updated summaries of this literature by Cahuc and Zylberberg (2004) and Psacharopoulos and Patrinos (2007).

<sup>22</sup> This estimate resembles a wage effect more than a rate of return, since the latter would require consideration of the costs associated with attaining a given level of education.

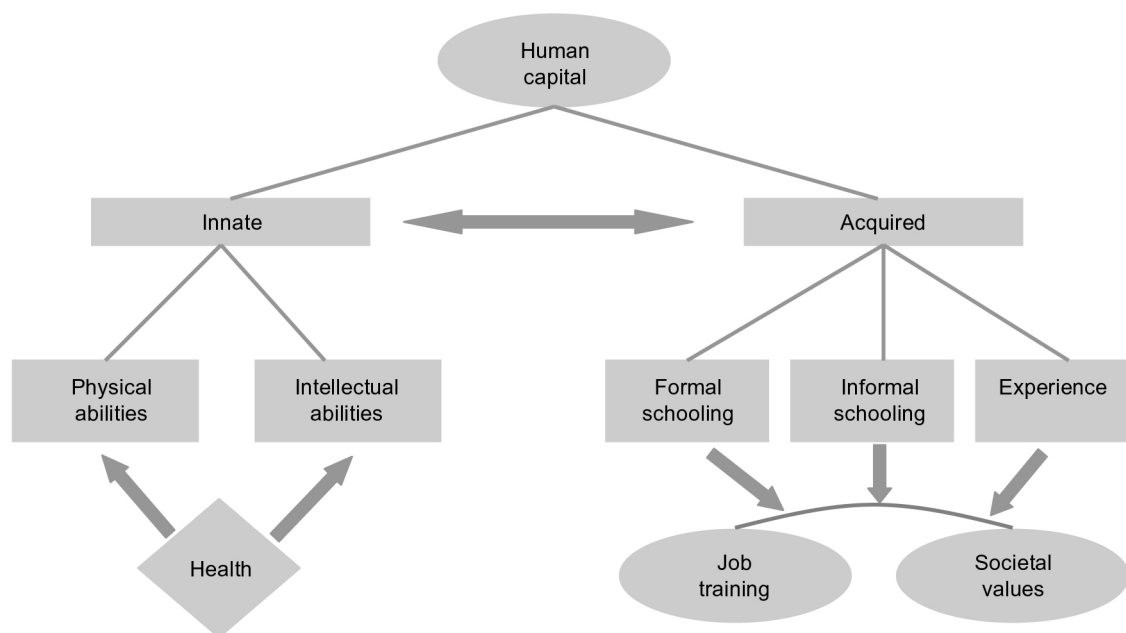
Fuller, Gorman & Edwards (1986) note that quality of education, measured through literacy rates, as well as overall school quality, may have a greater impact on growth than increased enrolment (pp. 170). In the case of Mexico, these authors have demonstrated that increased manufacturing production was associated with improvements in the quality of education – particularly literacy rates and per capita school spending.

Recent extensions of Mincer's equation have analyzed the effect of learning quality on individual earnings<sup>23</sup>. The direct relationship between school characteristics, educational inputs and personal income has been less studied in developing countries, mainly due to lack of data.

One of the first studies on the subject was carried out by Card and Krueger (1992), in the United States. According to these authors, school quality has a significant impact on income<sup>24</sup>. In the case of developing countries, the work of Bedi (1997) should be noted, as should the previous studies authored by Behrman and Birdsall (1983), for Brazil, and Psacharopoulos and Velez (1993), for Colombia.

These studies also reveal a strong correlation between the quality of learning and family background variables, such as the schooling of parents. Extensions of human capital models also suggest that parents who are illiterate or have very little schooling have a negative influence on the potential income of their children.

**FIGURE 7**  
**THE CONCEPT OF HUMAN CAPITAL: INNATE AND ACQUIRED**



<sup>23</sup> This literature follows a different line of inquiry from that which analyzes the determining factors of education using educational production functions, as explained in section 5.

<sup>24</sup> Betts, on the contrary (1995), argues that its impact is negligible.

The concept of human capital, in a broad sense, has been applied and quantified by Giménez (2005) for countries in Latin America. This author draws a distinction between innate and acquired human capital. According to Giménez, innate human capital is that which "...includes physical and intellectual aptitudes which may be modified by nutritional and health conditions", whereas acquired human capital "...is developed throughout life, through formal and informal education, as well as experience" (Giménez, 2005, pp. 106). Health plays a key role in determining innate capital, whereas the determining factors of acquired capital are job training and the values of society.

As noted above, few studies have directly analyzed the returns of initial literacy (learning to read and write). More attention has been paid to its impact on self-esteem, creativity, health, political participation and social integration. Nevertheless, there appears to be consensus regarding the fact that initial literacy offers advantages, both for its direct beneficiaries and for society as a whole. This is even more apparent in the case of functional literacy. The estimates provided by Social Panorama 2006 for primary and secondary education may serve as an approximate indicator of these benefits (ECLAC, 2006).

### **3. Illiteracy, Education and the Labour Market**

In addition to its direct impact on productivity, schooling affects the labour participation rate, as well as fecundity and the female labour supply.

While few studies focus specifically on the relationship between fecundity and the labour supply, certain "demographic" characteristics appear to influence the decision to participate in the labour market, as well as the number of working hours. In Chile, for example, the number of children under age seven significantly affects the female labour supply. The number of children between the ages of seven and fourteen is also significant, though to a lesser degree. Similar effects have been observed in Brazil and Mexico.

The transition from high to low fecundity is marked by critical points at which female literacy is a determining factor. According to Cutright and Hargens (1984), literacy rates above 60%-70% are required to genuinely affect fecundity.

The relationship between schooling and labour participation rates has also been indirectly studied, as a control variable in labour supply estimates. It is stronger in the female population, as the opportunity cost of not working is particularly high for women with more schooling (potential wages being higher).

It should be noted that, since illiteracy in Latin America may be a predominantly rural phenomenon, the link between illiteracy and labour supply should be weaker, since the behaviour of the rural population may be less elastic in terms of its contribution to the labour supply.

### **4. Education as a Determinant of Economic Growth**

Just as human capital models stress the role of schooling in increasing personal earnings, at the country level education improves the human capital of the workforce, as well as its productivity, leading to increased growth.

The effects of education on the economy as a whole have been noted not only by economic growth models, but also by microeconomic studies that highlight the social effects of increased schooling. Fuller, Gorman and Edwards (1986) emphasize an institutional model of increased education and its economic and societal effects – particularly when considering quality of education (including literacy rates) over quantity or years of schooling. Bedi (1997), using data from Honduras, notes that quality of learning has a significant impact on earnings, and emphasizes its importance for economic growth in developing countries.

Razin (1976) carried out one of the first empirical studies on the impact of schooling (the coverage rate of secondary education) on per capita growth. Other estimates (Hicks, 1979, and Romer, 1989) suggest that the literacy rate is an important variable in terms of explaining national growth. Barro (1991) has also noted the positive effect of the literacy rate and the initial coverage rate of primary and secondary education on per capita income growth.

For countries as a group, education improves understanding of new technologies and facilitates their diffusion and implementation – factors which also promote growth (Hanushek and Wobmann, 2007, p. 8). These authors also estimate that each additional year of schooling generates 0.58 percentage points of long-term growth.

Stevens and Weale (2007) note that, while there is a wide range of estimates on the effect of education on economic growth, the most reliable macroeconomic results are those which are consistent with microeconomic estimates of the returns of education (6% to 12%).

Ever since the appearance of Solow's long-run growth model, economic growth models have emphasized the importance of human capital in the economic growth of countries (Romer, 1992, and Lucas, 1988). A country's output depends on its human capital, which is determined endogenously, and "knowledge" is a public good which spreads over the economy as an externality (Psacharopoulos and Patrinos, 2007).

Most studies on the effect of education on economic growth employ regression estimates which express per capita GDP as a function of schooling (measured in terms of years of schooling or the enrolment rate), as well as a number of other economic growth variables <sup>25</sup>.

The debate on the importance of quality of learning vs. years of schooling is also present in the literature on economic growth. According to Hanushek and Kimko (2000) and Hanushek and Wobman (2007), a comparison of countries shows that quality of education has a stronger impact on economic growth than the number of years of schooling. They also note that the attainment of a basic level of skills – a literacy threshold on the international scale – is crucial to growth in developing countries <sup>26</sup>.

An additional question to consider is whether the relationship between growth and education is continuous or discrete. This is particularly important when analyzing the costs of illiteracy. "Poverty trap" models suggest that an accumulation of human capital must occur in order to influence the growth of production, and that the tipping point in this regard is determined by literacy. Thus, in order for a country to attain higher levels of development, it must clear a certain threshold of human capital. This could occur if, for example, the average schooling of the population reached the six-year mark, or if a significant percentage of the population became adequately literate. Once the threshold has been cleared, the country can attain higher levels of growth.

In the case of Brazil, Lau and others (1996) have found empirical evidence to support this hypothesis, pinpointing a threshold effect between three and four average years of schooling.

Finally, as is the case with microeconomic estimates, a distinction may be drawn between the private and social returns of education. New economic growth models stress the existence of externalities which go beyond the social returns of education (Psacharopoulos and Patrinos, 2007, pp.2, and McMahon, 2007, pp. 211).

Following is a list of the main effects and externalities of education found in the literature on the subject and its empirical estimates, according to McMahon (2007). Since literacy is a key stage in this process, many of the externalities associated with education are also present when the literate and illiterate populations are compared.

<sup>25</sup> For a review of the literature on the subject, see Topel (1999), Temple (2001), Krueger and Lindhal (2001) and Sianesi and Van Reenen (2003).

<sup>26</sup> The threshold consists of a score of 400 on international tests.

**TABLE 5**  
**ECONOMIC RETURNS OF EDUCATION**

Nature of benefits	Data employed	Empirical results	Methodology
		Private returns	<div> <div></div> <div>Full discounting</div> <div>Mincer equations</div> </div>
Market (monetary returns)	Microeconomic	Social returns (narrow)	Full costing
National accounts (monetary)	Macroeconomic	Contribution to growth	<div> <div>Domestic growth accounting</div> <div>Cross-country panel regressions</div> </div>
Social returns (broad)	Micro/Macro	Non-monetary benefits	Contingent valuation
		Externalities	New theory of growth

Source: : Psacharopoulos and Patrinos (2007).

**TABLE 6**  
**ECONOMIC EFFECTS OF EDUCATION**

On per capita growth	On (non-market) development
Higher rate of investment in physical capital, since education improves stability	Better public health
Greater investment in education, since education encourages economic growth	Lower population growth
Effects of new technology on growth	Democratization: authoritarian regimes depend on illiteracy. Strengthening of civic institutions
Contribution of education to research, development and innovation	Human rights: function of democratization and education
Lower population growth, due to effect on fertility	Political stability: spurred by improved civic institutions Lower homicide rates and propensity toward crime Less deforestation Less water pollution, as population growth slows Increased air pollution (negative externality) Reduction of urban and rural poverty Reduced inequality Less migration to urban ghettos Increased migration of university-educated workers (negative externality)

Source: : The Social and External Benefits of Education (McMahon, 2007).

## 5. The Consequences of Illiteracy

The World Declaration on Education for All (Jomtien, 1990) states that education begins at birth and continues throughout life. Consequently, the social effects of illiteracy are present throughout the entire life cycle.

During early childhood, the effects of illiteracy can be seen within the family unit and the primary socialization process. Later, during adulthood, illiteracy affects an individual's social position, income and cultural capital.

### 5.1 Illiteracy and the Life Cycle

Adult illiteracy increases present and future socioeconomic vulnerability, and is a significant factor in the reproduction of such vulnerability through children, passing from generation to generation. Its effects are present throughout life. While the needs and requirements of education may vary over the course of a lifetime, they never disappear. This should be borne in mind when studying possible prevention and mitigation initiatives for a given population (ECLAC, 2006).

The following section details the main consequences of illiteracy during the various stages of life, both for illiterates and for their children.

#### 5.1.1 Adult Illiteracy during the Pre-school Years

Recent research in the fields of psychology, nutrition and neuroscience suggest that the first five years of life are critical to the development of intelligence, personality and social behaviour. It is during this period that millions of cells are born, grow and become interconnected. When this process of growth, development and interconnection does not take place adequately, child development is negatively affected (UNESCO, 2004).

Poor education during early childhood compromises the synaptic process, the development of higher brain functions and the learning of language, communication codes and social and emotional development, among other factors. If children “lack informed and stimulated families, communities, health services and education, among other environmental factors...” during this phase of their development, “...they not only miss crucial development opportunities, but also risk permanent developmental damage” (Consejo de la Infancia, 2006).

#### 5.1.2. Adult Illiteracy during School Years

The school years are essential, providing a minimum of social integration and making possible the acquisition of values, habits and knowledge which provide a sense of belonging to society.

When parents have low expectations and participate little in the schooling of their children, the latter are more likely to perform poorly, have low grades, repeat school years and even drop out of formal education. Moreover, economic necessity drives poor youths to leave school in larger numbers, since they must help support their families, and are forced to accept second-rate, low-quality jobs. Hence, their income is low, not only due to the type of work they perform, but also because they lack formal employment contracts. Parental commitment and involvement are therefore essential during a person's school years. If young people fail to appreciate the intellectual and economic value of education, they will be more inclined to leave the educational system. Parents must play a key role. They must use their own experience and educational capital to help their children understand the importance of education, and they must ensure that their children place education before work, since illiteracy increases risk rather than reducing it.

It should be noted that the link between access to education and social origin suggests that the opportunities for well-being available to today's youth have, to a large extent, already been determined by the inequalities suffered by the previous generation (ECLAC, 2004b).

### 5.1.3. Illiteracy during Adulthood

Illiterate adults face serious employability issues, given their low level of knowledge and expertise. This is attributable to a lack of formal schooling, caused either by an early departure from school to enter the labour market or the loss over time of the ability to read and write.

In addition, illiterate persons have little awareness of their rights and duties, and may thus be inclined to accept precarious, low-quality employment contracts.

This increases the likelihood of remaining in poverty. Completion of 12 years of schooling (i.e., finishing secondary education) provides an 80% chance of earning an income high enough to escape poverty (ECLAC, 1997).

Adult illiteracy not only affects income and awareness of rights, but also leads to poor nutrition and health, due to illiterates' lack of knowledge regarding their own health and hygiene and that of their families. The daily diet of adults is adopted by their children, who learn by example. Eating habits may reduce or exacerbate nutritional risk, breaking or perpetuating the vicious circle of malnutrition (ECLAC, 2006).

### 5.1.4. Female Illiteracy during Child-bearing Years

Census data show that maternity is strongly correlated with the main activity performed by women in the household. Young mothers are far less likely to complete their schooling. While this appears to confirm the notion that child-rearing is highly incompatible with formal schooling, reproduction should not be interpreted as a cause of school dropout. Dropout may actually precede reproduction, and is probably one of its causes (ECLAC, 2004b).

Many young women who discontinue their schooling on account of motherhood ultimately leave the educational system altogether, with a deficient education which leads to precarious or inactive employment status.

As for the link between maternity and economic activity during the various stages of life, the probability of labour-market insertion for mothers is generally low. Mothers of two or more children find their chances of labour-market participation abruptly reduced, and their domestic role becomes predominant (ECLAC, 2004b).

An additional benefit of literacy programmes – and one which is especially significant for women – is the autonomy to participate, individually or collectively, in a variety of activities at home, at the workplace and in the community, among other venues. This autonomy may be understood both from a constructivist standpoint, as a learning experience (cf. Easton, 2005), and a socioeconomic perspective. Recent studies in Turkey (Kagıtcıbası, Goksen & Gulgoz, 2005), Nepal (Burchfield, 1996), India (Dighe, 2004) and Bolivia (Burchfield and others, 2002) have produced empirical evidence which suggests that literacy teaching significantly increases autonomy when it is performed in a favourable environment. Moreover, autonomy, understood as the acquisition of life skills ("to avoid being cheated"), is itself a key motivator to participate in literacy programmes (Lind, 1996).

## 5.2 Social Consequences of Illiteracy

Illiterate persons face greater obstacles in terms of social insertion, not only on a personal level (social inclusion difficulties, precarious work, high rates of disease, etc.), but also within the family (child nutrition, hygiene, health and schooling, among others) and at a societal level (lower productivity, high health care costs).



The social consequences of adult illiteracy can be divided into the following categories: health, education, economics and social integration and cohesion.

### 5.2.1. Effects on Health

Illiterate persons or persons with only rudimentary reading and writing skills have great difficulty understanding – and therefore putting in practices – messages designed to encourage healthy behaviour and the risk prevention in various areas of daily life (Dexter, LeVine and Velasco, 1998).

Research has also shown that illiteracy limits knowledge and practices necessary for self care – particularly among women. This has a negative impact on household health, hygiene and nutrition (UNESCO, 2006).

The effects of illiteracy on health can be divided into the following categories: consequences in the home (in general and in the mother-child relationship), consequences in the workplace and consequences in sexual and reproductive behaviour.

a) Health at home: Several studies have shown the impact of literacy on the health awareness of mothers. Indeed, illiterate persons – particularly mothers – are more likely to adopt inadequate nutritional and hygiene practices in their homes. Literate women, or women who are participating in literacy programmes, possess better skills and follow better health practices than their illiterate counterparts. They also have better access to preventive health measures, such as vaccination and medical check-ups, among others (UNESCO, 2006; Burchfield, Hua, Iturry and Rocha, 2002).

This phenomenon is exemplified by Nicaragua, where the child mortality rate was found to drop in families where the mother had participated in literacy programmes. It was even lower in families whose mothers were primary school graduates (Sandiford Cassel, M. & Sánchez, 1995). Research by Burchfield's team (2002) in Bolivia found that literacy programmes have a significant impact on the acquisition of health-related habits and knowledge. This is key if one considers that, as shown by Dexter, LeVine and Velasco (1998) in Mexico, a lack of reading and writing skills is the ultimate cause of difficulties in understanding the verbal explanations and recommendations of medical personnel.

Araujo (1999) and Desai and Soumya (1998) report that, as mothers acquire more years of schooling, their ability to acquire knowledge that improves the nutrition of their children increases. Similarly, the high prevalence of diseases passed from mother to child caused by the factors mentioned above raises demand for medical services and causes job absenteeism (due to illness on the part of either the mother or her children).

In this regard, if a mother or her children are not treated in time, disease may progress or even lead to death. Robinson-Pant (2006) estimates that child mortality decreases by 9% for every additional year of schooling attained by the mother.

In short, the health benefits of literacy have been documented by a growing number of longitudinal studies, which also show that the impact of adult literacy programmes may be even stronger than that of formal education (The EFA Global Monitoring Report Team, 2005).

b) Occupational health: Illiterates suffer from a high occupational accident rate (ECLAC, 2005), since they do not understand written instructions for the operation of machinery – which puts their own health and that of co-workers at risk – or the safety rules they must follow to complete their daily tasks.

Failure to use safety equipment increases not only the risk of accident, but also of work-related illnesses. This increases the need for medical services (and the accompanying costs), on the one hand, and causes job absenteeism, on the other.

In summation, illiteracy raises the risk of inadequate occupational hazard prevention practices, which could, in the long term, significantly damage productivity.

c) Sexual and reproductive health: Disinformation is one of the most significant problems of illiteracy. Among other things, illiteracy increases the likelihood of high-risk sexual behaviour, due to lack of awareness regarding sexual and reproductive health, as well as inadequate use of contraception.

Increased schooling reduces the risk of HIV infection. According to one study of women in 32 countries, literate women are three times more likely than illiterate ones to know that a person in seemingly good health can be infected with the virus, and four times as likely to know how to protect themselves from AIDS (Vandermoortele & Delamonica, 2000).

Schooling helps prevent the spread of the disease, providing reliable information on AIDS and encouraging the adoption of protective practices (Schenker, 2005).

Unawareness of contraceptive methods increases the likelihood of adult and adolescent pregnancy. Studies by Cochrane (1989) and McMahon (2000) have shown that the birth rate declines only among those who have completed primary school or higher levels of education.

Finally, adolescent mothers are more likely to repeat grade levels or drop out of school, reproducing functional illiteracy intergenerationally.

### **5.2.2. Effects on children's Education**

The illiteracy of parents affects their children on a number of levels, one of them being schooling and educational attainment in the medium and long term. Children of parents who have failed to complete primary education are highly unlikely to complete primary or secondary education themselves.

According to Mediavilla and Calero (2007), completion of primary education by parents raises the number of years of schooling of children by 1.02 and 2.51 years, depending on the country. Carneiro, Meghir and Parey (2007) note that, the greater a mother's schooling, the fewer behavioural problems her children will exhibit, and the lower their repetition rate will be.

Comings, Shrestha and Smith (1992) and Shultz (1993, cited in UNESCO, 2006) have shown that literate parents are more likely to be able to help their children in concrete terms – for example, by meeting with their teachers and talking to their children about their academic performance.

Poor families often place work before education, due to the opportunity cost of the latter. The pressing need to work, in order to help support their families, is the chief cause of school dropout among young people. Moreover, the temptation to leave school is increased by the perception that those who complete their education are not rewarded with wages and job prospects. Poor youths are more inclined to leave school as a result (Marinho, 2007).

### **5.2.3. Economic Effects**

As noted above, one of the most convincing arguments in favour of human resource development is the fact that literacy and increased schooling improve productivity and drive economic growth.

Over the last few decades, knowledge has become the key ingredient of the new production paradigm, and education has become an essential factor in the modernization of production systems and the economic behaviour of individuals.

If income gaps are to be reduced, the coverage and quality of educational systems must be improved. A better distribution of income will also facilitate greater social cohesion.

Education is one of the key determinants of individual income, not only because it naturally improves or increases personal productivity, but also because it improves the information available to individuals regarding the challenges they must face in society (the marketplace). It also increases social mobility (Riveros, 2005).

Hence, education influences a worker's standing in the occupational hierarchy and the ability to find employment. It also affects unemployment. Schooling and training are the variables which exert the strongest influence on the occupational hierarchy (Schmelkes & Ahuja, 2000). Young people who fail to complete primary school have a lower chance of obtaining jobs of sufficient quality to avoid poverty (Goicovic, 2002).

#### 5.2.4. Effects on social cohesion

The links between education and society are strong and mutually reinforcing (UNESCO, 2005). In modern societies, "literacy skills are fundamental to informed decision-making, to active and passive participation in local, national, and global social life, and to the development and establishment of a sense of personal competence and autonomy..." (Stromquist, 2005).

Illiterate persons suffer from low self-esteem, are less autonomous and have less ability for critical reflection (UNESCO, 2006). When asked why they chose to learn to read, write and manage their finances, participants in literacy programmes have replied that they wish to become more autonomous, gain control over everyday situations and "avoid being cheated" (Lind, 1996, cited in UNESCO, 2006).

This issue is key; illiterates have only limited knowledge of, and access to, the rights to which they are entitled by law. Literacy enables them to actively promote the collective rights which are essential to human dignity.

The democratic process requires active participants. A citizenry which meets currently accepted literacy standards is therefore essential. Without a population that is aware of, and struggles for, its rights, and organizes itself in political parties, unions and a broad range of civic organizations, it is impossible to develop adequate public policies that benefit the population as a whole and strengthen the rule of law (Entreculturas, 2007).

Literate persons have access to more information – particularly information from public authorities and government bodies. Consequently, they are in a better position to protect their interests, according to their needs (Stromquist, 2005).

Literacy also enables women to access spheres which had previously been the exclusive domain of literate males. Research in rural areas of El Salvador shows that women who have recently become literate are able to make themselves heard at community meetings and perform highly complex sociopolitical analyses (Purcell-Gates and Waterman, 2000). In Brasilia, increased literacy among workers heightened their union activities (Ireland, 1994).

From a political perspective, literacy offers benefits in terms of social participation, democracy and equality among ethnic groups (Robinson-Pant, 2005, Stromquist, 2005). "...the potential for autonomy which literacy provides can lead to greater political participation, strengthening democracy and improving the quality of public policies" (The EFA Global Monitoring Report Team, 2005: 147).

In this regard, several studies have shown that persons who have participated in literacy programmes are more politically involved than illiterate persons. This includes union activities (Ireland, 1994), community activities (Greenleigh Associates, 1968; Becker Wesselius & Fallon, 1976), greater willingness to become registered voters (Boggs, Buss & Yarnell, 1979), greater willingness to effectively participate in elections and local associations (Carron, Wriira & Righa, 1989) and increased participation in general elections, as in the case of Turkey, where literacy programme participants voted in larger numbers than illiterates (Kagitcibasi and others, 2005).

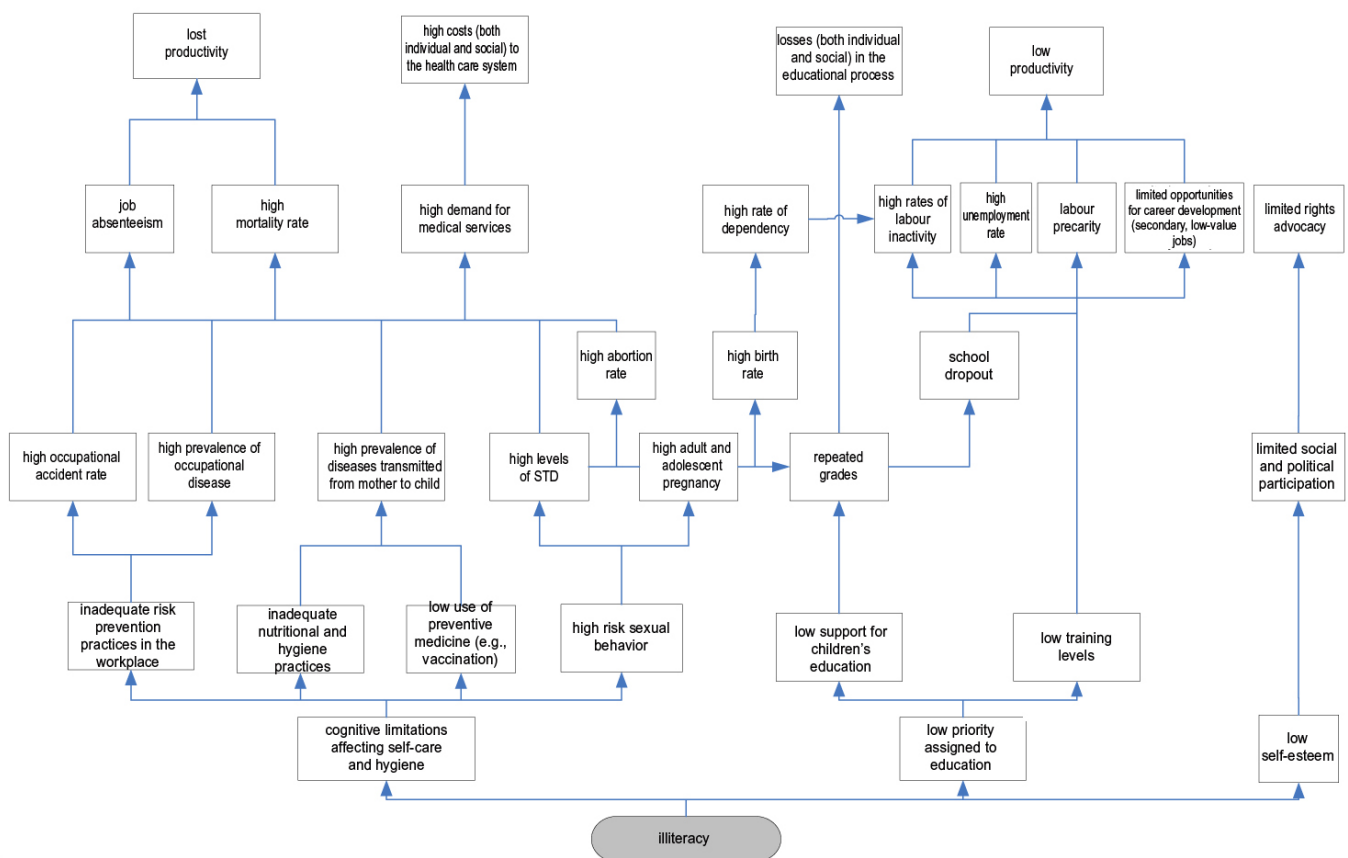
Literacy thus provides citizens with access to information they can use to participate in the sociopolitical life of their community, both locally and nationally, and allows them to express their views.

The flip side of increased social participation and inclusion is the problem of public safety – specifically, crime. Some studies have shown that “while there is no definitive evidence that scholastic achievement helps to reduce crime, schooling in and of itself can be said to have that effect, since young people enrolled in school are less likely to frequent the streets and come into contact with others, of similar ages, who engage in criminal activity” (UNESCO-SEP, 2005).

### 5.3 Tree of Consequences

Following is a diagram of the main consequences of illiteracy and the interrelationships they form.

**FIGURE 8**  
**COSTS OF ILLITERACY**



Source: : Psacharopoulos and Patrinos (2007).

## **IV. Methodology**

Following is an explanation of the main methodological issues which must be considered when estimating the social and economic consequences of illiteracy.

### **1. Universe of the Study**

The consequences of illiteracy are observable throughout a person's life. It is among adults, however, that these consequences are most apparent, and adults are the main drivers of the process. Among children, illiteracy may still be overcome through schooling.

Consequently, the general universe of illiteracy on which this pilot study focuses consists of persons over 20 years of age. Depending on the variables analyzed, other segments of the population have also been considered when analyzing the direct and intergenerational consequences of illiteracy.

From a labour and income standpoint, the universe studied was restricted to members of the working-age population (WAP) over age 20 who have completed up to twelve years of schooling (full secondary education) and are not full-time students.

### **2. Analytical Approach**

Given the horizon of analysis, two different methods may be used to estimate the consequences of illiteracy:

- Cross-sectional: developing estimates for the overall universe in one specific year.
- Longitudinal: estimating overall social and economic consequences of illiteracy over the lifetime of a population.

Since these approaches supplement one another, the analytical model employed by this study takes both into account.

### **3. Variables and Indicators**

Variables have been grouped according to the category of consequences to which they belong and their relationship to the core issue. The operational definitions of illiteracy, employment and productivity employed by this pilot study are detailed below.

### 3.1 Illiteracy

Illiteracy may be analyzed at different levels, through complementary indicators.

#### 3.1.1. Complete Illiteracy

Complete illiteracy is defined as the lack of the most basic reading and writing skills. Respondents to censuses or general or specialized social surveys who state that they can neither read nor write are classified as completely illiterate.

A proxy indicator of this variable is not having attended or graduated from at least the first year of primary education (zero years of schooling). This can be estimated individually, using census and survey data. It can also be estimated at an aggregate level, by studying different age groups on the basis of information from the educational system, analyzing the relationship between enrolment levels, graduation rates, failure rates and withdrawals from school and the size of the cohort of first-grade entrants for a given year.

#### 3.1.2. Functional Illiteracy

The lack of a minimum of capabilities needed to function in society has no fixed parameters, inasmuch as there is no consensus regarding what those capabilities are, aside from reading and writing.

For purposes of this study, years of schooling are used as a proxy. The following categories have been established for comparative purposes:

- i) Less than four years of schooling.
- ii) Incomplete primary education or less than six years of schooling.
- iii) Incomplete lower secondary education or less than nine years of schooling.
- iv) Incomplete upper secondary education or less than twelve years of schooling.

The population groups analyzed are those which attain the number of years of schooling described by each category, not those with more schooling. Thus, only four years of schooling for the first level, only six years for the second, only nine for the third and only twelve for the fourth.

This variable was measured individually, on the basis of replies to socioeconomic surveys or censuses in each country. At the national or regional level, it was measured using either aggregate data from those surveys or graduation statistics provided by national educational systems.

### 3.2 The Consequences of Illiteracy

Estimates of the effects of illiteracy are based on concepts of relative risk and gaps – that is, the increased risk illiterates and/or their descendants face of suffering one of the consequences described in the conceptual framework, and the gaps which diminish their ability to attain certain levels of well-being.

To estimate relative risk, probability estimators of the occurrence of consequences are needed for the literate and illiterate population groups.

Relative risk and gaps are not the same thing as the impact achieved by social programmes aimed at mitigating the problem. The former correspond to the differential probability of having a problem between different populations (illiterate and literate). The latter, in contrast, reflects the effectiveness of an intervention in the affected population (that is, those who have those problems), compared to the population for which no intervention has been made. When reliable data for relative risk estimation are not available, the impact estimator can be used as a proxy, provided that allowance is made for the bias that may be introduced.

Relative risk and gap indicators are similar in terms of their formalization. They differ in that relative risk refers to probabilities (the probability of disease, for example), whereas gaps refer to averages (such as income). The most common indicators are:

- Probability differences ( $\Delta P$ ): this corresponds to the difference between the probability of occurrence of a consequence (i) among literates (PA) and illiterates (PNA). That is,

$$\Delta P_i = P_i^A - P_i^{NA}$$

- Probability ratio (PR): this corresponds to the ratio between the probability of occurrence of a consequence (i) among literates (PA) and illiterates (PND). That is,

$$RP_i = P_i^A / P_i^{NA}$$

- Probability odds (PO): when the data in a cross-sectional study are displayed in a tetrachoric table just as in a prospective study, the expression “prevalence – odds” has been proposed, corresponding to the quotient between the probability of having a consequence (i) among literates (PA) and their counterparts. That is,

$$OP_i = P_i^A / (1 - P_i^A)$$

- Odds ratio (OR): this corresponds to the relationship between two PO values. That is,

$$OR = (P_i^A / (1 - P_i^A)) / (P_i^{NA} / (1 - P_i^{NA}))^{27}$$

According to the specialized literature, the OR calculation seems to be the most appropriate one, given that the evaluation of “exposure” variables (in this case, illiteracy) often has a retrospective view in cross-sectional studies. In addition, the vast majority of available studies are indeed cross-sectional and not prospective.

The  $\Delta P$  indicator is particularly important, since that is the one that makes it possible to estimate the number of cases to consider in the cost calculation. In the literature, however, estimates for total probabilities ( $P_i$ ) and associations with PR and OR can be found, so to use them as  $\Delta P$  requires derivations that allow for the estimation of PA and PNA, both for the different morbidities and for mortality.

Depending on the variable used, the probability P or gap of illiterates or their descendants acquires a specific name. Thus:

- for mortality, it is  $\Delta MM$
- for morbidity, it is  $\Delta M$
- for repeated grades, it is  $\Delta r$
- for school dropouts, it is  $\Delta d$

<sup>27</sup> The above formula, using the classic denomination of cells in a double-entry table, is also expressed as follows:  $OR = (a * c) / (b * d)$ .

- for proportions of the population that reach each level of education, it is  $\Delta e$
- for level of education or schooling, it is  $\Delta E$
- for income, it is  $\Delta Y$

The variables and indicators employed to estimate the effect of illiteracy on employment and production are detailed below. Other dimensions have been excluded due to the limited amount of secondary data available.

### 3.2.1. Effect on Employment

a) Employability: The consequences of illiteracy may be expected to include effects on the employability of the illiterate population – that is, their entry or non-entry into the labour market.

The unemployment rate and the proportion of employed persons were used as employability indicators. The entire working-age population (WAP) between the ages of 15 and 64 was considered.

- Proportion of employed persons: The population that describes itself as employed, as opposed to the overall WAP, which combines the economically active population (EAP) and the inactive population (retirees, students, female homeowners, among others).

$$o = \frac{Employed_{15-64}}{(Employed + Unemployed + Inactive)_{15-64}}$$

$$O = \frac{O_{15-64}}{WAP}$$

$$O = \frac{O_{15-64}}{(EAP + I_{15-64})}$$

In which:

- O = Percentage of employed persons
- WAP = Working-age population (aged 15 to 64)
- EAP = Economically active population
- $O_{15-64}$  = Employed population within the EAP
- $I_{15-64}$  = Inactive persons aged 15 to 64

- Unemployment rate: The ratio between the population aged 15 to 64 that during the reference period do not have a job but are currently available for it or seeking a job for the first time and the overall economically active population (employed, unemployed and first-time job seekers).



$$\mu = \frac{(unemployed + job\ seekers)_{15-64}}{EAP}$$

b) Quality of employment: Once they have entered the labour market, the limitations illiterates face in terms of reading, writing and numeracy increase the probability that their jobs will be of inferior quality. No attempt is made here to define the term “quality of employment”. For purposes of this study, the indicators usually employed as proxies to analyze quality of employment were used. These indicators are: employment contract and social security.

- Employment contract: The employed population may or may not have access to employment contracts. Given the nature of the surveys used, the answers respondents gave when asked whether they had signed a contract were used to compare surveys, as it was not possible to determine whether these were indefinite, verbal or written contracts.
- Pension system: Health and pension benefits are associated with the job status of employed persons. They are forms of insurance which provide some data on the use of employment contracts among the population. Workers with contracts may be expected to answer in the affirmative when asked whether they contribute to the pension system. Participation in the pension system is defined differently in each of the three cases studied.

**TABLE 7**  
**ACCESS TO PENSION SYSTEM BY COUNTRY**

Ecuador	Dominican Republic	San Pablo
Individuals are considered to be insured if they state that they have private health insurance or IESS, general insurance or IESS, voluntary general insurance or IESS, or rural insurance	Survey respondents are asked whether they have AFP, health insurance and life insurance. Those who answer “yes” to any one of those three questions are classified as contributors to the pension system.	Persons who are registered in the Instituto da previdencia are classified as pension system contributors.

Source: : Prepared by the authors.

c)Type of activity: The type of activity an individual performs probably depends on his or her skills and capabilities, which means that the jobs held by illiterates will probably differ from those of the literate population.

- Occupational category: The division of the population into different categories, based on type of work. The general categories used are employer, employed, own-account and domestic service workers.
- Formality of employment: This indicator is derived from the “labour insertion” variable created by ECLAC <sup>28</sup>, which divides the employed population into two groups (formal and informal), depending on the formality of their employment. This indicator was estimated by regrouping workers based on occupational category and specifying whether they are professional or technical workers, the sector in which they work (public or private) and the size of the enterprise for which they work, as shown in table 7.

<sup>28</sup> See Social Panorama 2006.

**TABLE 8**  
**EMPLOYMENT FORMALITY INDICATORS**

Employment characteristics	Formality
Employers in establishments with over five workers	Formal
Public wage workers	Formal
Private professional or technical wage workers in establishments with less than six workers	
Private non-professional or technical wage workers in establishments with more than five workers	Formal
Professional and technical own-account workers	Formal
Employers with less than six workers	Informal
Domestic service	Informal
Private professional and technical wage workers with less than five workers	Informal
Non-professional or technical own-account workers	Informal

Source: : ECLAC, Social Panorama, 2006.

### 3.2.2. Effect on Productivity

As noted in the conceptual framework, the impact of illiteracy on productivity is the result of a chain of consequences, some of which affect illiterate individuals directly, given their higher rates of dependency, limited job skills and low employability, as well the increased job absenteeism and mortality which result from higher rates of occupational accidents and morbidity.

The consequences of illiteracy are also borne by the children of illiterates, who receive less schooling due to the low priority attached to education by their parents.

Some of the effects of illiteracy on productivity are experienced by illiterates themselves and their families, in the form of low labour income and quality of employment. Others, however, affect their employers – in the form of higher production costs – or society as a whole, in the form of lower economic growth.

All of the above should be borne in mind when developing an operational definition of the effects of illiteracy on productivity. Given the progress made in this study, the procedure for measuring loss of productivity in the form of labour income is detailed below. The operationalization of other variables related to lost productivity are not addressed in this paper.

Loss through labour income: “Labour income” includes remuneration or wages received from labour. It excludes other sources of income, such as subsidies, remittances, capital gains, etc.

The gap between the labour income of literates and that of illiterates was estimated on the basis of human capital theory and the proposals of Jacob Mincer (1958 and 1962) and Gary Becker (1964), together with the idea that in a competitive market with balanced factors, labour productivity corresponds to the marginal product reflected in wages <sup>29</sup>.

<sup>29</sup> There is ample evidence showing that among the determinants of a worker’s productivity – given a certain technology – are years of education (including basic, intermediate, and higher education) and the experience the worker has gained. In this manner, considering differences in average monthly income of illiterate workers and literate workers, controlling for experience based on age, would in fact acknowledge the difference in productivity of these workers.

Thus,

$$y = f(EDU, EXP)$$

In this case, schooling includes complete and functional illiteracy indicators. Experience is estimated using age as a proxy, on the assumption that experience increases with age.

Potential loss of income due to illiteracy for each age group ( $CY_{xj}^{NA}$ ) is equal to the income differential between literates and illiterates, such that:

$$CY_{xj}^{NA} = \Delta Y_{xj}^{NA} = Y_{xj}^A - Y_{xj}^{NA}$$

In which:

$CY_{xj}^{NA}$  = Potential loss of income due to illiteracy for each age group j during year of analysis x

$Y_{xj}^{NA}$  = Income differential caused by illiteracy in persons aged j during year of analysis x

$Y_{xj}^A$  = Average income of literates aged j during year of analysis x

$Y_{xj}^{NA}$  = Average income of illiterates aged j during year of analysis x

Thus, the overall cost of illiteracy in terms of loss of potential income ( $CY_x^{NA}$ ) is equal to the sum of the income differentials of all age groups (i) which comprise the WAP under analysis (from i=20 to i=64) during year of analysis (x).

$$CY_x^{NA} = \sum_{j=20}^{64} \Delta Y_{xj}^{NA}$$

$$CY_x^{NA} = \sum_{j=20}^{64} Y_{xj}^A - Y_{xj}^{NA}$$

Age groups may be established for each specific year from 20 to 64, or they may be grouped in five- or ten-year cohorts.

To implement the above using a cross-sectional approach, the following steps must be taken:

a) Create a matrix in which the individuals that comprise the universe of the study (working-age population – WAP – aged 20 to 64) are classified according to their complete literacy status (knowing or not knowing how to read and write), years of schooling (0 to 12) <sup>30</sup> and age quintiles (as a proxy for experience) <sup>31</sup>.

b) Estimate the average annual income for each education and experience category, considering the entire WAP of the population, regardless of whether or not it is part of the economically active population (EAP), in order to obtain the expected income for the entire set of individuals in each age-education combination. This may be done for each year of age or for age quintiles or deciles, depending on how representative the base information is and the level of precision required.

<sup>30</sup> In general, the primary and secondary, or basic and intermediate, levels of education amount to 11 or 12 years.

<sup>31</sup> If the sample size allows, this classification can be made for each year of age and each year of schooling between 0 and 12.

- c) Estimate the number of individuals that comprise each illiteracy category during the year of analysis, as well as the literate population used for comparison (persons who know how to read and write among those with less than four, four, six, nine or twelve years of schooling, respectively).
- d) For each age group, estimate the average income differential between each illiterate sub-group and the literate population. For example, for persons aged 20 to 24, the average income differential between those with zero and four years, one and four, two and four and three and four years of schooling, respectively.
- e) Calculate the income differential of each group by multiplying the average differences by the relevant population size.

In order to implement a longitudinal approach, all potential income differentials which may arise during the years in which the population studied is part of the WAP must be considered. Thus, the cost associated with each age group (CYiNA) is equal to the present value (PV) of the potential income differential between literates and illiterates until the youngest generation of the WAP for the year of analysis (x) exits that population (x=45), such that:

$$CY_j^{NA} = PV(\Delta Y_{xj}^{NA}) = PV(Y_{xj}^A - Y_{xj}^{NA})$$

Thus, the overall cost of illiteracy in terms of loss of potential income (CYNA) is equal to the sum of the income differentials of all age groups (i) which comprise the WAP under analysis (from i=20 to i=64) during year of analysis (x).

$$CY^{NA} = PV \sum_{x=0}^{45} \sum_{j=20}^{64} \Delta Y_j^{NA}$$

$$CY^{NA} = \sum_{x=0}^{45} \sum_{j=20}^{64} \frac{(Y_j^A - Y_j^{NA})}{(1+r)^x}$$

This procedure requires the following additional steps:

- a) Estimate the expected income of each age group at each level of schooling, based on the definitions of illiteracy mentioned above.
- b) One alternative is to use the values estimated in point b). To increase specificity to age in simple years, moving averages should be estimated for each year, taking into account the income of the five- or nine-year cohort it contains as a midpoint at each year of age <sup>32</sup>. Thus, in order to estimate the expected income of a 34-year-old illiterate person, the average for those aged 32 to 36 (or 30 to 38) who have the same level of education must be calculated.
- c) Estimate potential income differentials on the basis of the difference between the literate and illiterate populations in each age group, or year of life, among the population aged 20 to 64.
- d) Estimate the proportion of literate persons who die at each year of age during a working life, on the basis of annual or five-year survival rates as reported by censuses. If no survival rates by literacy status are available, the rate for the general population may be used as a proxy.

<sup>32</sup> The smaller the samples on which estimates are based, the larger the cohorts considered should be, in order to reduce sampling error. Nevertheless, as the spectrum of age increases, variation due to experience also increases, leading to higher estimation error. The two factors must be balanced when establishing groups.

- e) Project the population that makes up the current universe for each following year, until all members are over 64. To that end, estimate the living population (adjusted for the survival rate) at every age between 20 and 65, for each of the next 45 years, and select all individuals under 65 in each calendar year.
- f) Project a flow of illiterates' potential lost income for each age group, based on the gaps estimated.
- g) Estimate potential lost income for each age group, based on the estimated illiterate population in each age group (point b) and the estimated income gap for each year of life (point e).
- h) Calculate the present value (PV) of the earnings illiterates are expected to lose at each age over the course of their working lives <sup>33</sup>.
- i) Estimate average cost per illiterate person, dividing PV by the relevant illiterate population (depending on the indicator used for comparison: ability to read and write of individuals with less than four years of schooling and those with four, six, nine or twelve years of schooling, respectively).
- j) For comparisons with GDP, public spending or other yearly indicators, estimate the equivalent annual cost (EAC) of the aforementioned PV, taking into account the entire period of analysis (45 years).

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<sup>33</sup> Consider an annual discount rate of 8%, which is equivalent to the lowest social discount rate in the region.

## V. Pilot Study Results

This chapter describes a pilot exercise in the application of the methodology proposed above. The results of the exercise are preliminary, and their main objective is to test the methodology employed, rather than draw substantive conclusions regarding each case.

### 1. Case Studies

Three countries with different socioeconomic variables, literacy rates, sizes and geographic locations were selected for the pilot study. They were:

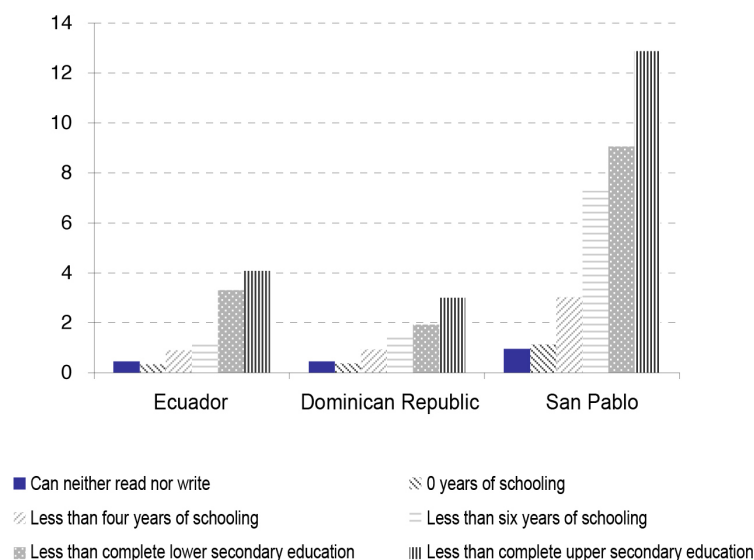
- Ecuador: an Andean nation with a GDP of US\$21.555 billion (US\$1.608 billion in 2000 dollars) and a population of 13 million, of which 39.9% are poor and 12.8% live in extreme poverty. With regard to illiteracy, 8.6% of persons over 15 can neither read nor write, 6.8% have not completed one full year of school and 79.9% have completed all six years of primary education. Per capita social spending was US\$104 as of 2006 <sup>34</sup>, of which 41% was allocated to education. The country has developed a “Plan Nacional Masivo de Alfabetización y Educación de Adultos” (National Mass Adult Literacy and Education Plan).
- Dominican Republic: a Caribbean nation belonging to the Central American Integration System (SICA), the Dominican Republic has a population of 9 million, of which 44.5% are poor and 22% live in extreme poverty. With regard to illiteracy, 10.8% of persons over 15 can neither read nor write, 9% have not completed one full year of school and 56.5% have completed eight full years of basic education. Per capita social spending was US\$285 as of 2006 <sup>35</sup>, of which 26% was allocated to education. The country has a literacy programme based on the Cuban “Yo Sí Puedo” (Yes I Can) programme. The programme is designed to reach 200,000 people.
- São Paulo: a Brazilian state with a population of 41 million, of which 15% are poor and 3.2% live in extreme poverty. With regard to illiteracy, 5% of persons over 15 can neither read nor write, 6.3% have not completed one full year of school and 61.2% have completed eight full years of ensino fundamental (basic education). Social spending on education was US\$3.498 billion, and the state is covered by a nationwide literacy programme entitled Brasil Alfabetizado (Literate Brazil).

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<sup>34</sup> Preliminary data.

<sup>35</sup> Preliminary data

**FIGURE 9**  
**ILLITERATE POPULATION IN PILOT STUDY COUNTRIES,**  
**BY TYPE OF ILLITERACY (COMPLETE AND FUNCTIONAL), 2006**  
*(Millions of persons)*



Source: Prepared by the authors on the basis of National Household Survey data for each country (ECLAC).

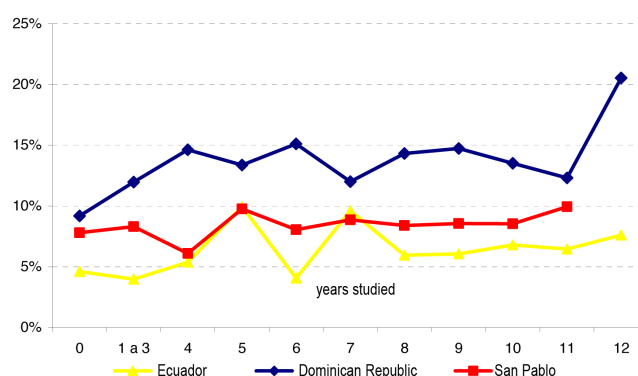
## 2. Preliminary Results

### 2.1 Illiteracy and Employment

The link between schooling and unemployment differed in each case. In Ecuador, the unemployment rate trended upward in a relatively stable manner as schooling increased, with variations occurring only among individuals with five to seven years of schooling. A similar trend was observed in the Dominican Republic, with variations occurring among persons with four to six years of schooling. In the state of São Paulo, variations were greater, both among those with the lowest and those with the highest levels of schooling.

One characteristic shared by all three cases was that unemployment was lower among illiterates and higher among those who completed upper secondary education, with (r) correlations of 0.39, 0.64 and 0.48 in the three countries, respectively. This may be due to the fact that the illiterate population has a higher percentage of older – and therefore more experienced – individuals, whereas those who have just completed the educational cycle are younger and new to the labour market.

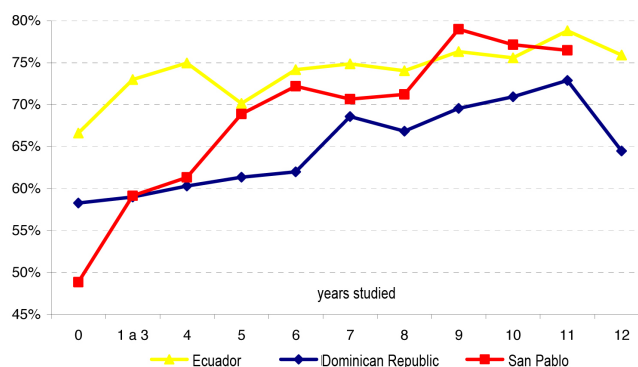
**FIGURE 10**  
**OPEN UNEMPLOYMENT RATE OF POPULATION AGED 15 TO 64**



Source: Prepared by the authors on the basis of National Household Survey data for each country (ECLAC).

In the three cases studied, completely illiterate persons over 15 years of age who do not attend school, or who attend school and work, represent 5.9% of the population in Ecuador, 9.8% in the Dominican Republic and 5.3% in the state of São Paulo. Persons with less than four years of schooling represent 15.6%, 24.2% and 14.1% of the population, respectively.

**FIGURE 11**  
**EMPLOYMENT RATE OF POPULATION AGED 15 TO 64**

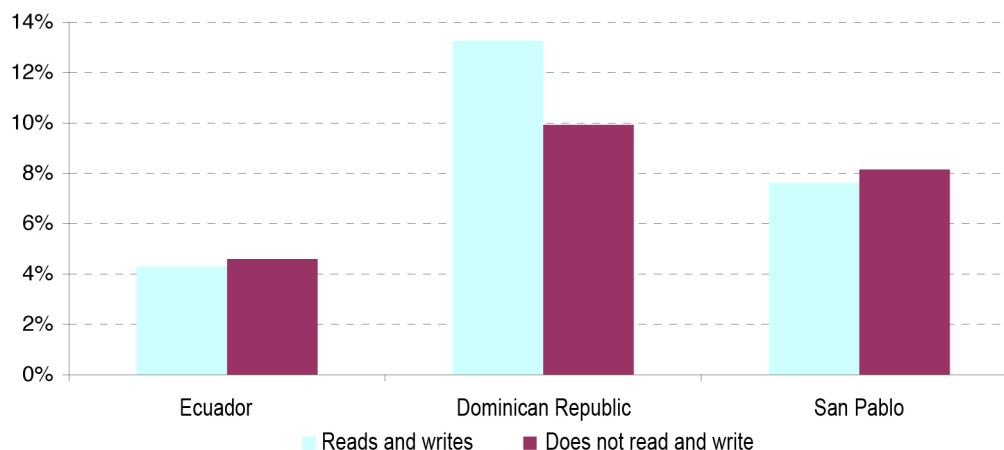


Source: Prepared by the authors on the basis of National Household Survey data for each country (ECLAC).

An analysis of the number and percentage of persons who attain each level of schooling, and who describe themselves as employed on household surveys, shows that, among persons aged 15 and older who do not attend school or who attend school and work, the higher the level of schooling, the higher the employment rate. This is expressed as a correlation of  $r = 0.81$  in Ecuador,  $r = 0.83$  in the Dominican Republic and  $r = 0.95$  in São Paulo. The opposite is true only among persons who have completed secondary education, in the case of Ecuador and the Dominican Republic, and among persons with over nine years of schooling, in the case of São Paulo.

Finally, when the unemployment rate among persons over 15 who have less than four years of schooling and can neither read nor write was compared to that of persons with the same characteristics who can, no significant difference was found in Ecuador and Brazil. Variation between the two groups was less than 0.5 percentage points. In the Dominican Republic, on the other hand, the unemployment rate of the second group exceeded that of the first by more than three percentage points.

**FIGURE 12**  
**UNEMPLOYMENT RATE OF POPULATION AGED 15 TO 64 WITH UP TO FOUR YEARS OF SCHOOLING, ACCORDING TO KNOWLEDGE OF READING AND WRITING**



Source: Prepared by the authors on the basis of National Household Survey data for each country (ECLAC).



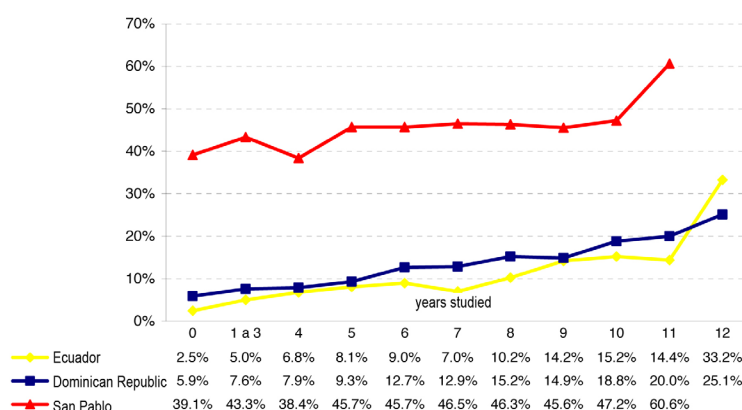
## 2.2 Quality of Employment

The working assumption of this study is that quality of employment is lower for illiterates than it is for literates. This assumption is borne out not only by a dichotomic comparison, but also as education increases. Supplementary indicators such as employment contract and type of work were employed to determine whether illiteracy has an impact on this variable.

### 2.2.1 Employment Contract

As shown in figure 13, employed illiterates are the workers least likely to have an employment contract. This was true in all three cases, although significant differences were observed between countries. Whereas formality of employment in São Paulo varied between 39% and 30%, in Ecuador and the Dominican Republic the range was similar but the variation was between 2.5% and 33%.

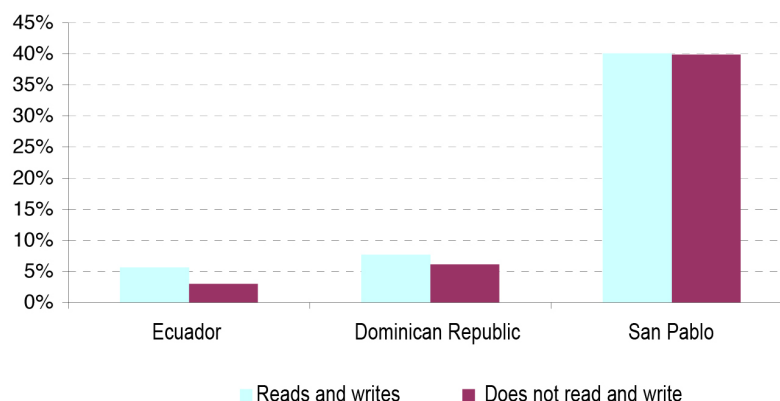
**FIGURE 13**  
EMPLOYED PERSONS IN THE POPULATION AGED 15 TO 64  
WHO HAVE AN EMPLOYMENT CONTRACT, BY YEARS OF SCHOOLING  
(Percentages)



Source: Prepared by the authors on the basis of National Household Survey data for each country (ECLAC).

It should be noted that having four years of schooling more than doubles the probability of having an employment contract in Ecuador; in the Dominican Republic that probability increases by only 30%, and in São Paulo there is no significant increase. A substantial increase does occur for persons who complete upper secondary education.

**FIGURE 14**  
EMPLOYED PERSONS IN THE POPULATION AGED 15 TO 64 WHO HAVE AN EMPLOYMENT CONTRACT,  
ACCORDING TO KNOWLEDGE OF READING AND WRITING  
(Percentages)



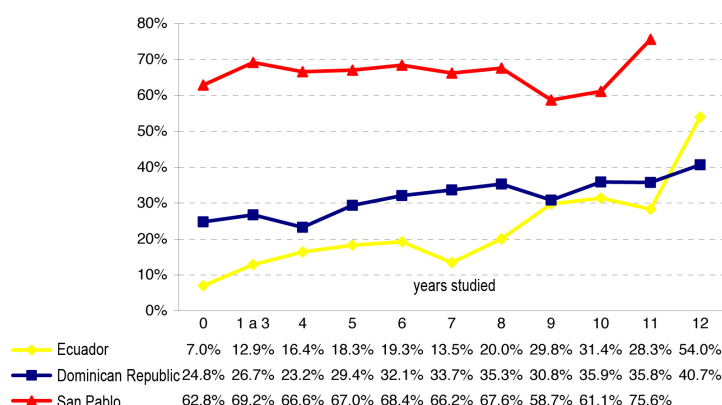
Source: Prepared by the authors on the basis of National Household Survey data for each country (ECLAC).

Notable differences were observed between persons with less than four years of schooling who can read and write and those with the same amount of schooling who are unable to do so. Completely illiterate Ecuadorians and Dominicans are 53.6% to 79.6% less likely to have an employment contract than their literate counterparts. No data are available for São Paulo.

As was to be expected, wage workers were more likely to have formal employment contracts. This trend was observed in all three cases. Ranges differed, however; in the Dominican Republic and São Paulo they were lower, while in Ecuador they were higher.

One issue that requires further analysis is the fact that, according to available data, the employability rate of those who reached the first and third categories of functional literacy (four and nine years) declined in the Dominican Republic and São Paulo. Variations were also observed in Ecuador, but among other groups.

**FIGURE 15**  
**WAGE WORKERS IN THE POPULATION AGED 15 TO 64 WHO HAVE AN EMPLOYMENT CONTRACT,**  
**BY YEARS OF SCHOOLING**  
(Percentages)



Source: Prepared by the authors on the basis of National Household Survey data for each country (ECLAC).

### 2.2.2 Pension System Coverage

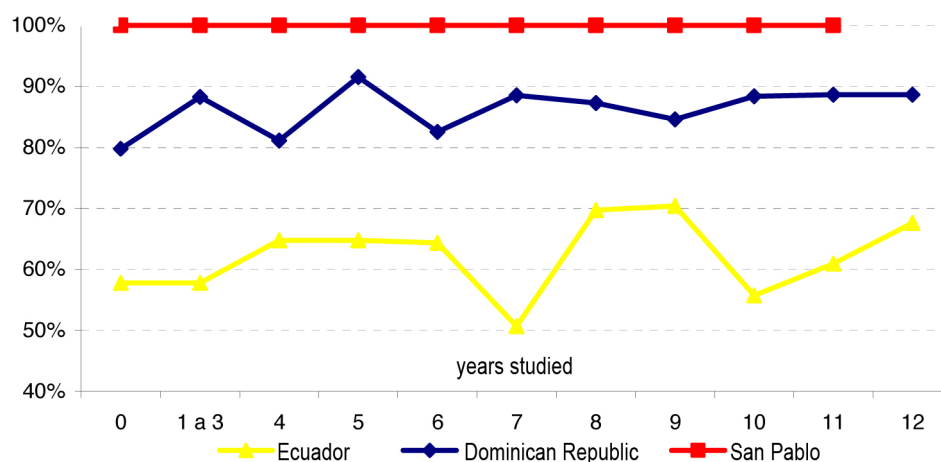
Household survey data do not reveal a significant link between pension system coverage and illiteracy. Certain specific issues should be noted, however. Whereas coverage is universal among Brazilian wage workers, it varies between 80% and 90% among Dominicans, and 50% and 70% among Ecuadorians.

While coverage does vary for certain groups, these data are more indicative of the restrictiveness or accessibility of a pension system than they are of an individual condition.

### 2.2.3 Occupational Category of Employed Persons

A comparison between the types of work performed by illiterate workers over 15 and their literate counterparts reveals that illiterates are more likely to belong to the group with the highest level of occupational precarity: non-professional, non-technical own-account workers. Over 60% of completely illiterate individuals in Ecuador and the Dominican Republic are part of this group.

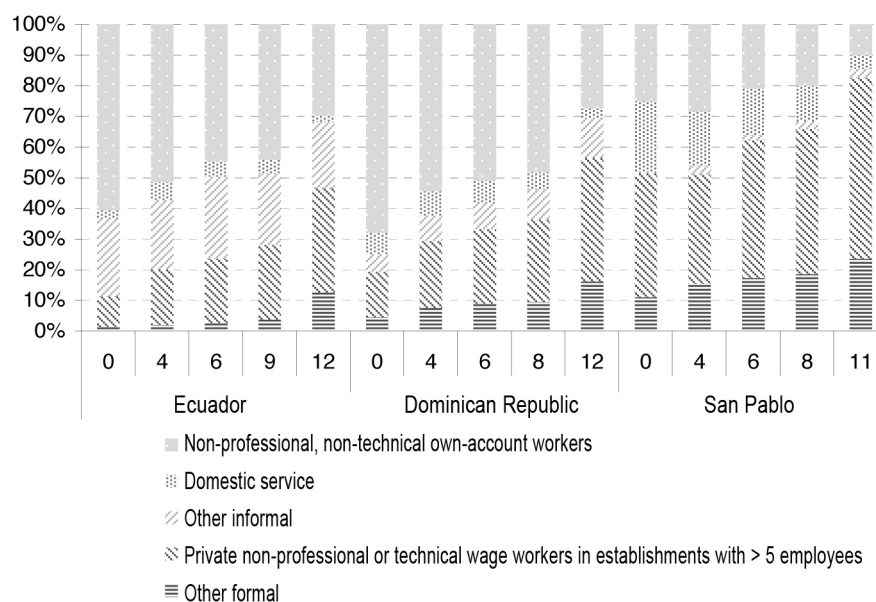
**FIGURE 16**  
**WAGE WORKERS WITH EMPLOYMENT CONTRACTS WHO CONTRIBUTE TO THE PENSION SYSTEM,**  
**BY YEARS OF SCHOOLING <sup>a</sup>**  
**(Percentages)**



Source: Prepared by the authors on the basis of National Household Survey data for each country (ECLAC).

<sup>a</sup> Due to sample size restrictions, in the case of Ecuador percentages refer to groups of zero to three years and four or five years.

**FIGURE 17**  
**FORMAL EMPLOYMENT IN THE WORKING POPULATION AGED 15 TO 64,**  
**BY YEARS OF SCHOOLING**



Source: Prepared by the authors on the basis of National Household Survey data for each country (ECLAC).

While it accounts for a smaller share of the overall working population, the “domestic service” category is more likely to be made up of illiterates. This is particularly clear in São Paulo, though not in Ecuador.

In the “other informal” category, comprised of non-professional, non-technical workers employed by microenterprises (less than five workers), no differences were observed between complete illiterates and persons with various degrees of literacy.

Complete illiterates clearly account for a smaller share of “formally” employed workers, with the exception of São Paulo, where there is no difference between the former and persons with four years of schooling. In all three cases, the greatest gap was observed within the professional or technical category. Differences were less significant among non-specialized labourers working for companies with over five employees.

## 2.3 Illiteracy, Schooling, Age and Income

As noted in the following figures, as well as the literature, a worker’s income is strongly correlated with his or her years of experience. In the three cases studied, income was observed to trend upward until the age of 40. After that point, it increased at a slower rate, or even stopped rising altogether, save for persons with four or twelve years of schooling in Ecuador and twelve years of schooling in the Dominican Republic. The income of such individuals continued to rise past the age of 60.

While absolutely illiterate persons (zero years of schooling) and functionally illiterate persons (six years of schooling) end their working lives with an average income similar to or slightly higher than that of their first years of employment, persons who reach lower secondary education (8 to 9 years of schooling) or complete their upper secondary education (11 to 12 years of schooling) end their working lives with an average income two to three times higher than that of their early years. The income of those with greater schooling invariably outstrips that of the illiterate.

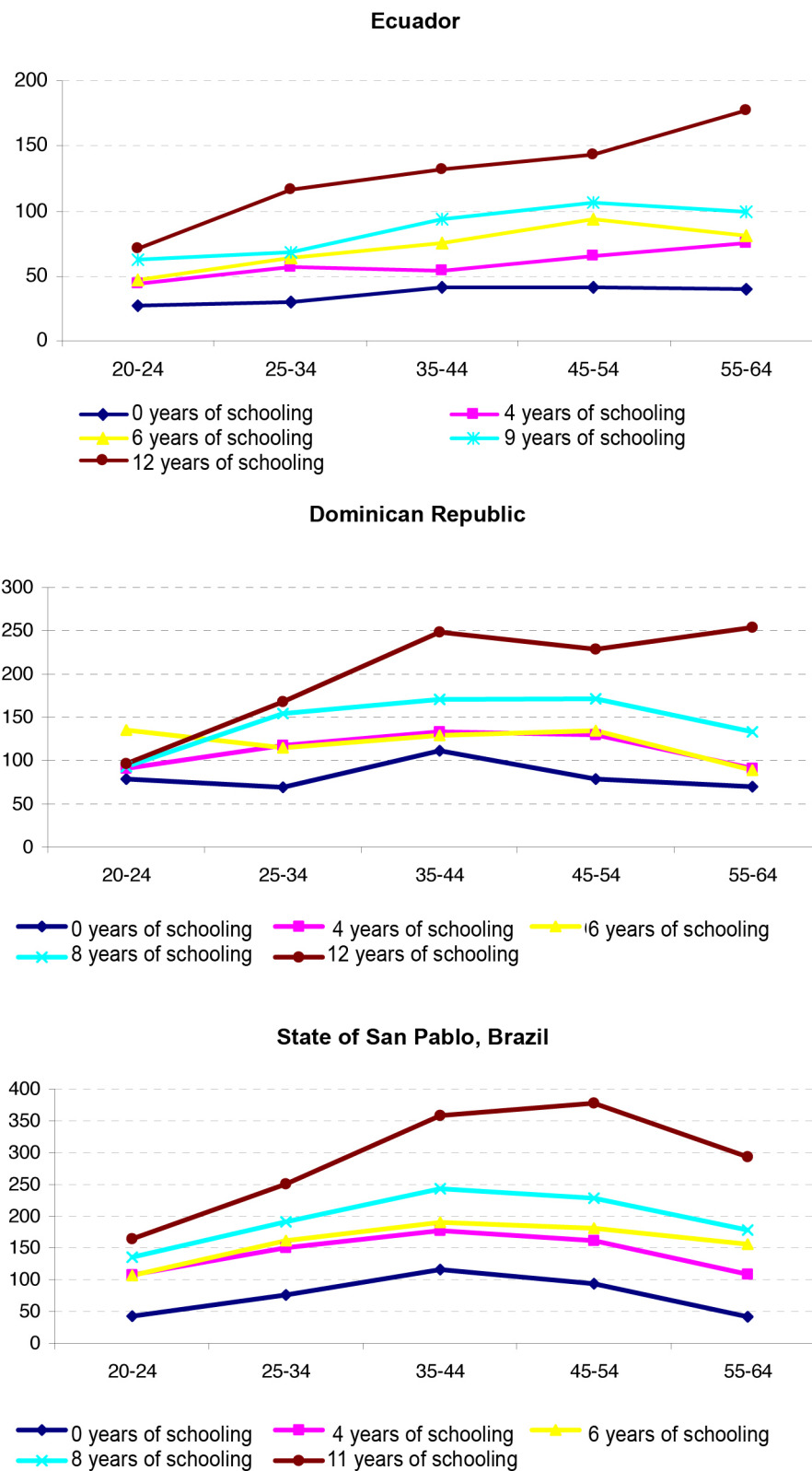
Finally, it should be noted that the patterns of income distribution by level of schooling or type of literacy are relatively similar in all three cases. While not every case is as clear, the gaps observed during the first years of work tend to increase over time. Thus, aside from differences in average income between countries, the data clearly show that literates – and, even more so, persons with greater schooling – always earn more than illiterates.

## 2.4 The Costs of Illiteracy

As shown below, in all of the cases studied, the labour income of illiterates differed significantly from that of literates. As was to be expected, differences increased in proportion to the schooling gap between the two groups:

- Among persons with no more than four years of schooling, those who could neither read nor write earned between US\$200 and US\$700 less in 2006 than those who could.
- The aforementioned gap was US\$100 to US\$150 wider for persons with less than one year of schooling than it was for those with four.
- A comparison between persons with no schooling and persons with six years of schooling reveals a gap of US\$440 to US\$1,100.

**FIGURE 18**  
**INCOME DIFFERENTIALS BY LEVEL OF SCHOOLING, 2006**



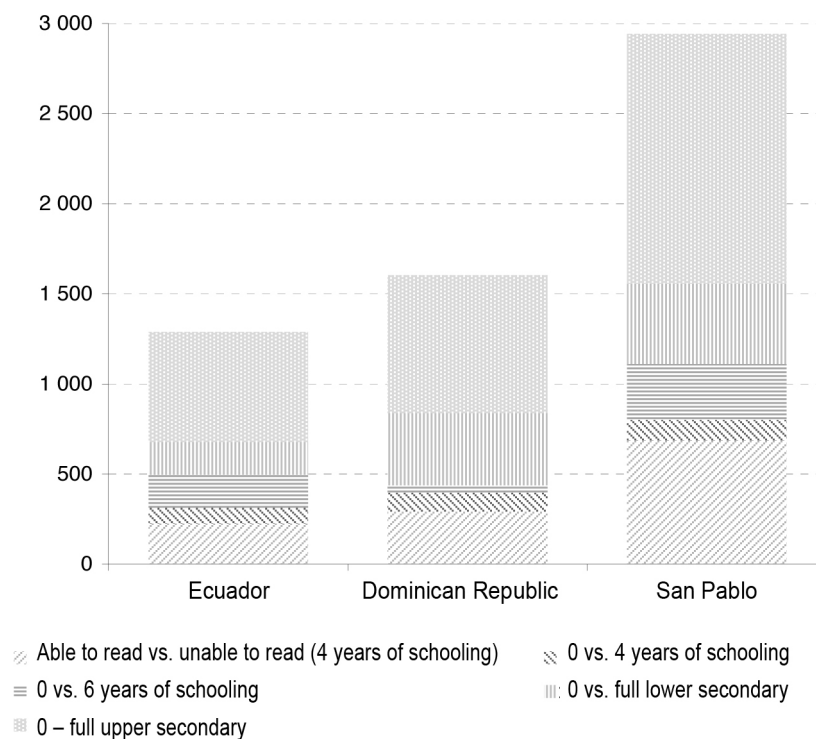
Source: Prepared by the authors on the basis of National Household Survey data for each country (ECLAC).

- A per capita gap of US\$678 to US\$1,557 exists between persons with no schooling and those who have completed lower secondary education.
- The greatest difference was observed between persons who have completed upper secondary education and persons with no schooling; the gaps in this case were four, five and six times larger than those between persons who can read and write and persons who cannot.

The variations observed in these comparisons are another reminder that opportunity costs depend on the characteristics of the labour market in each country. Thus, the rewards of functional literacy in terms of income are significantly higher in São Paulo than they are in Ecuador and the Dominican Republic. The structure of the latter two is relatively similar, although differences were observed in the income gaps between different levels of schooling.

When these differences are analyzed in terms of the overall population, the total cost of illiteracy in labour income for a country, state or region can be estimated. Thus, the 460,000 Ecuadorians who can neither read nor write generate an aggregate productivity loss of US\$104,000,000<sup>36</sup>; 460,000 completely illiterate Dominicans generate a loss of US\$135,000,000; and 957,000 complete illiterates in São Paulo generate a loss of US\$802,000,000. In Ecuador and the Dominican Republic, the loss generated by illiteracy is equivalent to over 0.4% of GDP (0.48% and 0.43%, respectively). In São Paulo it amounts to 0.3%. In terms of education spending, it is equivalent to 19.5% in Ecuador, 27% in the Dominican Republic and 23% in São Paulo.

**FIGURE 19**  
**PER CAPITA LOSS OF LABOUR INCOME BY TYPE OF ILLITERACY**  
**– CROSS-SECTIONAL APPROACH, 2006**



<sup>36</sup> This estimate does not include changes in the price of labour which might result from universal literacy in each case.

Comparison criterion	Ecuador	Dominican Republic	San Pablo
	US Dollars, 2000		
Able to read vs. unable to read (4 years of schooling)		227 292 685	
0 vs. 4 years of schooling	313 397 800		
0 vs. 6 years of schooling	496 437 1 111		
0 vs. Complete lower secondary	678 838 1 557		
0 – Complete upper secondary	1 288 1 604 2 943		

Source: Prepared by the authors on the basis of National Household Survey data for each country (ECLAC) and census data (CELADE).

An analysis of the aggregate loss of potential income suffered by those with zero years of schooling, compared to those who achieve various levels of functional literacy, shows a progressive increase. This increase ranges from 15% to 39% when persons with no schooling are compared to those with four years of schooling; it is 2.5 to 3.8 times larger when the former are compared to those who complete lower secondary education; and it increases fivefold when persons with no schooling are compared to those who complete upper secondary education.

If the income gaps between completely illiterate persons and those who have reached various levels of functional literacy are examined as a whole, losses are even higher. Every additional year of schooling contributes to income. Nevertheless, interannual losses do not become significant until a minimum of four or six years of schooling is reached, depending on the country.

**TABLE 9**  
**TOTAL LOSS OF LABOUR INCOME,**  
**BY TYPE OF ILLITERACY – CROSS-SECTIONAL APPROACH, 2006**  
*(Millions US\$, 2000)*

Comparison criterion	Ecuador	Dominican Republic	San Pablo
Able to read vs. unable to read (4 years of schooling)	104	135	802
0 vs. 4 years of schooling	107	150	911
0 vs. 6 years of schooling	170 1	65	1265
0 vs. Complete lower secondary	232	317	1772
0 – Complete upper secondary	442	606	3350
Less than four years vs. four	107	150	911
Less than six years vs. six	392	165	2254
Less than Complete lower secondary	888	770	6597
Less than Complete upper secondary	2 865	2 679	22229

Source: Prepared by the authors on the basis of National Household Survey data for each country (ECLAC) and census data (CELADE).

When the loss of income caused by illiteracy is analyzed in terms of GDP, it accounts for over 1% when the population with no schooling is compared to that which has completed lower secondary education or more. Moreover, the alternative cost of the completely illiterate with respect to those who have completed secondary education exceeded total spending on education in 2006.

**TABLE 10**  
**PROJECTED DIMINISHED LABOUR INCOME,**  
**BY TYPE OF ILLITERACY – LONGITUDINAL APPROACH, 2006-2050**  
*(Millions US\$, 2000)*

Comparison criterion	Ecuador	Dominican Republic	San Pablo
Able to read vs. unable to read (4 years of schooling)	1813	1 234	6 654
0 vs. 4 years of schooling	795	1327	7 360
0 vs. 6 years of schooling	1359	1557	9829
0 vs. Complete lower secondary	1820	2714	13753
0 – Complete upper secondary	3292	5087	26609
Less than four years vs. four	1255	2094	12201
Less than six years vs. six	3 91	2878 2	7242
Less than Complete lower secondary	5178	8990	6597
Less than Complete upper secondary	25493	25243	208861

Source: Prepared by the authors on the basis of National Household Survey data for each country (ECLAC) and census data (CELADE).

Finally, an estimate of the potential cost of illiteracy over the course of a working life shows that these values are multiplied by 8.7 to 11 between the completely illiterate and those who can read and write, and are 7.4 to 8.8 times higher compared to the various categories of functional illiteracy. Lost productivity would thus be equivalent to US\$25 billion in Ecuador and the Dominican Republic and US\$209 billion in the state of São Paulo.



## VI. Conclusions

The results of this study are a contribution to the analysis of the cost to society of allowing significant portions of the population to remain illiterate. Given the sums involved, this is a key element to consider when developing policies to address the issue.

While not applicable to other cases, the results of the pilot study do suggest that the impact of illiteracy on quality of employment, as well as the loss of productivity caused by its effect on labour income, is sufficiently significant to make its eradication not only a social objective but an economic priority.

From a methodological perspective, an estimate of the impacts of illiteracy on employment and income, developed by comparing groups of persons (the literate and the illiterate) on the basis of household survey data, appears to be a relatively simple, reliable approach which should make it possible to replicate the study throughout Latin America without additional data collection efforts.

The challenge in the future will be to develop instruments and procedures for the analysis of other consequences of illiteracy, such as its impact on productivity and/or other aspects of quality of life, as well as its intergenerational effects. Other sources of information must therefore be consulted, and relative risk data must be made available to analyze these conceptual associations in a more reliable manner. Multivariate statistical analysis can play a significant role in this regard, as can the collection of primary data on the operational health care and educational costs of illiteracy.

To that end, a prior assessment should be carried out in order to concentrate efforts in the areas of greatest significance. Earlier studies by ECLAC and other researchers suggest that operational health care costs and educational costs may be of little import, although the associated social indicators may be relevant. On the other hand, the impact of illiteracy on other aspects of productivity, such as job absenteeism, the occupational accident rate or the academic performance of children, do appear to require special attention. It should be noted that the costs of child malnutrition, in which the illiteracy of parents plays a key role, totalled US\$6.7 billion in Central America and the Dominican Republic in 2004, and US\$10.5 billion in the countries of the Andean region and Paraguay in 2005. Between 90% and 95% of these costs arose from loss of income resulting from lower productivity, which was itself a consequence of the diminished human capital of malnourished persons (ECLAC, 2007; WFP, 2008).

The concept of functional illiteracy must be universalized and further implemented. The general population – and, quite often, decision makers – tend to think of literacy teaching only in terms of reading and writing. The concept of skills has not yet taken hold; the issue is not viewed as a continuum, nor is consideration given to social, linguistic and cultural environment.

There is also a tendency to approach the problem in terms of individual effects and responsibility, overlooking the environment and responsibility of institutions, as well as their policies regarding the illiterate population.

Failure to take these issues into account makes it more difficult to appreciate the social and economic impacts of illiteracy policies, as well as the benefits of creating environments conducive to learning communication skills throughout life.

The region suffers from a serious shortfall of data with which to develop a broader definition of illiteracy – one which takes into account different levels of performance or skill. Consequently, the research trend has been to employ years of schooling as a proxy. This approach entails a significant estimation error, however, given the low reliability of base data collection, the issue of quality of learning during early childhood and the variability of educational models.

The challenge facing Latin America is to improve the assessment and statistical methodologies employed to address the problem, as well as to increase the body of knowledge on the issue. The new approaches developed over the last few years should be noted – particularly the more comprehensive approach to the education of young people and adults (EYPA) which has resulted from an increased focus on quality education throughout life. This approach places literacy efforts within a broader context, and is therefore richer in definitions and coordinated policies.

A joint effort on the part of governments, think tanks and international agencies may constitute an effective strategy with which to address the issue in all of its complexity. The implementation of LAMP or similar programmes would be a significant step in this direction. Case studies or comparative studies within and between countries would also help to achieve a broader understanding of the problem, as well as the requirements which public policies on illiteracy must meet.

Interdisciplinary efforts should also be increased, overcoming sectoral divisions to strengthen the synergies resulting from complementary approaches and coordinated actions.

The challenge is to turn the problem into an opportunity. The eradication of illiteracy would produce net gains; it is not an expenditure, but rather an investment. The direct impact of literacy teaching would generate the resources necessary to cover its cost, by increasing human productivity. This would be the case even without factoring in externalities, such as the investment a literate population would attract.

Furthermore, the eradication of illiteracy would benefit all of society – particularly the production sector. Consequently, all sectors must work together to ensure the financial, legal and operational sustainability of policies and programmes to universalize, as soon as possible, the right to an education which provides the minimum skills necessary for the development of personal abilities.

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