

**ECLAC: ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN**  
**UNESCO: REGIONAL OFFICE FOR EDUCATION IN LATIN AMERICA AND THE CARIBBEAN**

**EDUCATION AND KNOWLEDGE:  
BASIC PILLARS OF CHANGING  
PRODUCTION PATTERNS  
WITH SOCIAL EQUITY**



**Santiago, Chile, 1992**

*Cover:*  
Bas-relief on the ECLAC building in Santiago, Chile  
Architect: Emilio Duhart  
Photograph: Pedro Mujica  
Graphic design: María Paz Varela

## **PRELIMINARY NOTE**

Documents produced by the United Nations are the result of a collective effort on the part of many of its staff members, whose work is subject to the rule of anonymity observed by the Organization. This means that no public recognition is given to the contribution of any one person in particular.

We feel that on this occasion, an exception to that practice may rightfully be made. The primary source of inspiration for this document was unquestionably Fernando Fajnzylber, Director of the Joint ECLAC/UNIDO Industry and Technology Division. His own direct contributions to the study, the encouragement he gave to his colleagues and team-mates in the parts assigned to them, his critical review of its various preliminary versions and the many consultations he held, out of a desire to improve its narrative, have marked the document indelibly. Lamentably, on the very day on which he finished revising it, he fell victim to a fulminating heart attack which ended his life prematurely.

In presenting this document produced by a team of staff members of ECLAC and UNESCO, we wish to pay tribute to the memory of our departed friend and colleague.

LC/G.1702/Rev.1-P  
August 1992

This document has been prepared and published jointly by the Economic Commission for Latin America and the Caribbean (ECLAC) and the UNESCO Regional Office for Education in Latin America and the Caribbean (OREALC).

UNITED NATIONS PUBLICATION

Sales No. E.92.II.G.6

ISBN 92-1-121173-5

Applications for the right to reproduce this work are welcomed and should be sent to the Secretary of the Publications Board, United Nations Headquarters, New York, N.Y. 10017, U.S.A. Member States and their governmental institutions may reproduce this work without prior authorization, but are requested to mention the source and inform the United Nations of such reproduction.

Copyright © United Nations 1992  
All rights reserved  
Printed in Chile

## CONTENTS

	<i>Page</i>
Foreword . . . . .	15
Summary and conclusions . . . . .	17

### **Part one: The Latin American backdrop**

Chapter I	Latin American development and the proposal on changing production patterns with social equity . . . . .	23
	1. The old development model . . . . .	23
	2. The transition of the 1980s . . . . .	23
	3. The challenges of democratization in the 1990s . . . . .	24
	4. International challenges . . . . .	29
	5. The ECLAC proposal for the 1990s . . . . .	33

### **Part two: The starting point**

Introduction . . . . .	35	
Chapter II	Education and human resources in Latin America: recent trends . .	37
	1. The formal educational system . . . . .	37
	2. Regional research and scientific and technological developments . . . . .	61
	3. Adult training and education . . . . .	66
	4. The end of a cycle . . . . .	71
Chapter III	The international debate on education and training of human resources . . . . .	77
	1. Competitiveness, technological change and training of human resources . . . . .	77
	2. Some of the main issues of the international debate on education and training of human resources . . . . .	80
	3. Eight specific lessons derived from the international debate on education and human resources training . . . . .	84

	<i>Page</i>
Chapter IV	
Technology and education: the production and accumulation of knowledge as the motor of development . . . . .	87
1. Expansion of the store of knowledge as seen by the neoclassical theory of economic growth: an exogenous or unrecognized factor . . . . .	87
2. The new growth models: emphasis on the production of knowledge and its endogenization . . . . .	90
3. The view taken by business management analysts . . . . .	97
4. The transformation of education, as seen in some recent prospective analyses . . . . .	106
5. Conclusions . . . . .	112
Final reflections: perceptions and trends . . . . .	115

**Part three: Proposed strategy**

Chapter V	
Objectives, criteria, guidelines . . . . .	121
1. Introduction . . . . .	121
2. Strategic objectives: citizenship and competitiveness . . . . .	123
3. Policy guidelines: social equity and performance . . . . .	125
4. Institutional reform: integration and decentralization . . . . .	125
5. Policy design . . . . .	129

**Part four: Policies to implement the strategy**

Chapter VI	
Actions and measures . . . . .	135
1. To create an institutional structure for education and other knowledge-based endeavours which is responsive to the needs of the society in question . . . . .	135
2. Universal access to the codes of modern society . . . . .	149
3. To foster creativity as regards access to scientific and technological advances, the dissemination of such advances, and scientific and technological innovation . . . . .	163
4. Responsible institutional management . . . . .	169

	<i>Page</i>
5. The professionalization and promotion of a more active role for educators . . . . .	175
6. Society's financial commitment to education . . . . .	179
7. The furtherance of regional and international cooperation . . . . .	186

**Part five: Resources**

Chapter VII	Cost and financing of the strategy . . . . .	193
	1. Patterns of education spending in the 1980s . . . . .	193
	2. The cost of setting up a system of educational-generating institutions responsive to societal needs . . . . .	197
	3. The cost of universal access to the cultural codes of modern living . . . . .	197
	4. The cost of promoting access to, dissemination of and innovation in science and technology . . . . .	205
	5. The cost of responsible management . . . . .	206
	6. The cost of developing a professional, participatory teaching corps . . . . .	207
	7. The cost of the proposed strategy . . . . .	209
	8. Financial mechanisms and sources . . . . .	210
Annex I	The human resources training debate in some developed countries	213
Annex II	Sources of boxes . . . . .	245
Annex III	List of those interviewed or consulted during the preparation of this book . . . . .	253

**BOXES**

II- 1	External factors responsible for developments in education in Latin America in the 1980s . . . . .	41
II- 2	Independent academic research centres . . . . .	47
II- 3	Establishment of private universities: the cases of Spain and Chile . . . . .	48
II- 4	Education and agricultural productivity . . . . .	55

	<i>Page</i>
II- 5 Gender discrimination in schoolbooks . . . . .	57
II- 6 Growth of education and of population . . . . .	60
II- 7 The Monseñor Leonidas Proaño National Literacy Campaign, Ecuador, 1989-1990 . . . . .	67
II- 8 Training for micro-enterprises in El Salvador . . . . .	68
II- 9 Human resources policies of export enterprises in Uruguay . . . . .	70
II-10 Bolivia's new vocational education and training institute . . . . .	72
II-11 A new stage of educational development: the Quito Declaration . . . . .	75
III- 1 The new educational qualifications demanded by firms . . . . .	79
V- 1 How apt is the term "competitiveness"? . . . . .	124
V- 2 Efficiency as a policy criterion . . . . .	126
V- 3 Advantages and risks of decentralization . . . . .	128
VI- 1 Decentralization in a country in transition: the case of Colombia . . . . .	138
VI- 2 Decentralization in a country with a federal system: the case of Argentina	139
VI- 3 Links between universities and the production sector . . . . .	140
VI- 4 Dual-track training and stimulus for employer organization in the Dominican Republic . . . . .	142
VI- 5 Retraining for workers displaced by the retrofitting of industry in Mexico	143
VI- 6 Curriculum reform in Mexico . . . . .	145
VI- 7 Recommendations for eliminating gender-based stereotypes in textbooks and teaching . . . . .	146
VI- 8 Evaluation of post-graduate programmes in Brazil . . . . .	147
VI- 9 Creating a quality secondary-level technical training programme: the CONALEP system in Mexico . . . . .	148
VI-10 Training offered through joint efforts by employer associations . . . . .	150
VI-11 Search for a consensual and participative educational reform in the Dominican Republic . . . . .	151
VI-12 The <i>Escuela Nueva</i> : a national-level experiment in personalized education	153
VI-13 Ecuador's MACAC educational model . . . . .	154
VI-14 Education and television . . . . .	156
VI-15 <i>PEBA</i> , an integral educational concept: the radio school of the Archdiocese of San Salvador . . . . .	158

	<i>Page</i>
VI-16 Two company's in-house academic training programmes . . . . .	159
VI-17 Plan for sociocultural participation in Venezuela . . . . .	160
VI-18 Project to support training in small and medium-sized enterprises in Mexico . . . . .	161
VI-19 Public training and production workshops in Costa Rica . . . . .	162
VI-20 A training programme for young people in Chile . . . . .	163
VI-21 CONACYT (Mexico) programmes in support of technological development . . . . .	164
VI-22 Uruguay's scientific community and its interaction with expatriate scientists . . . . .	165
VI-23 Industrial subcontracting . . . . .	166
VI-24 Working groups for technological management in the Dominican Republic . . . . .	167
VI-25 Promoting technological and commercial studies and human resources training at the sectoral level . . . . .	168
VI-26 Human resources training and research and development in a Korean steelworks . . . . .	169
VI-27 Systems for measuring the quality of basic education. Some regional experiences . . . . .	171
VI-28 Institutional evaluation tools . . . . .	172
VI-29 Principles and preconditions for evaluating higher education . . . . .	173
VI-30 Institutional evaluation proposal: quality control of higher education in Chile . . . . .	174
VI-31 Evaluation and financing modalities of the Monterrey Institute of advanced technological studies . . . . .	175
VI-32 The LOGOS II programme for training teachers . . . . .	176
VI-33 New policies for professionalization of teaching . . . . .	178
VI-34 Private financing for public schools: draft legislation in Uruguay . . . . .	180
VI-35 Chile: tax exemptions for training, technical execution agencies (OTE) and intermediary technical bodies (OTIR) . . . . .	182
VI-36 Sources of financing for the national industrial apprenticeship service (SENAI) of Brazil . . . . .	184
VI-37 Cooperaton initiatives in the field of higher education . . . . .	188

	<i>Page</i>
VI-38 Regional cooperation in the field of education research . . . . .	189
VII- 1 Recent national science and technology programmes with financial support from IDB . . . . .	206
AI- 1 The proven benefits of preschool education . . . . .	216
AI- 2 Comparisons of educational levels . . . . .	217
AI- 3 Motorola's training activities . . . . .	221
AI- 4 Collaboration between businesses and the public school system in the United States . . . . .	222
AI- 5 The youth training scheme . . . . .	223
AI- 6 SKF's industrial school . . . . .	231
AI- 7 One school for all or different schools according to talent: the debate in the Netherlands . . . . .	234
AI- 8 Reform in the training of civil engineers in France . . . . .	237
AI- 9 Decentralized educational programmes in France . . . . .	239
AI-10 Institutional flexibility in Tuscany . . . . .	241
AI-11 FIAT's difficulties in training employees to work in its automated plans . . . . .	242
AI-12 The human resources development plan of the Republic of Korea . . . . .	243
AI-13 Corporate innovation follow-up strategies . . . . .	244

## TABLES

II- 1 Latin America and the Caribbean: estimated enrolment and enrolment rates . . . . .	39
II- 2 Latin America and the Caribbean: enrolment rates . . . . .	40
II- 3 Latin America and the Caribbean: efficiency indicators for primary education . . . . .	43
II- 4 Incidence of public expenditure for education by educational and income level in some countries of Latin America and the Caribbean . . . . .	51
II- 5 Latin America and the Caribbean: distribution of the population age 15 and over by years of study completed and area of residence . . . . .	53
II- 6 Latin America and the Caribbean: distribution of the population age 15 and over by educational level attained, age group and gender . . . . .	56

	<i>Page</i>
II- 7 Enrolment rates for primary, secondary and tertiary level . . . . .	58
II- 8 Quantitative indicators of the expansion of the educational system in selected countries . . . . .	59
II- 9 Latin America and the Caribbean: economic and technological weight, around 1985 . . . . .	61
II-10 Science and technology indicators for groups of selected countries . . . . .	62
II-11 Indicators of technological intensity in external trade in selected groups of countries . . . . .	63
II-12 Latin America and the Caribbean: expenditures for research and development . . . . .	64
II-13 Latin America and the Caribbean: distribution of expenditures for research and development by sectors . . . . .	65
III- 1 School enrolment rate by age group, in selected countries . . . . .	81
V- 1 Requirements of the production sector versus educational opportunities .	129
VII- 1 Public education spending . . . . .	194
VII- 2 Latin America and the Caribbean: public education spending . . . . .	194
VII- 3 Latin America and the Caribbean: estimates of private spending on education . . . . .	196
VII- 4 Latin America and the Caribbean: private education enrolments . . . . .	196
VII- 5 Latin America and the Caribbean: potential beneficiaries of public training programmes . . . . .	198
VII- 6 Latin America and the Caribbean: cost of grade repetition . . . . .	199
VII- 7 Latin America and the Caribbean: increase in initial unit cost as a result of adopting personalized instruction methods . . . . .	199
VII- 8 Latin America and the Caribbean: access, enrolment, costs and investment	200
VII- 9 Latin America and the Caribbean: access, enrolment, costs and investment	201
VII-10 Latin America and the Caribbean: access, enrolment, costs and investment	202
VII-11 Latin America and the Caribbean: cost comparison of alternatives I and III	202
VII-12 Latin America and the Caribbean: cost estimates for targeted remedial programmes . . . . .	205
VII-13 Latin America and the Caribbean: teachers and teacher salaries . . . . .	207
VII-14 Latin America and the Caribbean: access, enrolment, costs and investment	208

	<i>Page</i>
VII-15 Latin America and the Caribbean: estimated additional cost of the proposed strategy (summary) . . . . .	209
VII-16 Potential increase in GDP by raising the educational level of the active population to completion of primary school in selected countries . . . . .	210
VII-17 Latin America and the Caribbean: potential sources of financing . . . . .	212
AI- 1 Enrolment rates, by age group, in selected countries . . . . .	214

### FIGURES

I- 1 Latin America and the Caribbean: some macroeconomic indicators . . . . .	25
I- 2 Latin America and the Caribbean: international integration . . . . .	25
I- 3 Latin America (11 countries): urban real minimum wage . . . . .	26
I- 4 Latin America and the Caribbean: variation in net enrolment ratios . . . . .	26
I- 5 Latin America and the Caribbean: communications media . . . . .	27
I- 6 Latin America and the Caribbean: synthesis . . . . .	27
I- 7 Latin America and the Caribbean: syntehsis . . . . .	29
II- 1 Latin America and the Caribbean: distribution of population aged 15 and over, by years of schooling completed . . . . .	38
V- 1 Current configuration . . . . .	132
VII- 1 Latin America and the Caribbean: enrolment by grade in the year 2000 . . . . .	203

## FOREWORD

In its proposal on changing production patterns with social equity,<sup>1</sup> the Economic Commission for Latin America and the Caribbean (ECLAC) put forward a central idea around which all the others intermeshed: that the deliberate and systematic incorporation and spread of technical progress is the hub for changing production patterns and for ensuring that they are consonant with political democratization and growing social equity. The proposal clearly brings out the difference between a form of international competitiveness which makes it possible to raise the standard of living of the population through increased productivity, and another form of competitiveness based on the plundering of natural resources and the reduction of real wages. In the first-named form, it is technical progress which permits growing identity between competitiveness and social sustainability, and, basically, between economic growth and social equity.

Many different factors enter into the incorporation and spread of technical progress. Among these, the ECLAC proposal highlights in particular the strengthening of the entrepreneurial base, the technological infrastructure, increasing openness to the world economy, and above all, the training of human resources and the whole set of incentives and mechanisms which favour increased access to and generation of new

knowledge. In this latter respect, shortcomings in the area of education and knowledge jeopardize possible advances in other aspects of the incorporation and spread of technical progress.

Human resources and development are two subjects which are very closely interlinked. In view of this, ECLAC –in conjunction with the UNESCO Regional Office for Education in Latin America and the Caribbean (OREALC)– has embarked on a systematic effort to gain a more detailed knowledge of the interrelations between the educational system, training, research and technological development, within the context of the central elements of its proposal: namely, changing production patterns, social equity and political democratization. The present document represents a first attempt to outline possible action with regard to policies and institutions which could further the systemic links between education, knowledge and development in the light of the conditions prevailing in the 1990s.

As a methodological approach, it has been considered that in the design of human resources strategies and policies for changing production patterns with equity, it is necessary to make use of the experience accumulated inside and outside the region, to take account of the theoretical contributions made in the 1980s with regard to the linkages between education and economic development, and also to incorporate the current

---

<sup>1</sup> ECLAC, *Changing Production Patterns with Social Equity. The Prime Task of Latin American and Caribbean Development in the 1990s* (LC/G.1601-P), Santiago, Chile, March 1990. United Nations publication, Sales No. E.90.II.G.6.

perceptions in Latin America and the Caribbean regarding the results of the present interrelation between education, the economy and society, and the shortcomings observed in this respect.

On this basis, a strategic proposal is formulated, a set of policies for putting it into practice are identified and analysed, and finally an estimate is made of the order of magnitude of the resources needed for this purpose. This proposal is enriched by the consideration of various initiatives already under way in the countries of the region, which also serve to illustrate it.

The aim of the proposed strategy is to create within the coming decade certain conditions with regard to education, training and the incorporation of scientific and technological progress which will make possible the transformation of the production patterns of the region against a background of growing social equity.

This aim can only be achieved through a wide-ranging reform of the existing educational and training systems of the region and through the generation of endogenous capacity to take advantage of scientific and technological progress. This proposal represents a particular expression of the notion of the complementarity between changing production patterns and equity set forth and justified in *Social Equity and Changing Production Patterns: an Integrated Approach*,<sup>2</sup> prepared by the ECLAC secretariat for the twenty-fourth session of the Commission.

In part one of this study, a brief summary is given of the development pattern of Latin America and the Caribbean since the end of the war, the "painful lessons" of the 1980s and the challenges of democratization during the 1990s. It then goes on to refer to the ECLAC proposal for changing production patterns with social equity, current trends in the area of international production,

and finally, the nature of the strategy proposed in the new document, which is designed to secure both changes in production patterns and social equity.

The strategic guidelines and policies proposed in this document are the result of the diagnosis contained in part two. This section analyses various initiatives being carried out by individual countries with the aim of making changes in education, the training of workers, and scientific and technological training, as well as recent theoretical contributions on the links between education and economic development. In an annex to the document, a review is made of the debate currently under way on these subjects in some developed countries and newly industrializing nations of other parts of the world.

Part three of the document contains the broad lines of the educational strategy proposed, expressed as *idées-force*, with special emphasis on basic and secondary education, secondary vocational training and the strengthening of technological development. The strategy revolves around certain key objectives (modern citizenship and competitiveness), the criteria underlying the policies (equity and performance), and the main guidelines for institutional reform (national integration and decentralization).

On the basis of the background information analysed and in the light of the guidelines in question, part four of the study proposes a set of policies for putting the strategy into practice. The proposed actions and measures are accompanied by boxes illustrating experience, designs, methodologies and applications of the policies in various contexts both inside and outside the region.

In the last part of the document (part five) an estimate is given, purely for purposes of illustration, of the order of magnitude of the resources needed for implementing the proposed policies.

<sup>2</sup> ECLAC, *Social Equity and Changing Production Patterns: an Integrated Approach* (LC/G.1701(SES.24/3)), Santiago, Chile, 1992.

## SUMMARY AND CONCLUSIONS

### 1. The challenges

---

In the coming decade, the countries of Latin America and the Caribbean will face both internal and external challenges. Internally, the challenges will be to consolidate and heighten democracy, social cohesion, equity and participation: in short, to build up modern citizenship. Externally, the challenges will be to reconcile the aspirations for access to modern goods and services with the generation of the means which will effectively permit such access, i.e., international competitiveness. The intensity of these challenges in the different countries of the region will vary, but in all of them they will be of outstanding importance.

### 2. The central role of education and the generation of knowledge

---

In the developed countries and the successful cases of so-called "late industrialization" in other areas, there is a clear recognition of the central role that education and the generation of knowledge play in the development process, and this attitude has been spreading gradually in the countries of the region. The transmission of values, the ethical dimension and the forms of behaviour typical of modern citizenship, together with the generation of the capacities and skills which are essential for

international competitiveness (which is increasingly based on technical progress), receive a decisive boost from education and the production of knowledge in a society. Reform of the system of production and dissemination of knowledge is consequently a crucial instrument for tackling both the internal challenge, which is that of building citizenship, and the external challenge, which is that of competitiveness. It will therefore be understood why this dimension has a central place in the ECLAC proposal on changing production patterns with equity.<sup>3</sup>

### 3. The regional situation

---

In recent decades, the systems of education, training and scientific and technological development have registered noteworthy, albeit incomplete, expansion in most of the countries of the region. However, they still display obvious shortcomings with regard to the quality of their results, their degree of adaptation to the requirements of the economic and social environment, and the degree of equity in the access of the different strata of society to them. As far as their institutions are concerned, they tend to be excessively rigid and bureaucratic and to have scanty links with the external environment. The past decade, which was distinguished by constraints on public resources, growing

---

3 ECLAC, *Changing production patterns with social equity...*, op. cit.

liberalization of economies and increasing democratization, marked the end of a cycle, and it is therefore urgent to make the transition to a period whose dynamism and performance will be indicated by the degree of primacy which societies give to education and the production of knowledge.

#### 4. The need for a strategy

---

In these circumstances, it is of fundamental importance to design and put into effect a strategy for promoting the transformation of education and training and increasing the scientific and technological potential of the region with a view to the formation of a modern type of citizenship –linked to democracy and equity just as much as to the international competitiveness of the countries– which will make possible sustained growth based on the incorporation and spread of technical progress. To imagine that such a form of citizenship can become fully valid without an effective effort with regard to competitiveness is just as groundless in this decade of the 1990s as to think that competitiveness –which is necessarily of a systemic nature– can be maintained even though there are serious shortcomings in the area of citizenship.

#### 5. Objectives, criteria and main guidelines

---

The proposed strategy revolves around the objectives of citizenship and competitiveness; it takes equity and performance as the guiding principles of its policies, while the main lines of the proposed institutional reform are national integration and decentralization.

In the past, frequent reference has been made to the strategic objective of *citizenship*, to the concept of *equity* as the main guideline for policies, and to *national integration* as the driving force behind the institutional system. Substantial advances have been made on all three planes, but the shortcomings in each one of them are linked at least partly with the omissions committed with regard to the other three

components of the present strategic proposal: *competitiveness* as an objective, *performance* as a policy guideline, and *decentralization* as a component of the institutional scheme. In the 1980s, there were energetic defenders of these three previously neglected issues, and indeed there were often excesses in the opposite direction: competitiveness, performance and decentralization were given priority over the previously prevailing motivations, as explained in part three. The present proposal acknowledges the existence of tensions between citizenship and competitiveness, equity and performance and integration and decentralization, but it concentrates rather on the areas of complementarity which exist on each of these levels.

#### 6. The main features of the proposal

---

The strategy has three main features. It is *inductive*, which is the feature that lies at the root of its viability and is reflected in its design, based as it is on recognition of the changes taking place in regional and international conditions, on the assignment of their true value to the emerging *idées-force* which influence the positions, aspirations and perceptions of the various actors in the process of generation and dissemination of knowledge, and on the analysis of specific current experiences both inside and outside the region which suggest trends that could become more general. It is also *systemic*: that is to say, it takes into account both the linkages between education, training and science and technology on the one hand and the system of production on the other, and the many bridges which link the economy and society at the individual and collective level. Finally, it places great emphasis on *institutional change*. It takes into account, and even estimates in quantitative terms, the additional financial resources needed, but it seeks to show that these resources –although essential for the reforms– would not of themselves be enough to correct the shortcomings unless they were accompanied by profound changes giving

rise to an institutional structure open to the requirements of society. The criteria and guidelines of the strategy are illustrated at length in the case of some aspects, whereas in others, such as that of university education, more general guidelines are presented.

### **7. The main directions of the strategy**

---

The changes proposed point in the following main directions: i) from the political point of view, the activities of the production and dissemination of knowledge are seen as long-term strategic tasks which call for the broadest possible consensus among the various social actors and a stable financial commitment for their execution; ii) from the point of view of content, the action is focused on improvement of the results of education, training and scientific and technological development and their linkages with the requirements for the improved performance of persons, enterprises and institutions at the various levels of society; and iii) from the institutional point of view, the aim is to break the isolation of establishments concerned with education and the generation and transmission of knowledge and to introduce forms of action where the actors have a greater degree of autonomy in taking their decisions as well as greater responsibility for the results.

### **8. The policies**

---

Seven policy areas are identified and described. The first of them emphasizes the strategic purpose of overcoming the relative isolation of the system of education, training and acquisition of scientific and technological knowledge by opening it up to social needs. Overcoming such isolation is considered the most fertile source of dynamism and change in each subsystem and in the relations between all of them. The next two areas concern the results sought for through

such greater openness: namely, ensuring universal access to the codes of modernity,<sup>4</sup> and promoting creativeness in access, dissemination and innovation in scientific and technological matters. The last four areas are of an instrumental nature: responsible institutional management; professionalization and heightening of the role of educators; a financial commitment by society to education, training and the scientific and technological effort, and regional and international cooperation. In these various policy areas, guidelines are formulated which affect the various components of formal education (preschool, primary, secondary and higher), training and the scientific and technological effort, and especially the links among them and with the productive sector.

### **9. Special national features**

---

The drafting and detailed preparation of policies, as well as their application in the different national circumstances, is a task which is the responsibility of each individual country. There are many different ways of access to and participation in, the modern world and, moreover, highly diversified experiences and situations coexist and intermingle in many ways within each country. Only within each national society is it possible to determine priorities, design action plans and put them into effect by assembling the conditions, resources and support needed to make the proposed reforms viable and reconcile them with the maintenance and further enrichment of the many and varied channels of knowledge in each country's culture. The specific guidelines outlined in the text must be interpreted from this standpoint.

### **10. Regional and international cooperation**

---

There are four main fields in which regional and international cooperation

<sup>4</sup> The codes of modernity are taken to mean the set of knowledge and skills needed to participate in public life and play a productive part in modern society. See chapter VI, section 2, below.

can play an important role in the application of the strategies and policies proposed in this document. These are the training of human resources in the countries of Latin America and the Caribbean with a view to more efficient use of the installed capacity of the universities and academic centres of the region; improvement of the linkages between the system of education and generation of knowledge, on the one hand, and the productive or social development sectors on the other; research into education and the process of the generation, dissemination and use of knowledge; and the process of implementation of the strategy and policy proposals put forward in this document in operational and institutional terms at the level of the particular countries.

Specifically, emphasis is placed on the following lines of cooperation: improvement of quality; innovations in secondary education; accreditation of institutions, programmes and units of higher education; training of academics and researchers; institutional reform and local administration; technical training; educational research; student exchanges; and strategic cooperation.

#### **11. The development banking system and education and the production of knowledge**

---

Carrying out the proposed tasks will naturally need financial support for the changes suggested in each of the subsystems and the strengthening of the links between them. In the past, the development banking system played a decisive role in a phase where priority was given to the expansion of production capacity and the development of new

sectors, especially by large public and private enterprises. During the 1980s the development banking system reduced its capacity for action, both in terms of resources and of the profile of its activities. In the 1990s, however, there is new scope for it: namely, in tasks directly related to education and the production of knowledge, which are seen as the hub of changing production patterns with equity. Specifically, in collaboration with the private financial sector, it could promote institutional machinery for supporting investment in human resources, scientific and technological development and the expansion of small and medium-scale enterprises and establishing linkages between the various subsystems.

#### **12. Final comments**

---

The proposed strategy makes education and knowledge the hub of the process of changing production patterns with social equity, since they are seen as vital areas for promoting the development of the region and as objectives which could realistically be attained through the application of a coherent set of policies. In the present context, the partial efforts now being made and the perceptions of the leading actors in the process of education and the production and dissemination of knowledge are tending to converge in the direction of the proposed lines of action. This is a complex and far-reaching task which is unavoidable and is indeed already under way: its results will condition both the domestic economic and social evolution of the countries of the region and the importance they will have in the world context.

**Part One**

**THE LATIN AMERICAN BACKDROP**

## Chapter I

# LATIN AMERICAN DEVELOPMENT AND THE PROPOSAL ON CHANGING PRODUCTION PATTERNS WITH SOCIAL EQUITY

This part contains a brief analysis of the development model prevailing in Latin America in the post-war period, the painful lessons imposed on the region in the 1980s, the challenges of democratization in the 1990s, the proposal advanced by ECLAC in the document *Changing Production Patterns with Social Equity*, current trends in international production and, lastly, the nature of the education strategy set forth in this document with a view to enabling the region to change production patterns and enhance social equity.

### 1. The old development model

---

The economic development model followed in Latin America after the Second World War showed various signs of obsolescence in the late 1970s and early 1980s. In previous decades, some countries had experienced significant economic growth, and a few had achieved a minimal degree of social equity, but none, apparently, had simultaneously attained these twin objectives of the development process. In contrast, some countries characterized by late industrialization in other regions, and against the same international backdrop, had successfully reconciled growth with social equity.

A comparison of the Latin American model to that of countries whose

development can be termed successful reveals, in addition to the latter's higher levels of growth and social equity, clear differences in respect of savings and investment, human resources training and the dissemination of technical advances; moreover, the international position of Latin American countries is considerably more precarious. The countries of the region absorb more foreign direct investment, have higher levels of external debt and copy the consumption patterns of developed countries to a greater extent than do countries in other areas. However, the necessary counterpart to this –integration through increasingly sophisticated exports– has not made the required progress in Latin America.

On the contrary, the old Latin American development model had relied on income from natural resources and external debt at the international level, and on financial imbalance and the inflation tax at the domestic level.

These three pillars of the economy progressively eroded and, in the case of external credit, collapsed in 1981. The development model described above thus became impossible to pursue.

### 2. The transition of the 1980s

---

In the late 1980s, the determination that the 1990 per capita product was unlikely to reach its 1980 level gave rise to the

expression "lost decade", which subsequently became widespread. Per capita output and investment were, in fact, lower at the end of the decade than in 1980. Inflation, on the other hand, was considerably higher (see figure I-1).

Often the macroeconomic perspective, being crucial, masks the changes taking place within economies and ignores factors which are beyond its scope. In the political/institutional sphere, many countries began the transition to democracy or the consolidation of democratic systems in the past decade. There was a gradual depolarization of the political and economic debate, and greater emphasis on the processes of negotiation and engagement. This trend is reflected by the political and social cooperation arrangements which have proliferated in the region. In the sphere of intraregional relations, rivalries between neighbour countries were abandoned and, in some cases, were replaced by innovative cooperation programmes. New social movements and agents emerged, laying the foundations for an unprecedented equilibrium between government and private initiatives.

On a strictly economic level, the countries of the region, by basing their foreign debt servicing on a large trade surplus (see figure I-2), implicitly expressed their will to consolidate their position in the international market and to rectify the asymmetrical external integration which had characterized the preceding phase of development.

In contrast to the system under which international competitiveness is based on the absorption of technical advances and increased productivity and remuneration ("genuine competitiveness"), the region's enhanced international integration was accompanied by a reduction of remuneration in the more modest sectors (see figure I-3). This corresponds, in general, to what has been called "spurious competitiveness".<sup>1</sup>

Although the 1980s witnessed an exacerbation of the long-standing problem of poverty and greater social exclusion in various forms, trends towards the expansion of coverage of social services were maintained in some areas, though with a deterioration in quality, as in the case of primary, secondary and higher education (see figure I-4).

In addition to the foregoing, greater inequality in effective access to goods and services was accompanied by the spread of the information media, whose immediate effect was to create uniform aspirations which brought the "collective imagination" of the region closer to that of developed countries (see figure I-5).

These factors – democratization, international integration, decreased minimum wage, increased education coverage and wider dissemination of communication media – suggest that in the 1980s, the countries of the region underwent profound changes that will have a tremendous impact on their future development (see figure I-6).

### 3. The challenges of democratization in the 1990s

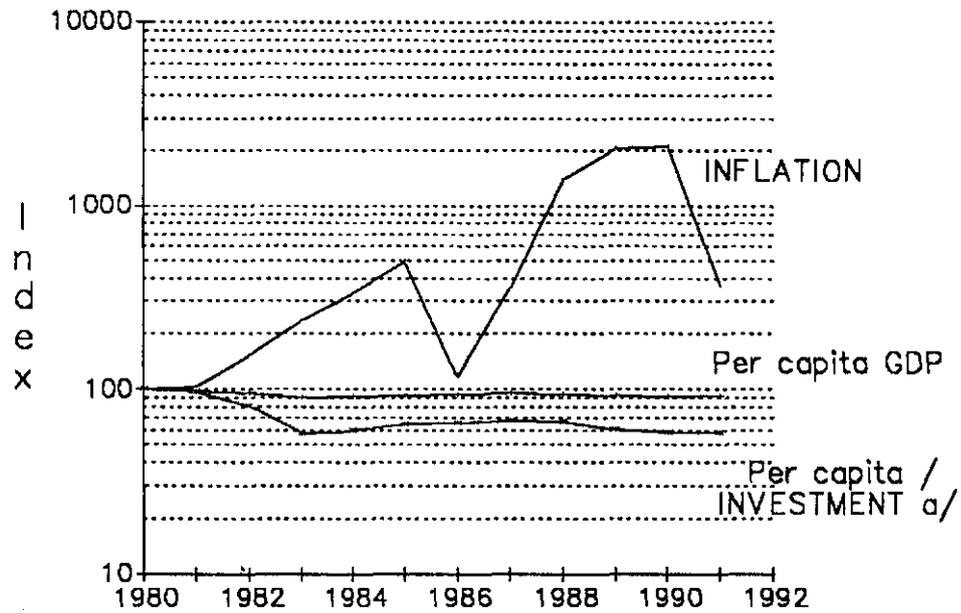
The democratization process currently under way faces, *inter alia*, two great challenges: the growing disparity between aspirations and reality, particularly prevalent among Latin American youth, and the new demands of international integration.

#### a) Aspirations and reality

Part of the legacy of the past decade is the marked tension generated by the imbalance between increasingly homogeneous aspirations in respect of access to goods, services and modern institutions (illustrated by the wide availability of mass media) and the reduced actual purchasing power of low-income population sectors, whose actual chances of acquiring such strongly

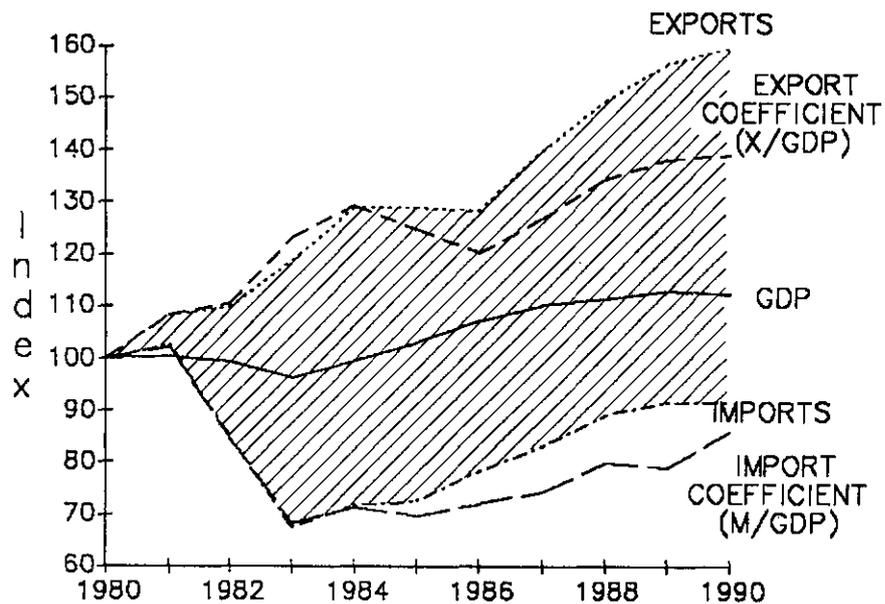
<sup>1</sup> ECLAC, *Changing Production Patterns...*, op. cit.

Figure I-1  
**LATIN AMERICA AND THE CARIBBEAN: SOME MACROECONOMIC INDICATORS**  
 (1980 indexes = 100)



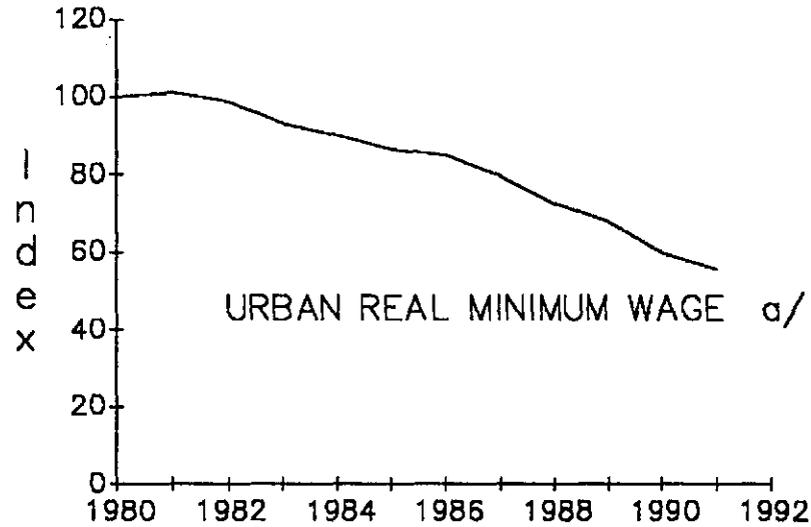
Source: ECLAC, on the basis of official figures.  
 \* Estimated 1991.

Figure I-2  
**LATIN AMERICA AND THE CARIBBEAN: INTERNATIONAL INTEGRATION**  
 (1980 indexes = 100)



Source: ECLAC, on the basis of official figures.

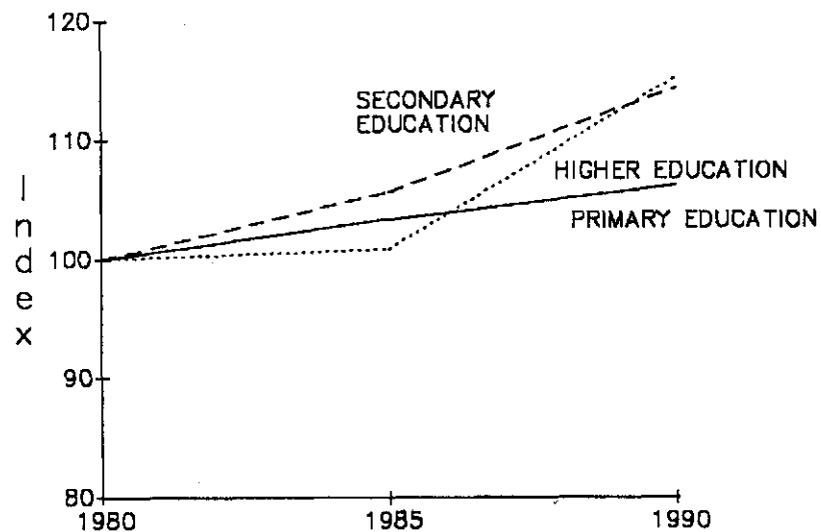
Figure I-3  
**LATIN AMERICA (11 COUNTRIES): URBAN REAL MINIMUM WAGE**  
 (1980 indexes = 100)



Source: ECLAC, on the basis of official figures.

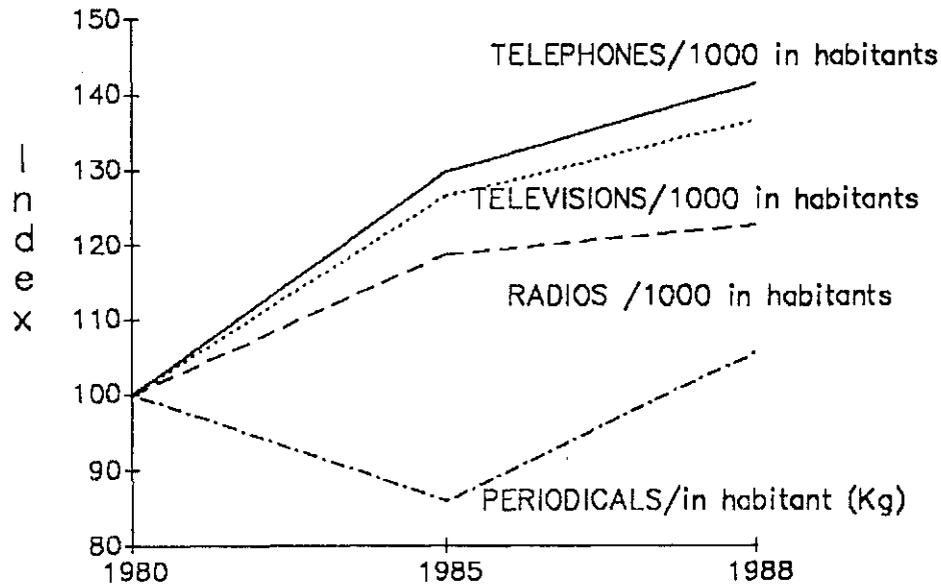
\*Weighted average of 11 countries. For more details on coverage and other technical aspects, see ECLAC, *Preliminary Overview of the Economic of Latin America and the Caribbean, 1991* (LC/G.1696), Santiago, Chile, December, 1991.

Figure I-4  
**LATIN AMERICA AND THE CARIBBEAN: VARIATION IN NET ENROLMENT RATIOS**  
 (1980 indexes = 100)



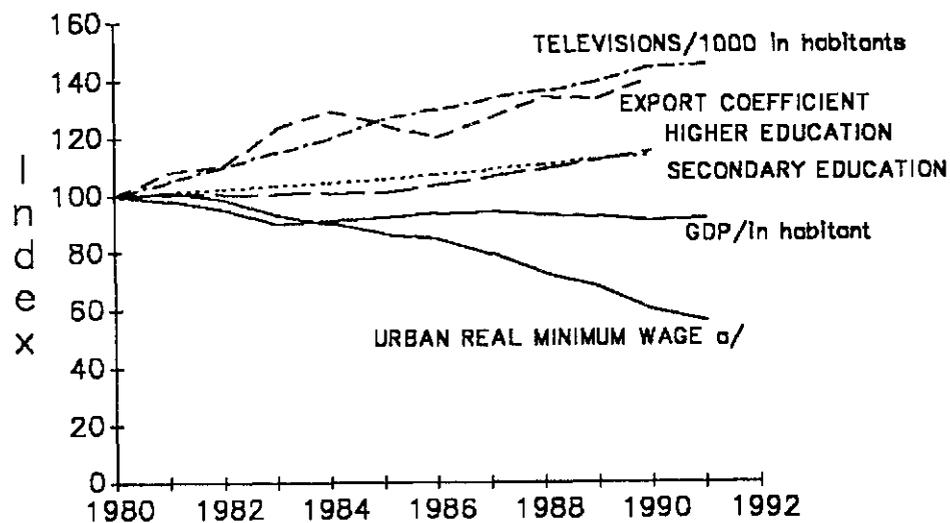
Source: ECLAC, on the basis of official figures.

Figure I-5  
**LATIN AMERICA AND THE CARIBBEAN: COMMUNICATIONS MEDIA**  
 (1980 indexes = 100)



Source: ECLAC, on the basis of official figures.

Figure I-6  
**LATIN AMERICA AND THE CARIBBEAN: SYNTHESIS**  
 (1980 indexes = 100)



Source: ECLAC, on the basis of official figures.

<sup>a</sup> Weighted average of 11 countries. For more details on coverage and other technical aspects, see ECLAC, *Preliminary Overview of the Economy of Latin America and the Caribbean, 1991* (LC/G.1696), Santiago, Chile, December, 1991.

desired goods and services are thereby diminished (see figure I-7).

Young people are among the groups most affected by this situation, as they represent the highest proportion of low wage-earners and the unemployed. Not only are their chances of acquiring goods and services slim, but often they are also virtually barred from consumer activity and civic participation.

Although it is impossible to posit a direct causal relation, it is reasonable to assume that this "frustration factor" is a determining factor in the violence and delinquency to which a number of young people and youth sectors are turning. This is all the more likely in that the discrepancy between dreams and reality is much more serious than the overall figures suggest.<sup>2</sup>

Democratization faces the daunting task of reconciling public order, respect for human rights and narrowing of the gap between realities and aspirations. Given the difficulty of regulating the last two, efforts must focus on changing production patterns to promote external integration and greater social equity, thereby facilitating social integration.

#### *b) International market standing and democratization*

The increased openness of Latin American economies and the goal of consolidating integration into the world market make new demands on the democratization processes under way in the region. Indeed, these processes must now include attributes that were absent, or not so urgently required, in the previous phase of relative isolation from international trade.

i) *Technical capacity and equitable representation.* The requirements of international integration limit the freedom with which policies may be put forward

and adopted. This, in itself, reduces the spectrum of alternatives presented to the public. In this context, the preservation of sectoral and group identity necessarily implies enhancement of technical capacity in the area of political and social activities to solve the concrete problems faced by the community. In contrast, the absence of such policy limitations in the past resulted in the prolongation, intensification and recurrence of internal conflicts, with no regard to their external effects.

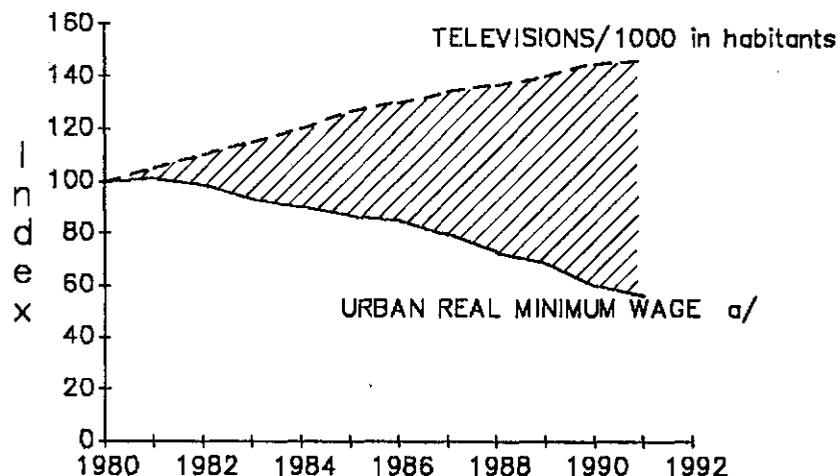
Nevertheless, the hope for a greater degree of consensus, coupled with the increasing technical sophistication of the socio-political sphere, may create a relative distance between professional social and political activity and the deficiencies and imperatives perceived by the population, which would thwart or excessively restrict their aspirations to participate.

Consequently, the technical improvement of socio-political know-how must be accompanied by measures to strengthen equitable representation of political parties and trade unions in areas concerning social demands. If technical development and equitable representation do not progress simultaneously, new difficulties could emerge to hinder the consolidation of modern, stable forms of democratic coexistence. This, in turn, could cause a reversion to the cycle of confrontational or neo-authoritarian policies, or to populism and stagnation.

ii) *Institutional innovation.* International integration entails many forms of institutional innovation, in the organization of enterprises, labour relations, links between the public and private sectors, regional decentralization, environmental sustainability and education strategy. Enterprises, sectors and countries must cope with a dizzying array of changes in meeting the challenges of international competition.

2 Probably the spread of drug trafficking, in addition to reflecting the expansion of external demand, is linked to this sudden upsurge of frustration, in the case of both users and suppliers. To the former, it represents a means of escape from their situation and one of many possible aggressive responses, this time directed against themselves. To the latter, most of whom are adults, it is a shortcut to securing the benefits of modern life.

Figure I-7  
**LATIN AMERICA AND THE CARIBBEAN: SYNTHESIS**  
 (1980 indexes = 100)



Source: ECLAC, on the basis of official figures.

<sup>a</sup> Weighted average of 11 countries. For more details on coverage and other technical aspects, see ECLAC, *Preliminary Overview of the Economy of Latin America and the Caribbean, 1991* (LC/G.1696), Santiago, Chile, December, 1991.

The essential task of democratization is not only to satisfy these demands for institutional innovation, but also to help initiate and channel them, to forestall their potentially destructive effects. The consolidation of open, participatory systems will, in turn, prompt a renewed call for greater social equity. Thus, international integration poses new challenges to democracy, which then encourages greater demand for social equity.

To reconcile social equity with international integration, productivity must be constantly increased and all of the institutional capacities of countries must be improved, in a process in which education and dissemination of technical advances play crucial roles. The proposal contained in the document *Changing Production Patterns with Social Equity* clearly pointed in this direction, as efforts are under way to develop this approach in the areas of education, training and

development of national capacities for innovation.

#### 4. International challenges

The main trends in the international economy, which determine the requirements which the countries of the region must meet and to which education must respond, are:

##### a) *An era of scientific and technological revolution*

The world is now in an era of scientific and technological revolution which stems from the dissemination of micro-electronics technologies, especially those related to information processing and transmission. The uniqueness of this revolution, compared to those of the past, lies in the increasing convergence of scientific development, technological advances and their application to the

production, distribution and consumption of goods and services. This convergence implies the existence of "technological systems", which are the foundation for increased productivity in the economic process.

A technological system combines new inputs, products and processes with organizational and managerial innovations. The dynamic of such systems is generated by packages of technically and economically interrelated innovations, which may affect various aspects of production. The world is currently witnessing the effects of sets of radical innovations that are capable of completely transforming the production sector; a *technological revolution*<sup>3</sup> based on conglomerates of technological systems with a common dynamic, which are changing "ways of producing, ways of living and the international economic map".<sup>4</sup>

The current process of technical change highlights the systemic nature of innovation and the central role of feedback between phases of innovation linked to market activity and phases related to technical logistics. This, in turn, implies a cooperative interaction among the internal activities of each enterprise and even between enterprises.

The systemic nature of innovation illustrates the fundamental role of alliances or networks set up among enterprises and between them and public institutions, non-governmental organizations and other economic agents. The key to economic success in the context of this revolution lies in linkage between the system of generating knowledge and the system of producing goods and services.

#### *b) Progressive globalization of markets*

A dual process is currently taking place: globalization of certain economic activities on the one hand, and regionalization of markets on the other. Although its end results are still unclear, it is changing the economic structure of large regions of the world.<sup>5</sup>

The globalization of certain key industries entails a radical change in the generation and distribution of wealth and opportunities for innovation at the international level. In particular, this has accentuated the competitive advantage which large enterprises enjoy by virtue of their innovative capacity, which has translated into a growing number of markets and combinations of enterprises in a climate of intensified international competition.

#### *c) Competitiveness based on the incorporation and dissemination of technical progress*

There is general agreement that the ability to compete in international markets increasingly depends on the skill with which enterprises and countries disseminate technical advances and absorb them into the system of producing goods and services. This is known as genuine or structural competitiveness, and is reflected by the increasing amount of resources devoted to research and development in industrialized countries and in countries which, though characterized by late industrialization, have successfully entered international markets.

The accumulation of technical knowledge involves a mutual complementarity between the generation of knowledge, innovation and

3 See Christopher Freeman, "Induced Innovation, Diffusion of Innovations and Business Cycles", *Technology and Social Process*, Elliot Brian (ed.), Edinburgh, Edinburgh University Press, 1988, pp. 98 and ff.

4 See Carlota Pérez, "Las nuevas tecnologías: una visión de conjunto", *La tercera revolución industrial: impactos internacionales del actual viraje tecnológico*, Carlos Ominami (ed.), Buenos Aires, Grupo Editor Latinoamericano (GEL)/Programme of Joint Studies on the International Relations of Latin America (RIAL), 1986, p. 48.

5 ECLAC, *Changing Production Patterns...*, op. cit., chapter II.

dissemination. To achieve full development and utilization of new technologies, certain basic learning processes are required, particularly learning by doing, learning by using and learning by interacting.<sup>6</sup>

*d) Technical progress and social acceptance: the "productivity paradox"*

Significantly, despite the increase in resources for research and development, the growth of productivity still lags behind the rate achieved in the 1950s and 1960s. One possible explanation for this is the hypothesis that the nascent technological paradigm requires a degree of social acceptance which, in turn, necessitates major organizational changes at the business, institutional and political levels.

The ways in which available technologies are used, the extent of such use and their potential applications depend on the economic conditions, social values and attitudes of the agents involved. The concept of "growing adoption rates" reflects the fact that technologies are often used not because they are efficient in theory, but because they have become efficient through use. Technical advancement is a question of not only innovation and dissemination, but also social acceptance.

The broadening of access in a given country to higher levels of modernity and efficiency has a positive influence on social acceptance of technologies. The effects of current technological changes will multiply in so far as such access increases.

*e) Basic research, education and public policy*

The emergence of new technologies and important scientific advances are necessarily the fruit of long-term basic research, which only a limited number of

large enterprises are in a position to undertake; thus, to ensure who small- and medium-scale enterprises have access to the results of such research, part of it must continue to be carried out by public institutions.

Both access to sources of basic research and the training of qualified human resources who can be retrained a number of times during their productive lives comprise an element of public or collective welfare; for this reason, developed countries have made the promotion and direct provision of such services a matter of public policy. The experience of those countries also demonstrates that the public sector has an important role to play in regulating or directly providing communications services, on which the globalization of many highly competitive activities is based.

*f) The new organizational and managerial paradigm for enterprises*

Any technological revolution also transforms institutions, work organization modalities and enterprise relations. In practice, it affects almost all aspects of the production system, since it introduces new concepts of efficiency and organization of production in industrial facilities, managerial and enterprise models, personnel qualification profiles, investment models, competitive advantages, etc.<sup>7</sup>

The basic features of the new forms of organization are increased flexibility, reduced costs and improved production quality, achieved through: i) efficient management of production flows and inventories of materials and components (e.g., stocking them according to the "just-in-time" criterion); ii) development of mechanisms to integrate market strategy, research and development, product design, engineering and manufacturing; iii) capacity to combine

<sup>6</sup> Organization for Economic Cooperation and Development (OECD), *Background Report Concluding the Technology/Economy Programme (TEP). Report by the Secretary-General (C/MIN(91)14)*, Paris, May 1991.

<sup>7</sup> See Carlota Pérez, *op. cit.*, p. 55.

innovative activities within enterprises with those of universities, research centres and other enterprises; iv) establishment of networks or joint investments with suppliers or customers; v) enhancement of employee and worker skills through training; and vi) emphasis on quality (application of such concepts as "zero defect" or "total quality control") and increased participation and responsibility of workers in production.<sup>8</sup>

While Japan has spearheaded organizational innovation at the enterprise level, the fact that the techniques used have been disseminated and adapted in various sectors and countries indicates that they are more or less universally applicable.

*g) Horizontal effect of information technologies*

In addition to having undergone radical innovations in their own products and processes, the microelectronics, computer and telecommunications sectors exert a powerful horizontal influence on all durable and non-durable consumer goods, the automotive industry, widely-used intermediate goods such as steel and petrochemicals products, a wide range of capital goods and the more dynamic service industries, including banking, insurance, trade and telecommunications; this influence also promotes the efficient use of natural resources and, in particular, energy conservation.

*h) The shortening technological cycle: increasing flexibility to respond to demand*

The dissemination of information technologies in the design, production, distribution and marketing stages shortens the time required for completion of the cycle, so that new demands, either real or induced, can be met much faster than in the past. This phenomenon, together with the proliferation of

participants in the struggle for competitiveness and accelerated international dissemination of technological knowledge, is promoting alliances among enterprises in different countries and sectors with a view to stimulating a technological synergy and maximizing response capacity in various markets.

*i) Technological disparity and prospects of growing protectionism in the technology market*

Whereas the technological disparity between developed and developing countries tended to diminish in the 1960s and 1970s, the current revolution seems to have widened the gap. Since the early 1980s, the main indicators of international technology flows (foreign direct investment, imports of capital goods, licence payments and official technical assistance) to developing countries have shown an unprecedented decline, except in the case of China and the newly industrializing economies of East Asia. Moreover, the crisis that hit many countries, apart from those mentioned, considerably undermined their domestic efforts.

While there is no consensus on the conditions which will govern the transfer of technology to developing countries in the future, there are indicators which point to a growing technological protectionism. This is particularly true in the case of front-line technologies which relatively advanced developing countries will need in order to continue progressing. In the future, a reduced supply of important technologies could exacerbate the problems faced by those countries in developing and financing new technologies, and thus could endanger export markets won through an incipient genuine competitiveness. Such is currently the case for the newly industrializing economies of East Asia, including the Republic of Korea.

<sup>8</sup> See OECD, *Background Report...*, op. cit.

In a context of greater technological protectionism, the principal means of access to new techniques would be equipment imports and agreements between enterprises on some form, either new or traditional, of direct investment from abroad. Alliances between national and international enterprises will become an increasingly important channel for the transfer of technology.

*j) Automation and erosion of the comparative advantage in cheap labour and natural resources*

The growing importance of design and the automation of production, distribution and marketing are rapidly eroding the supposedly sustained comparative advantage in the availability of cheap labour. Other competitive factors, including quality, rapidity and reliability of delivery, and capacity to widen the range of goods and services needed by consumers in industrialized countries, are taking on greater significance.

The industrialized countries' impressive energy-conservation campaign, which was spurred by price increases since 1973 and has influenced product design, manufacturing processes, transportation systems and domestic usage, is perhaps the most notable component of a broader trend to rationalize the use of natural resources. This trend has been stimulated and encouraged by intensified competition, progressive reduction of the delay between design and production, development of synthetics, introduction of new materials and increasing use of automation to regulate the process of streamlining the use of raw materials. These factors are compounded by a growing concern for environmental sustainability, which exerts an influence in the same direction.

*k) Technical change and environmental sustainability*

Environmental sustainability has become a universal value, nurtured by legitimate concern for the quality of life of the population and by the consequences of recent environmental disasters. On the one hand, the challenge of environmental sustainability has generated additional costs; on the other, it has prompted major technological innovation efforts to neutralize negative effects on the environment and to increase the competitiveness of products in a climate of growing sensitivity to the environmental dimension. In the future, the links between technical advances that are compatible with environmental preservation (in both countries of origin and countries of destination) and international competitiveness will become progressively closer.

## 5. The ECLAC proposal for the 1990s

In 1990, ECLAC submitted for the consideration of Governments, leaders and Latin American public opinion its proposal *Changing Production Patterns with Social Equity*,<sup>9</sup> which puts forth, *inter alia*, the following guidelines for the future development of Latin America:

*a) Indispensable, untransferable and unpostponable internal responsibility*

This consideration translates into the need to promote a new national consensus in each country according to current domestic and external conditions; the design of policies and institutions; and the channeling of internal resources towards the objectives of changing production patterns and social equity. It also entails support for various regional cooperation and integration modalities that can further these goals.

<sup>9</sup> ECLAC, *Changing Production Patterns...*, op. cit.

**b) *Competitiveness and social equity in a context of environmental sustainability***

The proposal stresses the relevance of both objectives and the areas and conditions in which they support each other. Competitiveness that leads to a higher standard of living is based on increased productivity and the absorption and dissemination of technical progress. Its systemic nature calls for a reasonable degree of social cohesion and equity. The latter, in an increasingly homogeneous world of generalized, converging aspirations to enjoy access to modern goods and services, cannot survive unless countries achieve genuine competitiveness.

Since the integration of Latin America into the world market is heavily dependent on the use and development of natural resources with various degrees of processing, environmental sustainability in the countries of the region is not only a factor in the quality of life, but also determines its level.<sup>10</sup>

**c) *Human resources and dissemination of technical progress***

Among the many areas in which action is needed to reach the aforementioned objectives, there is one whose development is a prerequisite for increasing competitiveness and social equity and which, moreover, promotes environmental sustainability: human resources training and dissemination of technical progress.

**d) *Reorientation of the State***

To lead this new phase of Latin American and Caribbean development, a different type of State is needed. It must support the corporate base that emerged in the previous period in fulfilling its responsibilities in the production sphere, and also promote development of the capacities necessary to reach international levels of competitiveness, seek greater social equity (compensatory role of the State) and further environmental sustainability. To these ends, the changes which the State must undergo include modernization, tax reform and the design of new policies and institutions to finance development.

**e) *External support for changing production patterns with social equity***

Notwithstanding the emphasis placed on internal efforts, it is clear that success in changing production patterns with social equity will also depend on the evolution of the international environment, especially in the areas of trade, access to technology and financing. With respect to the latter, external debt remains a formidable obstacle in the path the momentum of development in the region. Despite recent progress, more relief is needed if countries are to speed up the process of changing production patterns with social equity without being forced, once again, to postpone decisions and internal resource mobilization. It should also be borne in mind that progress in solving the external debt problem complements, but does not obviate, internal responsibility and determination.

<sup>10</sup> This topic is explored in ECLAC, *Sustainable Development: Changing Production Patterns, Social Equity and the Environment* (LC/G.1648/Rev.2-P), Santiago, Chile, 1991. United Nations publication, Sales No. E.91.II.G.5.

## **Part Two**

# **THE STARTING POINT**

## **Introduction**

The starting point for designing the strategies and policies proposed below lies in a description and analysis of the economic and educational development process which led up to the present situation and brought an end to a whole series of policies (chapter II). With a view to identifying the specificity of the challenges facing the region in this field, a summary is presented of the debates about education taking place in certain industrialized countries (and in developing countries in other regions) and the lessons that can be drawn from them (chapter III). The view that arises from regional and extraregional experiences is enriched by theoretical inputs from the discussion about education and development, which expanded tremendously throughout the last decade. Contributions are gathered from those who have studied this question from the perspective of economic theory, business management and global and technological prospects (chapter IV). Finally, a number of thoughts synthesizing the trends and perceptions mentioned in the previous chapters are presented.

## Chapter II

# EDUCATION AND HUMAN RESOURCES IN LATIN AMERICA: RECENT TRENDS

The rise in the average educational level of the population was normally one of the variables used in characterizing the evolution of the region between 1950 and 1980 as a rapid process of socio-economic modernization.

Indeed, despite considerable differences from one country to another, during that period the Latin American and Caribbean region experienced sustained growth in both its formal educational system and its technological and scientific research capacity, as well as in its manpower training structures. This expansion is even more remarkable in that it takes place simultaneously with a significant increase (an average of 3% a year) in the school-age population, a radical change in the structure of employment, huge population flows from the countryside into the cities and an increase in women's participation in the workforce.

The following pages summarize the region's achievements and limitations in the different spheres connected with human resources training and the deployment of its technological and scientific capacities. The conclusion drawn is that a series of policies has ended and that the task of changing production patterns with social equity requires

profound changes in educational, training and technological innovation systems.

### 1. The formal educational system

---

#### *a) Sustained expansion of coverage*

The sustained expansion of the educational system of Latin America and the Caribbean in the post-war period was reflected in the marked reduction, generation after generation, of the proportion of the population lacking formal education (see figure II-1). Thus, while a third of those over 45 years of age never went to school, that figure slowly drops to slightly more than 10% for those between 15 and 19 years old. However, educational expansion, although widespread, seems to have exacerbated the heterogeneity of different country situations. Thus, in 1980 the proportion of young people in the region with no schooling varied from a minimum of 0% (Cuba) to a maximum of 44% (Haiti).

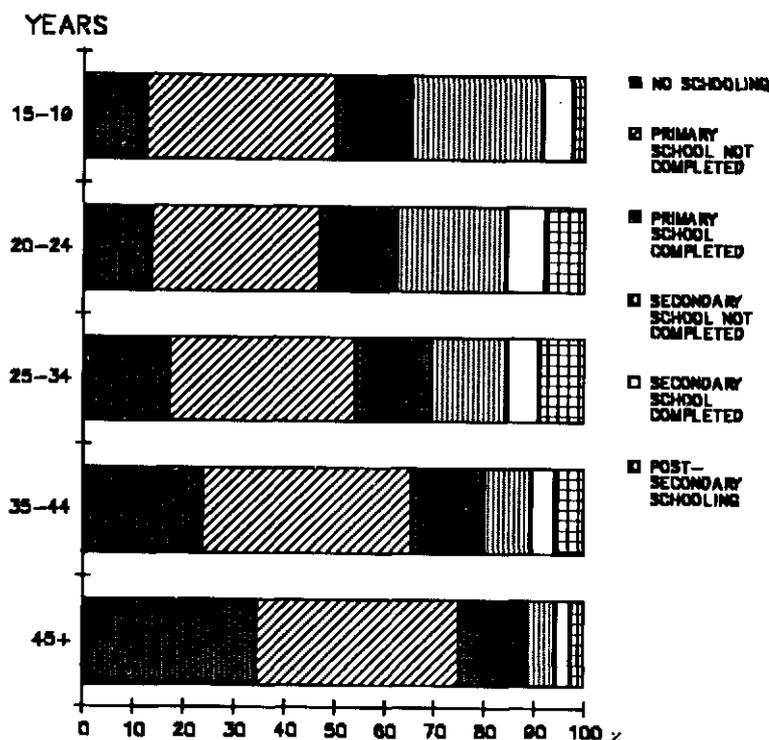
The most spectacular quantitative advances of the period mentioned were at the primary level.<sup>1</sup> Seventy-three million children, 88% of the 6-11 age group, were enrolled in primary education in 1990, compared with 27 million (58% of that age group) in 1960 (see table II-1). That sustained effort to expand the coverage of

---

<sup>1</sup> Primary education is obligatory and free in every country of the region, lasting between four and nine years, with most countries (22) requiring six years.

Figure II-1  
 LATIN AMERICA AND THE CARIBBEAN: DISTRIBUTION OF POPULATION  
 AGED 15 AND OVER, BY YEARS OF SCHOOLING COMPLETED

(Percentages, around 1980)



Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, on the basis of official data.

schooling –enrolment increased by an average of two million children a year– was reflected in a sharp drop in the rate of complete illiteracy, from 34% in 1960 to 16% in 1987. Towards the end of the 1980s, primary education coverage was practically total throughout the region. The net enrolment rate was 90% in 1988 for the 6-11 age group, and almost 94% for ages eight and nine. At present, more than 90% of school-age children are enrolled, and the average pupil remains in school almost seven years.

Once again, these averages mask important differences between countries. Some of them lag considerably behind (see table II-2). Even though most countries offer universal access to primary

education, the respective enrolment rate in Guatemala and Haiti was below 60%, while in Colombia, Dominican Republic, El Salvador and Nicaragua it varied from 60% to 80%. Moreover, it is clear that a detailed study of the numbers would show a serious lack of schooling basically in the rural, marginal urban and indigenous areas of several countries.

Primary education continued to expand even during the recession of the 1980s, despite setbacks in family situations and the reduction of public expenditure for education. In fact, preliminary indicators show that educational development in the region continued to be characterized during the last decade basically by inertial trends,

Table II-1  
**LATIN AMERICA AND THE CARIBBEAN: ESTIMATED ENROLMENT  
 AND ENROLMENT RATES**  
 (Thousands and percentages)

Level	1960	1970	1980	1985	1986	1988	Average annual growth rate				
							1960- 1970	1970- 1980	1980- 1985	1985- 1988	1980- 1988
<b>Pre-school</b>											
Number of pupils	983	1 728	4 739	8 264	8 619	9 491	5.8	10.6	11.8	4.7	9.1
Rate of coverage <sup>a</sup>	2.4	3.3	7.9	12.8	15.0	14.0					
<b>Primary school</b>											
Number of pupils	26 653	43 983	64 795	69 646	71 419	72 741	5.1	4.0	1.5	1.5	1.5
Net enrolment rate for the 6-11 age group <sup>b</sup>	57.7	71.0	82.4	85.2	85.0	87.6 <sup>c</sup>					
Gross enrolment rate <sup>d</sup>	72.7	90.7	104.8	106.4	107.3	109.3 <sup>c</sup>					
<b>Secondary school</b>											
Number of students	4 085	10 662	17 595	21 318	22 054	23 434	10.1	5.1	3.9	3.2	3.6
Net enrolment rate for the 12-17 age group <sup>b</sup>	36.3	49.8	62.6	66.2	...	71.6 <sup>c</sup>					
Gross enrolment rate <sup>d</sup>	14.6	25.5	44.9	50.7	51.6	57.6 <sup>c</sup>					
<b>Higher education</b>											
Number of students	573	1 640	4 872	6 363	6 784	6 978	11.1	11.5	5.5	3.1	4.6
Net enrolment rate of the 18-23 age group <sup>b</sup>	5.7	11.6	23.6	23.8	...	27.2 <sup>c</sup>					
Gross enrolment rate <sup>d</sup>	3.0	6.3	13.5	15.9	16.8	18.7 <sup>c</sup>					

Source: UNESCO Regional Office for Education in Latin America and the Caribbean, on the basis of figures provided by UNESCO and CELADE.

<sup>a</sup> 0-5 age group. <sup>b</sup> Number of students in age group (regardless of grade) divided by population of same age group. <sup>c</sup> 1990. <sup>d</sup> Total enrolment in grade (regardless of age) divided by population of age group corresponding to grade.

which seem not to have been changed by the crisis, and which took the form of a steady widening of educational coverage<sup>2</sup> (see box II-1).

Along with broader coverage of primary education, pre-school classes increased notably, especially from the 1970s onwards. The number of children below five years of age enrolled in establishments at that level rose from one million to almost 10 million between 1960 and 1988, an increase from 2% to 14% of that age group (see table II-1). This remarkable growth (averaging more than 10% a year) took place especially in the higher ages of that group, with more than 25% of three- and four-year-olds and 50%

of five-year-olds receiving some form of pre-school education in 1987. The forms and objectives of pre-school programmes vary greatly. They are provided not only by the school system, but also by other agents such as ministries of health, non-governmental organizations, private entities and even mass communications media. At this level, coverage has evolved in different ways from country to country. Most of the English-speaking countries of the Caribbean make education obligatory for five-year-olds. In other countries, pre-school coverage, far from being universal, tends to be concentrated in urban areas (81% of total enrolment) and in medium- and high-income sectors.

2 ECLAC, *La equidad en el panorama social de América Latina durante los años ochenta* (LC/G.1686), Santiago, Chile, 31 October 1991.

## Box II-1

EXTERNAL FACTORS RESPONSIBLE FOR DEVELOPMENTS IN EDUCATION IN  
LATIN AMERICA IN THE 1980s

The continuous expansion of educational coverage in Latin America in the 1980s in spite of the negative effects of the recession can be attributed to a number of factors. Some of them are static factors in that they are the result of decisions taken in the past and were not greatly changed by the crisis. For example, the increase in average educational levels obviously reflects the expansion of the coverage of the educational system in the 1960s and 1970s. In addition, a number of favourable changes have taken place in the physical conditions of households, such as increased access to drinking water, improved sanitation in dwellings and less crowded living quarters, which, according to a number of studies, has a significant effect on school performance.

Actually, recent developments confirm that children's performance at school depends largely on the educational level of their households (i.e., on the average number of years of education of household members over 15 years old), regardless of the income bracket into which they fall. Moreover, in all the cases studied, children from households in the lowest income bracket but where educational levels are high recorded better performances than their peers from higher-income groups but from households where lower educational levels prevailed. The educational level of households rose during the 1980s in all the geographical areas and socio-economic sectors of the region although great disparity persisted between countries and economic levels. The rise in the average educational level of households has a positive effect on the motivations behind and the objects of family spending, and means that the cultural ambience at home is closer to that which prevails at school and is therefore a key, although not very apparent, factor in the improved school performance of children. The higher educational level of households in the region is the result of past investments in education, which reach fruition in just one generation and are not closely linked to the vicissitudes of the economic situation.

The fact that many Governments have tried to maintain the size of educational coverage, if not the quality of the education offered, and have given priority to education over other services provided by the State, even within a framework of broad reductions in public spending, also has a positive effect. It may be noted that people are becoming more aware of the importance of education and its value as an

instrument of social mobility. The situation with regard to family types evolved less favourably in that the number of households headed by women without a partner and the proportion of consensual unions increased; these two types of household, which occur more frequently at lower-income levels, have been associated, on the one hand, with a drop in school performance and, on the other, with a greater tendency to make use of preschool programmes. As for the drop in household income, it had a markedly negative effect in that children's biological welfare and intelligence and a household's capacity for socialization are largely determined by income. Although it has not been possible to accurately measure the effects of the increase in poverty and extreme poverty in Latin America in the 1980s, it probably lowered the learning capacity of the region's school-age population. In addition, since the fertility rate of low-income households is higher than that of other households, the increase in the relative weight of poverty was proportionally greater in the under-14 age group than in the total population, producing an extreme situation in some countries, including Brazil and Colombia, and in rural areas of Venezuela, where one out of every two children lives in poverty and one out of every four in a situation of extreme poverty. In such circumstances, the correlation between school attendance and household income seems to have become stronger, and in three countries (Brazil, Costa Rica and Uruguay) an increase was recorded in the difference in the attendance of young people of 15 to 19 years old from households in different income brackets.

Other indicators suggest that in the case of young people and adolescents (15 to 24 years old), the positive effects of the static factors mentioned above were weakened, making some of the impacts of the crisis easier to identify. The proof of this is that in some countries the upward trend in school attendance by that age group has reversed and that the percentage of young people who work while attending school is increasing; in several other countries in the region, however, young people sometimes decide, as an alternative to the unemployment and underemployment they face in depressed labour markets, to prolong their training, either as a temporary refuge or as a necessary strategy in view of the high educational requirements for obtaining the kind of employment which provides greater social prestige and higher income.

from 1.6 million in 1970 to almost 7 million in 1988.

The expansion of higher education has varied from country to country. Thus, some countries –with a long history of higher education– reached a ratio of 3,000 students to every 100,000 inhabitants by the mid-1980s, while others barely reached a level of 300.

**b) *Poor quality of the education provided***

Unfortunately, as education expanded, its overall quality declined and the educational system became more inefficient. Several factors were responsible: one was the explosion of social demand for education, which fostered the incorporation of more and more children into formally higher levels, without redefining the educational content or increasing resources to meet expanded enrolment. Moreover, the traditional preference for material investments over qualitative investments and industry's lack of interest in education also contributed at times to an inorganic and poorly implemented educational growth, with the corresponding deterioration in results.

Both in élite schools (which emphasize academic training) and in poorer schools (which tend to provide a vague moralistic message instead of relevant and quality content), ethical and axiomatic dimensions –permanent components of any good educational system– are lacking.

Along with being provided with skills and abilities and being encouraged to assume risks and take decisions in order to facilitate their productive integration into the modern world, students also need to be trained in the social values of a modern citizen, which are the foundations of a democratic system and economic development with social equity. The

failure to transmit values like social responsibility, solidarity, tolerance and participation truncates educational efforts.

i) *Poor quality of basic skills training.* Poor quality education has a more serious impact at the primary level because it drags down results at later educational levels and is a serious obstacle to the economic, political and social development of the region. The poor quality of primary education in Latin America and the Caribbean is reflected in high rates of late entry into the system, repetition of the school year, temporary drop-outs and premature definitive drop-outs. Due to the combined effect of these four factors, half of those in school drop out before finishing their primary education, and a significant proportion of the region's youth are functionally illiterate, in the sense that at the end of their schooling they have minimum ability to read and understand what they read, express themselves in writing and do simple arithmetic.<sup>3</sup>

Within this discouraging panorama, the repeater rate stands out. Latin America has one of the highest rates in the world, concentrated in the early school years. One of every two children repeats the first year, and every year an average of 30% (18 million) of all primary school pupils repeat the school year.<sup>4</sup> It is also estimated that most children enter school between six and seven years of age, that permanent dropping out begins around 13 years of age for the average country (10 in Brazil), and that by age 15, 55% of former students no longer attend school. Repetition of the school year explains how the average primary school pupil spends seven years in the system but only passes four grades (see box II-3).

Unlike coverage problems, found only in a few countries, efficiency problems are widespread. For example, in only five

3 UNESCO Regional Office for Education in Latin America and the Caribbean, *Situación educativa en América Latina y el Caribe, 1980-1987*, Santiago, Chile, 1990.

4 UNESCO estimates. The assumption is that failure levels reported by school principals (an average of 20%) are underestimated in so far as the practice is to register a good part of those repeating grades as new students. This discrepancy also explains how gross enrolment rates are normally higher than 100%.

Table II-3  
**LATIN AMERICA AND THE CARIBBEAN:  
 EFFICIENCY INDICATORS FOR  
 PRIMARY EDUCATION**

(Around 1988)

Repeaters of first year (%)	46.0
Repeaters of sixth year (%)	18.0
Repeaters of first to sixth year (%)	29.0
Number of school years successfully completed	6.8
	42
Percentage of a cohort completing the sixth year	60.4

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean.

countries of the region is the repeater rate below 10%, and in only three more than 80% of each cohort finish primary school.<sup>5</sup>

The factors that explain high repeater rates have been well documented. They combine poor living conditions (low wages, nutritional and sanitation deficiencies, inadequate housing) and deteriorated educational opportunities (rigid and relatively irrelevant curricula, one-room schoolhouses with little educational equipment and materials and an inadequately trained teacher).<sup>6</sup> The situation is such that the education offered reinforces instead of compensating for the deficiencies of the school population.

There are indications that these characteristics worsened during the 1980s, due to the sharp reduction of public expenditure for education.<sup>7</sup> Most affected were teachers' salaries, fostering widespread absenteeism, long strikes, resignations of skillful teachers and a

search for second or third jobs. Pupils therefore spent less time being taught, and the quality of the teaching they did receive declined.

The steady deterioration of teachers' working conditions also seems to have begun to affect would-be teachers. Data from some countries indicate that those preparing to be teachers are students with low academic achievement. Other research shows that most positions open to teachers are the early years of primary schools in rural or marginal urban areas. Paradoxically, teachers working in the most demanding places in the educational system are those who have the least professional experience and who are the most poorly paid, owing basically to their short time in the profession.

These defects are aggravated, moreover, by the centralized and bureaucratic managerial style that normally characterizes educational administration in the region, frequently converting it into an "institutional apparatus" answering to no one but itself and incapable of escaping its own inertia and routines.<sup>8</sup> Enslavement to the already established, submission to inherited procedures, conservation of what exists, compromise solutions between change and educational peace, including the rotation of ministers of education, all conspire to maintain the status quo, allowing the system to continue on without innovating or adapting to the demands of the world around it. Such systems usually shirk responsibility for the results of the schooling they provide, which explains in part their incapacity to face the high repeater and drop-out rates

5 For purposes of comparison, the failure rate in the industrialized countries was only slightly above 2% in 1985. See Marlaine E. Lockheed and Adriaan M. Verspoor, *Improving Primary Education in Developing Countries. A review of Policy Options*, Washington, D.C., World Bank, 1990. See also Luis Ratinoff, *Necesidades de educación básica en América Latina y prioridad política de la reforma de la educación primaria*, Documento de trabajo, No. 8, Washington, D.C., Inter-American Development Bank (IDB), October 1991.

6 UNESCO Regional Office for Education in Latin America and the Caribbean, *Situación educativa...*, op. cit., and *El Proyecto Principal de Educación en América Latina y el Caribe. Avances, limitaciones, obstáculos y desafíos*, Documento de trabajo (PROMEDLAC IV, 90-91/CONF.212/COL.3), Santiago, Chile, 1991.

7 This question is treated in Part Five of this document.

8 Sylvain Lourié, *Education and Development: Strategies and Decisions in Central America*, Paris, Trentham Books/UNESCO, 1989.

and poor learning performances that have characterized the last several decades.

ii) *Obsolete curricula in secondary education.* The relative expansion of access to secondary education substantially changed its function from mainly preparing students for higher education to being a terminal level from which the vast majority of students directly enter the labour market.

That change, however, was not accompanied by a correlative modification of the content and structures of secondary education. Some countries opted to reduce the length of secondary education in order to increase the length of primary education, thus prolonging the period of comprehensive education and postponing differentiated education. Most of those countries, however, have maintained the traditional horizontal structure, diversified into three sectors: general or academic, which prepares students for higher education; normal, to prepare teachers, and technical and vocational, which trains for industry, commerce and services as well as agriculture.<sup>9</sup> This structure has gradually drifted away from developments taking place in the economy and society. Consequently, curricula in all forms of secondary education have little by little become obsolete, providing learning that is more and more removed from what is needed to function in a modern society.

The sector most affected by this deterioration has been technical training, which has become increasingly irrelevant in the face of ever more numerous and diversified requirements for the occupations the students are preparing for. The fragmentary studies available

coincide in pointing out the inefficiency and high cost per student in this education. Criticisms include its lack of communication with enterprises, rigidity in responding to their needs, resistance to change rising from the inertia of existing programmes and equipment and inadequate teacher training. Therefore, these establishments face growing difficulties in combining studies with in-service training and work experience, key elements for facilitating the eventual insertion of graduates into the labour market. In fact, training frequently has little relation to the way work is actually done. Employers prefer to hire workers with a good general educational background rather than vocational school graduates.<sup>10</sup>

Aversion to technical education, therefore, has grown; its relative weight in secondary enrolment has been declining over the last two decades, in addition to having high drop-out rates. Often those who enter technical training do so in hopes of later entering higher education, helped by income they may earn by working at a technical occupation. It has also been observed that secondary-level agricultural schools, established to train young middle-level technicians as intermediaries between university-trained professionals and farmers, have become, at least in one country, an escape route towards non-agricultural, formal, stable and preferably government jobs; the curriculum reform introduced in 1985, which put greater emphasis on self-employment, led to a reduction in enrolment.<sup>11</sup>

Even so, academic or general secondary education has attracted more

9 Within this general framework, the structures of secondary education in Latin America vary greatly, lasting from three to seven years, and often divided into two different levels.

10 Ricardo Nassif, Germán Rama and Juan Carlos Tedesco, *El sistema educativo en América Latina*, Project on development and education in Latin America and the Caribbean, sponsored by UNESCO, the ECLAC office in Buenos Aires and UNDP, Buenos Aires, Kapelusz, 1984; Christopher Dougherty, *The Cost-Effectiveness of National Training Systems in Developing Countries*, Policy, Planning and Research Working Papers series, No. 171, Washington, D.C., World Bank, 1989; Wadi D. Haddad and others, *Education and Development: Evidence for New Priorities*, World Bank Discussion Papers series, No. 95, Washington D.C., World Bank, 1990.

11 Eduardo Weiss, "La formación escolar del técnico agropecuario en México, 1970-1990", *Comercio exterior*, vol. 41, No. 1, January 1991, pp. 68-78.

and more young people, at the expense of the other two sectors. Despite the increase in students, most of whom later enter directly into the labour market, the content of this education has continued to follow an encyclopaedic conception proper to classical humanism and totally unrelated to the working world. Moreover, even in elite strata, students tend to be more critical of secondary education, realizing that their teachers do not fully understand the more dynamic aspects of contemporary culture (to which students have access through ever-expanding communications media). These students frequently assume an evasive and indifferent posture *vis-à-vis* school.<sup>12</sup> Indeed, it is in this segment that the lack of stimuli for fostering rational, critical thinking and the closed-mindedness of education systems to modern societies and contemporary modes of expression are perhaps most clearly displayed.

iii) *Questionable quality of higher education.* Unlike what happened at the other educational levels, the quantitative expansion of higher education during the 1980s was accompanied by significant structural changes. The growing number of graduates from academic secondary schools produced a steady increase in demand for post-secondary education, which led to ever more differentiation in academic institutions to service different groups of the population. To the extent that traditional universities no longer could meet the increase and diversification of demand, there was a proliferation of non-university institutions of higher learning offering professional training in non-traditional specializations and short technical programmes. Post-secondary institutes of technical training have sprung up in greater number in certain countries, like Colombia and Chile, where they represent close to half of the total enrolment in higher education. This segment is usually comprised of private institutes or centres

that came into existence under laws or policies that liberalized the post-secondary education market. In general, these establishments, with few exceptions, have no relations with industry or fruitful links with universities, especially those of the public sector. Most of the enrolment is concentrated in service and commerce-related studies. Although they are technical training institutes in name, they suffer from the same lacunae and limitations as technical training at the secondary level. With very few exceptions, the preparation they provide only adds to that part of the training market which is far removed from the needs of enterprises –the part that seeks almost exclusively to supply services. These institutes absorb social demand for education rather than respond to the needs of the economy and the labour market.

On the other hand, even though many private universities have been created, their participation in total university enrolment has not grown as fast. Rather, the number of private establishments and specializations has increased, but enrolment has remained concentrated mainly in public universities, which have also increased in number.

During this same period, however, some of the universities of the region became more international. This phenomenon began in the 1950s, when scientific research was strengthened, and then when universities adopted a departmental structure and professors became full-time academic professionals. This trend received early support from abroad from the Alliance for Progress and similar initiatives, and continued to expand in later decades, despite growing constraints on international cooperation. The practical results of this internationalization were, among others, a greater incorporation of the sciences into the better established universities of each country or universities created especially for science; development of an academic

<sup>12</sup> Josefa Ruiz-Tagle, "Opciones y percepciones de alumnos de la educación media", Santiago, Chile, 1990, manuscript.

profession, whose leaders participate today more or less dynamically, according to the discipline and fields of specialization, in international scientific dialogue; new researchers trained outside the region; adoption of research agendas that are frequently widespread both inside and outside the region and shared with university research centres in the developed countries; and for regional researchers, the practically obligatory period of study and/or work at a foreign university.<sup>13</sup> At the same time, new forms of institutionalization of academic research have appeared, such as independent academic centres for the social sciences (see box II-2).

In the context of relative popular expansion of post-secondary education on the one hand, and of diversification and fragmentation of curriculum offerings on the other, the quality of higher education in the region is more and more being questioned.<sup>14</sup> Several recent studies hold that higher education degrees are losing prestige and economic value; rapid expansion of faculty is acting against professionalization; the decline in professors' salaries has removed professors and researchers from the ranks of full-time faculty, adding to the exodus of scientists from the university, the country and the region; bureaucratization of university governance systems, together with the rigidity of State institutions, prevents organizations from adapting to new challenges; politicization of university campuses at times and political and administrative intervention at others demoralize professors or push them towards confrontational forms of association or unionization, altering the

inner life of institutions; and the lack of rigorous mechanisms for selecting and promoting professors throughout their professional careers in accord with their proven merits and productivity leads to stagnation in universities and the loss of intellectual competitiveness.

Quality is more or less deficient from one country to another, from one institution to another and even within the same institution. Nevertheless, the situation is such that the quality and seriousness of post-secondary diplomas can no longer be fully verified. That lowers the prestige of national educational systems in the eyes of public opinion and government authorities, as well as employers and other users of their services, since all lack adequate information on the institutions' performance and the relative value of their diplomas.

This situation is growing worse owing to the non-existence of public mechanisms for accreditation or institutional evaluation in almost every country of the region. Except for some postgraduate or research programmes in a few countries, there are really no permanent mechanisms at the national or local level for evaluating universities and their different sectors and programmes, which therefore lack incentives to evaluate their own activities and productivity (see box II-3).

The poor quality of education in Latin America and the Caribbean is also seen in figure II-1. The two most numerous subgroups within the 15-19 age group (the region's future labour force) are those who failed to complete an educational level, be it primary (38%) or secondary (26%).

13 E. Fuenzalida, "Internacionalización de la educación superior en América Latina", Santiago, Chile, ECLAC/UNESCO, July 1991, manuscript.

14 Juan Carlos Tedesco, *Tendencias y perspectivas en el desarrollo de la educación superior en la América Latina y el Caribe* (ed.83/ws/75), Paris, UNESCO, 1983; Instituto Colombiano para el Fomento de la Educación Superior (ICFES), *Calidad, eficiencia y equidad en la educación superior colombiana*, Bogotá, ICFES, 1990, vols. I and II; José Joaquín Brunner, *Educación superior en América Latina: cambios y desafíos*, Santiago, Chile, Fondo de Cultura Económica, 1990; Simón Schwartzman, "La calidad de la educación superior en América Latina", paper presented at the Seminar on the Efficiency and Quality of Higher Education in Latin America, Brasilia, 1988, manuscript; and Simón Schwartzman, "Brazil: Opportunity and crisis in higher education?", *Higher Education*, No. 17, 1988.

## Box II-2

## INDEPENDENT ACADEMIC RESEARCH CENTRES

These entities, also known as private research centres, emerged and developed over the past three decades in various countries of the region, including Argentina, Brazil, Chile, Colombia, Ecuador, Peru and Uruguay. They also exist in other countries, but in fewer numbers and with less influence.

Most of the centres focus on the social sciences. Many of them, especially in the countries of the region's Southern Cone, were founded in response to the practice of discouraging the study of these disciplines in universities during the period of military governments.

Nevertheless, the phenomenon of academic centres cannot be reduced to this purely reactive origin. A study carried out in four countries (Argentina, Brazil, Chile and Uruguay) shows that the emergence and development of such centres is part of a broader, more substantive process connected with the institutional ecology of scientific research.

As in other parts of the world, a process of differentiation in the organization of scientific and technological research is taking place in the region, with the result that such activities are being localized in various institutional niches. Thus, research is no longer confined exclusively to universities, but has moved beyond their walls as researchers seek out favourable conditions in which to establish themselves and pursue their work.

The following features characterize these independent academic centres:

\*Most of them are devoted exclusively to research and do not offer systematic higher education, though almost all of them carry out extension and dissemination activities, and some have initiated training programmes. In contrast, other entities, normally grouped under the generic name of non-governmental organizations, are more broadly defined as

social support centres, and work closely with grass-roots community organizations and social movements of low-income women and youth.

\*In each country, the nucleus of independent academic centres having the highest prestige or visibility comprises groups of distinguished academics who normally work within regional and international communication networks and who may have national influence in the Government, the Parliament or the local political system. In some countries, members of these centres may also be university teachers or researchers, or may carry out both activities and divide their time between the two types of institutions.

\*The financing of these centres varies by country, but consists mainly of resources from abroad obtained through cooperation programmes and grants for specific research projects. In some cases, the centres receive domestic support from scientific and technological development funds, public agencies, or both. In general, the centres have difficulty covering their institutional operating costs.

\*In a number of cases, the internationalization experienced by independent academic centres and their financing through resources from abroad granted according to project evaluations by their foreign counterparts have led to the application of international standards to measure their productivity and quality, which has created hubs of excellence and strengthened academic ties with colleagues and institutions in countries of the North.

According to a recent survey by the Latin American Social Sciences Council (CLACSO), more than half of its current members are independent academic centres, thus outnumbering the university centres that are members of the Council.

### c) Education and social mobility

In almost all countries and regions, education has been a means for social mobility. However, if education is to bring about a permanent change in the social structure, there must be a corresponding change in the structure of production. In Latin America and the Caribbean, the expansion of education in the post-war period gave impetus to a form of social mobility based mostly on the expansion of

public employment and expenditure, the fragility of which became patent during the 1980s when that foundation weakened.

i) *Expansion of education and economic development.* Generally speaking, education expanded more because of a political will to meet a widespread desire in all sectors of society than to meet a clear economic demand. Consequently, it has moved ever further away from the needs of the productive sector.

## Box II-3

## ESTABLISHMENT OF PRIVATE UNIVERSITIES: THE CASES OF SPAIN AND CHILE

In view of the proliferation of private universities in Latin America and the Caribbean, it may be of interest to compare different regulations for incorporating the new private institutions into the system of higher education. Two different options are described below. Spain has chosen stringent regulations; Chile, on the other hand, has chosen liberal regulations.

*Spain: stringent regulations*

Curriculum requirements for higher education are considered in the establishment or recognition of universities.

A new university must have the educational structure needed to provide, at a minimum, instruction leading to eight degrees, at least three of which must be in the second cycle, with one in experimental sciences or technical studies.

Before beginning its operations, it must elaborate a prospectus defining the areas of its research activities.

The total number of teachers in each university cannot be less than that required to maintain a ratio of 1/25 with respect to the number of students.

In the first cycle, 30% of the teachers must hold doctoral degrees; in the second cycle, 70%; in the third cycle, 100%.

In no case may the number of teachers holding doctorates be less than 50% of the total teaching staff.

Sixty per cent of the teachers must be employed full time (or the equivalent thereof).

Teachers in private universities may not belong to the active teaching staff of any public university.

Full and effective compliance with the principle of academic freedom must be guaranteed.

A formal commitment must be made to keep the university and each of its divisions in operation for a minimum period of time, to allow students who began their studies in the university to complete them there.

Public authorities shall periodically inspect compliance by private universities with the standards that apply to them.

The inauguration of a new university is authorized by the competent education administration after it has ascertained that all commitments have been fulfilled and that the Government has accredited the official degrees to be conferred.

A report on the teaching and research activities carried out in the context of the university's multi-year programme must be submitted annually to the competent education administration and to the Board of Universities.

*Chile: liberal system*

Curriculum requirements for higher education are not considered.

A new university must have the educational structure needed to provide instruction leading to a professional career, chosen from among 12 prescribed by law.

It may begin operations and continue to function without undertaking research activities of any kind.

There is no minimum.

There is no minimum.

There is no minimum.

There is no requirement in this regard.

There is no requirement to employ full-time personnel.

There is no incompatibility.

The plans and programmes of new universities are subject to approval, and their students and graduates must be examined by a traditional university for a number of years.

New universities begin to function automatically, once the approval formalities for their plans and programmes are completed by an examining university.

They have no reporting obligations. The 1990 amendments to the law on universities established reporting obligations only for universities that opt for the public accreditation system.

There is no requirement in this regard.

Historically, education received its first impetus when nation-States were constituted. During the first half of this century, education came to be seen as a right for all. In Latin America and the Caribbean, that view was supported by the liberal enlightenment tradition of the past century, which considered education as an efficient instrument for national integration and the training of citizens. This ideological school – more ethical than political, more liberal than technocratic – later combined with different modernizing justifications which postulated “the more education, the more development”. The result of this fusion was a powerful argument in favour of education, which gave the Latin American States sufficient reason for investing in the expansion of education and legitimized the demands of medium- and low-income social groups for more education.

Economic development patterns, in turn, were based on factors which failed to consider either the absorption of technical progress into production or the equitable distribution of the benefits of growth. Education played a small part in determining levels of economic growth. For that reason, Latin America frequently suffers from imbalances between a weak educational system and strong economic growth, or conversely, between an oversupply of graduates and weak economic growth. In countries like Ecuador and Panama, for example, the decline in the relative value of diplomas in the labour market did not prevent a large proportion of young people, those better educated, from being more productive and receiving better wages than those entering the same occupations 20 years ago. In the Southern Cone, on the contrary, education was expanding, at different times and in different countries, while the

economy was hardly growing, which led education to practically ignore market signals and trends in employment structures.<sup>15</sup> Brazil presents the opposite case, where more importance seems to have been given to directly productive investments. Even though education expanded greatly, starting from rather low levels at both ends of the educational scale, its growth was still insufficient to absorb ever-larger numbers of youth. For that reason, in the years before the crisis, an increase in employment opportunities in the modern sectors of the country led to the massive incorporation of youth, in spite of the fact that many of them had little education.<sup>16</sup>

ii) *The relative demise of education as a channel for social mobility.* For three decades, between 1950 and 1980, despite its failure to take into account the needs of economic development, the educational system was the main channel for social mobility for individuals and groups. According to a number of studies, the growth of the region's educational systems made it possible to expand the so-called middle classes by incorporating strata emerging from low-income levels, who received some professional training and became white-collar workers, sales representatives and mid-level managers in industry, commerce and services.<sup>17</sup>

With the economy lacking sufficient dynamism and social equity to self-generate opportunities for upward social mobility, education became the main source of such opportunities. Indeed, the substantial increase in access to public education and relatively more productive occupations, with higher wages and greater social prestige, gave impetus to an intergenerational process of upward social mobility, since it gave more young people access to an expanding

15 Carlos Filgueira, *Expansión educacional y estratificación social en América Latina (1960-1970)*, Buenos Aires, Project on development and education in Latin America and the Caribbean, sponsored by UNESCO, the ECLAC office in Buenos Aires and UNDP, 1984.

16 ECLAC, *Transformación ocupacional y crisis social en América Latina (LC/G.1558-P)*, Santiago, Chile, December 1989. United Nations publication, Sales No. S.90.II.G.3.

17 Carlos Filgueira and Carlo Geneletti, *Estratificación y movilidad ocupacional en América Latina (E/CEPAL/G.1122)*, Cuadernos de la CEPAL series, No. 39, Santiago, Chile, ECLAC, October 1981, especially pp. 104-129.

public education and then to more prestigious and better-paying occupations than those available to previous generations.<sup>18</sup>

Even though the information available for analysing changes in the relation between education, employment and income during the 1980s –marked by a contraction of income and formal employment– is still partial and preliminary, it does provide some new elements. First, it shows that the level of education continued to be a determining factor in how persons fit into production and wage levels. This is reflected in the fact that the largest declines in income were recorded among youth with little formal education, who are relegated to less prestigious and low-paying occupations, or, as in the case of young women, even excluded from the labour market.<sup>19</sup> Higher educational achievement, to the contrary, opened up a variety of opportunities for entering the working world within a broader and better wage bracket.

However, several situations have arisen in which education seems to have lost its effectiveness as a determining factor in relative income and potential source of occupational mobility. First, slower growth of formal employment has led to a significant increase in the education requirements for many occupations, including those paying low wages. Thus, even though education is still necessary for finding a job, it no longer always meets expectations of social progress or relative income. Second, income differentials favouring high education levels (10 years or more) seem to have diminished. Also, the creation of new kinds of jobs and the growing heterogeneity in the structure of production makes it difficult to establish as direct a relation as before between

occupations and relative income levels. It all seems to indicate that the crisis weakened education's traditional capacity to maintain or improve absolute and relative economic positions.

Moreover, young people began to receive different treatment than adults. Thus, while income differentials among adults of varying education levels continue to diminish, they increased among youth, whose incomes uniformly decreased in relation to the national average. It is interesting to observe that this happened despite their higher educational level. This difference of treatment according to age is a product of several factors outside the educational sphere, such as closer links to worker organizations and greater participation of young women (with lower incomes). It also reflects the higher value employers placed on experience over theoretical knowledge.<sup>20</sup>

Education's loss of effectiveness as a means for occupational mobility does not mean that the population has lost its expectations about education. It is, however probable that the confrontation between these unchanged expectations –validated by the experience of several generations– and situations of downward mobility or difficult entry into the labour market will generate growing frustrations, especially among young people.

#### *d) An inequitable style of expansion*

The expansion of education was shaped by a variety of complex pressures and desires that gradually conditioned the patterns of response and defined how it would develop. This fact led to the establishment of an inequitable model for the distribution of its benefits. The gradual

18 ECLAC, *Transformación ocupacional...*, op. cit.

19 During the 1980s, unemployment rates among young women with very low educational levels (three years or less) rose in many countries of the region, which is a reflection of increasing demand for education, even for jobs like maids or farm workers. See ECLAC, *La juventud latinoamericana en los años ochenta: igualdad de oportunidades en educación y empleo* (LC/R.960), Santiago, Chile, 13 May 1991 and *La equidad en el...*, op. cit.

20 ECLAC, *La juventud latinoamericana...*, op. cit.

incorporation over the last few decades of groups that previously had no access to education was not enough to compensate for growing segmentation with respect to the quality of education offered.

i) *Social segmentation among schools.* As already mentioned, the higher levels of the educational system tend to grow faster than the lower levels. Medium- and high-income groups –the ones who benefit from the expansion of university, post-secondary and secondary education– predictably displayed a greater capacity to convince the State to expand the levels that interested them. Expenditures for primary education, on the other hand, are generally markedly progressive in social terms, since the proportion of primary-education services allocated to lower-income sectors is usually higher than the percentage of the total population these sectors represent. This is due, first, to the fact that poorer families normally have more children than the average family. Moreover, children from the top 20% income bracket more frequently attend private primary and secondary schools. Both phenomena contribute to the fact that better-off families in many countries of the region receive a lower proportion of benefits than their share of the population, even if the enrolment rate of those groups is 100%. Thus, public

expenditure for primary education mainly benefits low-income strata, although middle-income strata receive a proportion of those expenditures more or less equal to their share of the population. In this regard, of all the countries in the region for which data is available, the only exception is Brazil, where the middle classes receive a large percentage of primary school expenditures and the lower classes a much smaller proportion (see table II-4). At the higher education level, on the contrary, distribution is markedly regressive, reflecting the fact that only a small percentage of poor youth have the necessary educational background, and fewer still can afford the direct and opportunity costs of this education. The richest 20% of the population, therefore, receives between a third and half of the benefits of public higher education, while the middle classes once again receive a proportion more or less equal to their demographic weight.

These figures, however, do not reflect the qualitative differences in educational expenditures. As mentioned above, in order to absorb expansionary pressures and adapt to the diversification of demand, the education system diversified horizontally by creating new establishments and institutional sectors, and vertically by opening up new

Table II-4  
INCIDENCE OF PUBLIC EXPENDITURE FOR EDUCATION BY  
EDUCATIONAL AND INCOME LEVEL IN SOME COUNTRIES  
OF LATIN AMERICA AND THE CARIBBEAN

(Percentages)

	Primary education			Higher education		
	40% Poorest	40% Middle	20% Richest	40% Poorest	40% Middle	20% Richest
Argentina	57	32	11	17	45	38
Brazil	15	80	5	...	...	48
Chile	59	32	9	17	31	52
Costa Rica	57	35	8	15	42	43
Dominican Republic	59	37	4	32	35	33
Venezuela	45	39	16	23	43	34

Source: Joint ECLAC/UNIDO Industry and Technology Division, based on figures from the World Bank, *Social Spending in Latin America: The Story of the 80s*, Report No. 8450, Washington, D.C., 18 December 1990.

educational levels (pre-school, secondary and higher technical, postgraduate, etc.).

Because of the fact that in Latin America education expanded so rapidly and with public resources insufficient to cover even the expansion process, diversification in the education system tended to manifest itself in a social segmentation among schools. Also, the fragile nature of the social mobility produced by the expansion of education led to educational circuits of varying quality depending on the social stratum.

"The State's weak capacity for implementation, together with the chronic scarcity of material and human resources, makes the expansion of education among low-income sectors more or less symbolic, while high-income groups favour the creation of a higher quality academic track, which they normally enter through private and selective pre- or primary schools."<sup>21</sup>

While expanding education, the State was unable to give priority to goals of quality and social equity, which negatively affected schools for low-income children and youth. That was the origin of the unequal and heterogeneous evolution of different educational levels, the result of which has been an effective "social division of educational labour" between public and private sector schools. This gives rise to segmented educational tracks offering service of unequal quality to social groups according to their educational capital and their income level.

Indeed, school performance tends to reflect diverse income levels more than policy differences between or within countries. The factors that affect poor performance and repeater and drop-out

rates are generally concentrated in marginal urban and rural sectors. According to achievement results measured by schools in Chile, for example, students in schools located in poor neighbourhoods have a performance equivalent to a third of that of students from higher-income groups. In Uruguay, tests show that higher-income students perform four times better than those from lower-income groups.<sup>22</sup> According to a study done in six countries of the region, the level of scholastic backwardness is closely linked to the level of household income and affects between a quarter and half of children from the bottom 20% income group, depending on their country and neighbourhood.<sup>23</sup> Moreover, there are indications that inequalities between the educational achievements of different socio-economic strata tended to increase during the 1980s. An increasing correlation has also been observed between the capacity to take advantage of educational opportunity and income level.<sup>24</sup>

ii) *Growing rural/urban imbalance.* The sector most negatively affected by the fact that access to free or subsidized public education has not been socially equitable, nor the distribution of its benefits just, has been the rural population in Latin America and the Caribbean. Generally speaking, their access and the benefits they have received have been proportionately much less than their weight in the total population. White collar and professional sectors, on the contrary, appropriate a proportion of those services far above their percentage of the population. A recent study shows that the children of white collar and professional workers receive on the

21 Germán Rama, *Educación, participación y estilos de desarrollo en América Latina*, Buenos Aires, Kapelusz, 1984, p. 106.

22 ECLAC office in Montevideo, *¿Qué aprenden y quiénes aprenden en las escuelas de Uruguay?: los contextos sociales e institucionales de éxitos y fracasos*, Montevideo, 1990.

23 ECLAC, *La equidad en el panorama...*, op. cit.

24 ECLAC, *La juventud latinoamericana...*, op. cit.

average five times more educational benefits than the rural population.<sup>25</sup>

During the 1980s in Latin America and the Caribbean, geographical differences seem to have become even more decisive than social differences. Thus, for example, in Brazil and Venezuela the school attendance rates of children from the poorest 20% of the population in urban centres were similar to or even higher than those of children from the second richest 20% of the population in rural zones. In both countries, access to pre-school education was twice as great in cities and the absentee rate in primary school three times less, in comparison with rural sectors.<sup>26</sup> It is worth mentioning that this comparison does not take into account the differences in the quality of education in both places, which even further exacerbate inequalities in the geographic distribution of education (see table II-5).

In fact, problems of quality in primary education are worse in the rural context, where higher rates are recorded for repeaters (in some cases reaching 60% in the first year of school) and drop-outs, especially temporary drop-outs. Such difficulties reflect a certain lack of adaptation on the part of education to rural conditions, as well as a rural demand that attributes limited usefulness to education beyond the strictly elementary level.

However, the content of education is even more problematic, as clearly shown by the information available.<sup>27</sup> Suffice it to mention only the most adverse factors: the obligatory primary curriculum is designed in cities and is totally unadapted to rural children, especially those of indigenous origin with little or no knowledge of Spanish; incompatibility

Table II-5  
LATIN AMERICA AND THE CARIBBEAN: DISTRIBUTION OF THE POPULATION AGE  
15 AND OVER BY YEARS OF STUDY COMPLETED AND AREA OF RESIDENCE  
(Percentages, around 1987)

	Urban population			Rural population		
	0-3	4-6	7 or more	0-3	4-6	7 or more
<b>Total population</b>						
Brazil	31	30	39	66	26	8
Costa Rica	13	28	59	28	48	24
Guatemala	43	15	42	83	13	4
Panama	11	27	62	33	41	26
<b>15-19 age group</b>						
Brazil	19	39	42	52	37	11
Costa Rica	5	24	71	10	59	31
Guatemala	25	29	46	66	26	8
Panama	3	20	77	9	44	47

Source: Joint ECLAC/UNIDO Industry and Technology Division, on the basis of ECLAC figures, and ECLAC, Latin American youth in the 1980s: equality of opportunity in education and employment (LC/R.960), Santiago, Chile, 1990, statistical annex.

25 A. Mingat and Jee-Peng Tan, "Who profits from the public funding of education: A comparison of world regions", *Comparative Education Review*, vol. 30, No. 2, May 1986, pp. 260-270.

26 ECLAC, *La equidad en el panorama...*, op. cit.

27 ECLAC, *Educación y transformación productiva con equidad en la agricultura. Problemas y propuestas* (LC/R.1084), Santiago, Chile, 11 November 1991; UNESCO, Regional Office for Education in Latin America and the Caribbean, *Situación educativa...*, op. cit.; and E. Lockheed and A. Verspoor, *Improving Primary Education...*, op. cit.

between school holidays and periods of heavy demand for labour in the countryside, which contributes to temporary drop-outs and poor educational results; poorly prepared teachers, particularly notable in rural areas, with the proportion of non-certified teachers running normally between 33% and 50% above the national average; the number of schools where several years are taught together has increased, with no preparation of the teachers for that kind of education; improvements in transport have tended to exacerbate the teachers' lack of integration with the rural community, since they frequently no longer reside nor even spend the night in the town or settlement where the school is located, which renders them even less committed to specific local problems.

The search for solutions has more often looked to quantitative expansion (opening new schools, hiring more teachers, increasing resources for school cafeterias or distributing clothes to the student body) than to elaborating and carrying out special programmes. When such programmes have been carried out, the results have seldom been systematically evaluated and disseminated.

In sum, the expansion of education in rural zones calls for further study. On the one hand, the percentage of the population with some formal education has risen considerably and illiteracy has been reduced, which has led to a significant cultural transformation of the rural world. However, among rural youths between 15 and 19 years of age there are still high percentages (even above 50% in Brazil and Guatemala, for example) who have 0-3 years of primary education and who therefore must be considered functionally if not completely illiterate (see table II-5). In all the countries for which information is available, 50% or

more of rural youth barely have six years of primary schooling or less, which is considered the minimum for handling numbers well enough to be able to efficiently use the new technologies<sup>28</sup> (see box II-4).

Moreover, the differences in the access of rural and urban youth to post-primary education seem to have increased in most countries, while narrowing only in a few (see table II-5). In order to attend secondary school, rural youth normally have to go to a medium-sized urban centre. That means travelling daily, often great distances, or finding temporary shelter in the city. Both alternatives cost more than most of the rural population can afford.<sup>29</sup> Also, many rural youth who do succeed in attending secondary school do not return to the countryside or their home village. This produces a kind of domestic brain drain, which is further encouraged by teaching subjects poorly adapted to the rural environment and by the lack of employment opportunities in that sector. None the less, even though the more educated tend to emigrate, they are less inclined to do so to the extent that their home area modernizes.<sup>30</sup>

iii) *Women's access to education.* Women have made notable progress in gaining access to education, although the effect in terms of employment opportunities and income levels has been less than expected (see table II-6). At present, more than half of the women age 15-19 have completed primary school or more, double the proportion for women 45 years old and above at the same educational level (51% and 24% respectively). That has compensated for their previous relative lag behind men, of whom less than half reach a similar educational level (49% in the 15-19 age group).<sup>31</sup> Women's access to post-secondary education has also increased over the last few decades, to the

28 ECLAC, *Educación y transformación productiva...*, op. cit., y *la juventud latinoamericana...*, op. cit.

29 ECLAC, *Educación y transformación productiva...*, op. cit.

30 Daniel Cotlear, "The effects of education on farm productivity", *Journal of Development Planning*, No. 19 (ST/ESA/209), New York, 1989. United Nations publication, Sales No. E.89.II.A.2.

31 Also, repetition rates for women show no net differences with respect to the total population.

## Box 11-4

## EDUCATION AND AGRICULTURAL PRODUCTIVITY

Education is considered a promising means of increasing agricultural productivity, since it helps producers to obtain and evaluate information on technical improvements and new economic opportunities, and reduces the cost of learning to use them properly. Three potential effects of education on agricultural productivity have been identified: the "worker effect", which improves the quality of work and allows the producer to produce more with the same amount of inputs; the "distribution effect", which improves the producer's capacity to process information and distribute resources among competing uses; and the "selection of inputs effect", which improves the selection of inputs in the short term and the scale of operation in the long term.

Studies in this area have attempted to measure the impact of education on agricultural productivity. They generally agree on the existence of a positive and statistically significant effect, estimated at more than 7% for producers who have completed four years of basic education. However, as significant irregularities are also noted, two important observations should be borne in mind.

The first is the perception that increased productivity only occurs in a climate of technological change. In fact, some studies have shown that in the context of traditional agriculture, formal education can even have a slightly negative effect. This observation is also supported by the argument of Theodore Schultz, father of the concept of human capital, that the economic value of education lies in its capacity to develop the individual's aptitude to handle situations of imbalance characterized by a great deal of new information and processes. Technological modernization processes are a clear example of this type of situation.

Although this argument has been used to conclude that education has little economic value for most Latin American farmers, recent studies have revealed the vast diversity of small-scale agriculture in the region and the irrelevance of the cliché of a uniformly poor farm population using traditional technology with low levels of productivity. Today, there are almost no regions from which technological innovations are completely absent. From this

standpoint, education can effectively benefit the entire rural population in so far as it prepares the latter to cope with increasingly frequent and rapid changes.

The other observation, verified by a number of studies, is that new technologies are adopted more readily by those who have had more schooling. This finding has served as a basis for the hypothesis that there is a threshold beyond which the effect of formal education becomes more evident and clear increases are noted in the capacity to absorb new technologies, to adapt them to specific conditions and to use inputs in a generally efficient manner. According to one recent study, productivity can increase by almost 2% per additional school year beyond this threshold.

One possible explanation is that modern agricultural inputs require considerable skill on the part of the producer in handling reading, writing and figuring. The testing, adaptation and application of new technologies call for a mastery of the four basic arithmetical operations, plus the calculation of percentages and the rule of three. For example, the proper use of fertilizers, pesticides and seeds requires the ability to cut down the recommended amounts proportionally, since they are usually designed for an area of one hectare, and the ability to work from one unit of measurement to another (grams per litre, litres per hectare, etc.), all of which demands fluency in calculating ratios, proportions and percentages. These skills only begin to be mastered in the fourth year of primary school and should be ingrained after the sixth year. Under this hypothesis, the three or four years of basic education that are generally considered sufficient to impart literacy are clearly inadequate; the threshold should be closer to the sixth year of primary school, with variations depending on the curriculum and the complexity of the new technologies to be assimilated, as well as the quality of primary education. In other words, while universal literacy in zones of traditional agriculture can act as a catalyst, hastening their entry into the first stages of technological change, further progress in this direction calls for higher levels of education.

Table II-6  
**LATIN AMERICA AND THE CARIBBEAN: DISTRIBUTION OF THE POPULATION AGE 15  
 AND OVER BY EDUCATIONAL LEVEL ATTAINED, AGE GROUP AND GENDER**

(Percentages; around 1980)

	15-19 years		20-24 years		45 and over		Total	
	Men	Women	Men	Women	Men	Women	Men	Women
No schooling	12.8	11.8	13.0	13.8	31.1	37.5	19.8	23.1
Primary completed	49.2	50.6	53.1	52.7	26.1	23.8	41.0	39.2
Secondary completed or not	32.4	32.5	29.6	29.9	8.8	8.9	20.2	20.2
Post-secondary	2.3	2.6	8.5	7.5	4.0	1.8	6.5	4.6

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, on the basis of E. Schiefelbein and S. Peruzzi, "Education opportunities for women. The case of Latin America and the Caribbean", *Bulletin The Major Project of Education in Latin America and the Caribbean*, No. 24, Santiago, Chile, UNESCO Regional Office for Education in Latin America and the Caribbean, 1991, table 3.

point where in 1985 some 45% of all students enrolled were women, compared to 42% 10 years before.

In spite of this progress, available indicators show that women's access to education is still inadequate in several countries of the region, such as Bolivia, Guatemala, Peru, and to a lesser extent, Ecuador, Haiti, Mexico and Panama. These are now the only countries in which the educational profile of young women is not similar to that of men of their same age.<sup>32</sup> In Brazil, Chile, Ecuador, Mexico and Peru, the proportion of women in total post-secondary enrolment was less than half.

The distribution of women by specialization has changed little. As in the industrialized countries, a large proportion of them are preparing for careers that allow them more flexible schedules or are more compatible with tasks in the home, and where there is less risk of gender-based wage discrimination. This can also be attributed to the persistence of certain discriminatory educational practices (see box II-5). Thus,

even though the proportion of women in engineering increased by eight percentage points, they continued to be a minority (18%), and in no country, with the exception of Cuba, did they reach a third of total enrolment. In social sciences and education, to the contrary, women comprise between 60% and 70% of enrolment.

Finally, despite notable progress in education, women still face problems in achieving a proportionate share of employment opportunities. In the educational sector, for example, women have fewer opportunities to occupy high-level academic or administrative posts. This is demonstrated by the fact that while almost all pre-school teachers are women, they comprise close to three quarters of the number of teachers at the primary level, close to half at the secondary level, and only a third in higher education.<sup>33</sup> In general, more years of education are demanded of women than of men of the same age for the same occupation. In fact, secondary or higher education seems more and more to be the

32 E. Schiefelbein and Sonia Peruzzi, "Education opportunities for women. The case of Latin America and the Caribbean", *Bulletin The Major Project of Education in Latin America and the Caribbean*, No. 24, UNESCO Regional Office for Education in Latin America and the Caribbean, Santiago, Chile, April 1991.

33 E. Schiefelbein and S. Peruzzi, "Education opportunities for...", *op. cit.*

## Box II-5

## GENDER DISCRIMINATION IN SCHOOLBOOKS

In spite of the progress made over the past two decades in connection with the incorporation of women in the educational system, gender discrimination persists in textbooks used in elementary school, as shown in studies carried out in Chile, Costa Rica and Guatemala.

In Costa Rica a study was made of a sample of 28 books distributed either commercially or by the Ministry of Public Education.

In the case of the books distributed commercially, the study proved that no progress had been made in this connection between 1975 and 1985. In the years beginning and ending that period, 75% of the pictures reproduced in the books related to men and only 25% to women. The male figures shown corresponded to historical personages or to men engaged in intellectual activities, farming or the like. The female figures, on the other hand, usually correspond to home life, child care and similar occupations. The only intellectual activities depicted as being engaged in by females are student activities. No women are depicted as playing a scientific or professional role.

In the case of the books distributed by the Ministry, 72% of the figures shown in those distributed in 1975 were male figures and 28% female figures. The commonest kinds of male figures were the same as in the commercial texts; the commonest female figures were maids, grammar-school teachers and little girls playing dolls. In 1985, on the other hand, following an effort made by the Government to amend the books used in the school, 69% of all the human figures represented corresponded to males and 31% to females. In addition, the female figures

are not all of subordinates; they are depicted in more active roles rather than exclusively in traditional activities, and pictures are also included of males engaged in domestic activities and child care.

In Chile, 10 Spanish-language textbooks used in grades 1 to 5 were considered. It was observed that 67% of the references made to gender (in written or picture form) concerned males, while 33% related to females. About 82% of the activities depicted seem to relate to males. Of the activities depicted which are clearly of a remunerative nature, as opposed to those which are not, only 14% correspond to pictures of or written references to females.

Nine books were studied on the basis of leading roles played by males and by females with a view to determining the frequency with which each of the sexes appeared in leading or secondary roles. Of all the characters taken into consideration, 59% were men and 38% women, while in the remaining cases the sex of the character was not specified. When a character is obviously shown in a leading role (with the action revolving around him or her), 61% were males, 33% females, and the remainder of indeterminate sex.

The texts reviewed in Guatemala also depict women as a demographic minority in that only 19% of the figures shown are female and 81% male. In representations of activity, the distribution is entirely symmetrical—78% of the figures shown as engaged in productive activity relate to men, while 71% of those depicting the performance of domestic chores relate to women.

only means for women to obtain more productive jobs. This does not, however, necessarily lead to higher wages. Indeed, although wage differences between men and women lessened slightly during the 1980s, they increased for young men and women with similar educational backgrounds. On the average, wage discrimination is the equivalent of around four years of formal education, although the gap tends to diminish as the educational level rises. In this context, women's higher educational level allows

them to raise their potential wage level and lessen discrimination.<sup>34</sup>

e) *Latin American educational trends from an international perspective*

A comparison between education in Latin America and in some southern European and East Asian countries that have rapidly industrialized and modernized over the last few decades provides some interesting conclusions. The countries chosen from southern Europe are Spain, Italy and Portugal, and

<sup>34</sup> ECLAC, *La equidad en el panorama...*, op. cit.

Table II-7  
**ENROLMENT RATES FOR PRIMARY, SECONDARY AND TERTIARY LEVEL**  
 (Percentages)

Country	Primary		Secondary		Tertiary	
	1975	1987	1975	1987	1975 <sup>a</sup>	1987 <sup>a</sup>
Argentina	96	...	42	...	27	41
Brazil	71	84	9	15	11	11
Chile	94	90 <sup>b</sup>	34	56 <sup>b</sup>	16	18
Ecuador	78	...	28	...	27	29
Guatemala	53	58 <sup>c</sup>	10	13 <sup>c</sup>	4	9 <sup>c</sup>
Mexico	98	100	33	44	11	16
Venezuela	81	89	35	44 <sup>d</sup>	18	27
Japan	99	100	...	95	25	30
Korea	99	99	52	...	10	36
Thailand <sup>a</sup>	84	95	25	28	4	16
Italy <sup>a</sup>	105	95	71	75	26	26
Spain	100	100	63	...	20	32
Portugal	91	100 <sup>d</sup>	29	37	11	14 <sup>d</sup>

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, on the basis of official data.

<sup>a</sup> Gross rate. <sup>b</sup> 1988. <sup>c</sup> 1980. <sup>d</sup> 1986.

from East Asia, Korea, Japan and Thailand. The comparison is based on a few variables, showing that the strategies followed in the different countries has had very different results.

Table II-7 gives enrolment rates in the three levels of the formal educational system for the years 1975 and 1987. The expansion of primary education reflects the tremendous effort made by all the countries even before 1975. However, there is still a group of countries in Latin America –represented in the table by Brazil and Guatemala– which has not yet extended primary education to the whole population. This group includes countries with relatively simple production systems, like Bolivia, El Salvador, Guatemala, Haiti, Honduras and the Dominican Republic, and one country with a highly complex production system and a huge population and economy: Brazil. Their weak development processes and the financial constraints on their public sectors explain why the first group lags behind, but those factors do not explain Brazil's case. There the reasons would seem to be basically the

exclusionary and concentrative character of the development patterns adopted.

At the secondary level, differences between the countries are significantly greater than at the other levels. Korea and Japan in Asia, and Spain and Italy in Europe, have practically attained universal secondary education. Portugal and Thailand, however, are more similar to Latin American countries where expansion has not been so intense. In any case, this information shows that once the goal of universal primary education is met, the demand for access to secondary education assumes proportions approaching total coverage.

At the higher educational level, on the other hand, enrolment rates are more homogeneous in all the countries, independently of their level of economic development and even the size of the base of their educational system. This confirms the hypothesis about the polarized character of the expansion of education in Latin America. In sum, this international comparison makes it possible to hold that the expansion of education in Latin America was highly exclusionary at the base of the system, inadequately funded

Table II-8  
**QUANTITATIVE INDICATORS OF THE EXPANSION OF THE EDUCATIONAL SYSTEM  
 IN SELECTED COUNTRIES**

(Percentages; growth rates between 1975 and 1987)

	Primary level					Secondary level		Tertiary level <sup>a</sup>	
	Schools	Teachers	Pupils enrolled	Pupils per teacher		Teachers	Students enrolled	Teachers	Students enrolled
				1975	1987				
Argentina	1.8	28.7	37.4	18	19	62.1	59.4	26.0	31.7
Brazil	4.5	22.0	34.1	22	24	67.6	67.7	31.0	43.9
Chile	0.1	4.7	12.8	18	19	40.9	55.0	1.6	4.7
Ecuador	20.8	80.7	49.8	38	31	128.5	112.3	8.4	55.7
Guatemala	38.5	73.4	75.1	35	35	172.5	142.9	115.7	126.7
Mexico	42.3	80.9	28.8	45	32	128.6	131.6	167.3	139.3
Venezuela	11.8	61.5	36.6	30	24	65.6	58.1	86.4	87.4
Japan	1.1	11.5	-1.3	26	23	...	34.0	30.8	5.1
Korea	1.5	22.6	-13.9	52	35	89.2	55.0	53.0	384.8
Thailand	-19.2	46.0	6.0	28	20	180.8	76.7	61.7	42.2
Spain	...	4.8	-6.6	28	26	15.8	46.2	64.3	17.0
Italy	-19.8	8.3	-30.3	19	14	...	9.5	22.1	74.6
Portugal	-2.8	23.3	2.6	20	17	...	24.4	82.7	36.4

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, on the basis of official data.

<sup>a</sup> Universities and equivalent institutions.

and unconnected to the development of production.

Table II-8 shows the growth rate of the number of schools, teachers and students at the different educational levels. That is particularly interesting because it shows the importance of the demographic factor in demands for universal educational coverage and for better quality. It also points out that in Korea, Spain, Italy and Japan primary education coverage is total, but that the number of students entering the system is declining. That smaller number of students is taught by a growing number of teachers and, in the two Asian countries, in more establishments.

In Latin America, on the other hand, capacity to receive new students each year must continue to increase if primary education coverage is to be maintained. Undoubtedly, there is a close relation between educational development and changes in demographic trends. While these trends determine the potential demand that the educational system will have to meet, given their effect on the age

structure of the population, education has played a key role in demographic transitions by influencing the decline in mortality and fertility rates, marriage patterns, and changes in the structure, size and composition of families. It has also led to changes in the aspirations and strategies of each social stratum concerning education itself (see box II-6). Table II-8 also shows, however, that this effect has not been equally intense in all the countries of the region. Demographic pressure, moreover, has been considerably aggravated by the inefficiency of the educational system, leading to high repeater rates and a higher number of primary school students above normal ages.

At the secondary and higher education levels, unlike primary education, all the countries are faced with strong quantitative demands. In this regard, Korea stands out the most. In a little more than a decade, it practically quintupled the number of students in higher education. The difference between

## Box II-6

## GROWTH OF EDUCATION AND OF POPULATION

Demographic growth and the structure of the population by age have a decisive effect on the size and growth of the population covered by education policies. However, countries differ as to the level and rate of decrease of fertility and mortality rates depending on the stage they have reached in the process of demographic transition. The behaviour of these variables within the context of international migrations determines the decrease, stagnation or expansion of the various age groups in each country, which, in their turn, make different demands on the education sector.

The demographic change which has had the most impact in Latin America is the decline in fertility, because of its marked effect on the numerical size of the younger generations. The decline in fertility directly affected the base of the age-pyramid, and in the past two decades, a notable decrease has been observed in the growth rate of the child and teenage population, and even, in some countries, of the young adult population. This trend will become stronger in the next few years, and some countries are expected to see a reduction in the absolute size of their younger population, which poses new challenges for the design of education policies.

In those countries of the region which are now in the most advanced phase of demographic transition (Argentina, Chile, Costa Rica, Cuba, Panama and Uruguay), the population under 24 years of age, which is the source of the potential demand for formal education, represents less than 50% of the total population, and its growth has been decreasing. In the remaining countries, which are either in full transition or are just entering into the phase of transition, this age group still makes up over 50% or 60% of the total population, although only in a few countries (Bolivia, Guatemala, Haiti, Honduras and Nicaragua) is its growth rate still high. Thus, it may be assumed that while those countries where the demographic transition is most advanced will need to make a relatively smaller effort with regard to the coverage of formal education, the effort which countries in the latter group will have to make will be comparatively greater in terms both of the infrastructure needed and of teacher training.

Education for its part has an enormous impact on demographic trends, affecting the variables which cause them to change. In particular, a higher educational level in a given population, possibly due to an improvement in living conditions or medical care, has played a key role down through history in a decline in mortality, especially infant mortality, and

fertility, both directly and through the effect it has on the intermediate variables relating to mortality and fertility. A number of studies have been carried out in an attempt to identify the role of education—usually in terms of the level of education of mothers—in the behaviour of these variables over time and in different geographic and social contexts. In both cases, an inverse ratio has been found to exist. The higher the educational level of mothers, the lower the rates of infant mortality and of fertility, although differences exist in the levels and patterns followed by this ratio, both among countries and within them.

It has been stated that the educational level of mothers is a factor which takes large differences in levels of fertility between different groups into account, especially during the period when fertility begins to decline, and great importance has been attached to the fertility variable because it may reflect a drop in the average number of offspring. Some authors have described the many and varied ways in which education may affect reproductive behaviour, ranging from the formation and spread of the attitudes, values and beliefs associated with a relatively small family (the model of the urban West) to the drop experienced in the economic value of offspring in terms of the return realized from their labour within or outside the household and from the work of mothers outside the home and their growing aspirations for personal and economic fulfilment.

Consideration has been given to the relationship between education and some of the intermediate variables relating to fertility, such as age at first union, breast-feeding and the use of contraceptives, and it has been shown that women with the most education marry later, have fewer children and have a much more favourable attitude towards the use of modern contraceptive methods. The distances between these differences can, however, vary widely according to the stage reached by a country in the process of demographic transition. In theory, the differences tend to increase from the time when fertility begins to decline, which happens first in the most highly educated social sectors, but become less marked as time goes on.

Although it is expected that school enrolments will continue to increase and that women will eventually have the same educational opportunities as men in countries where inequality between the sexes still exists, in the next few years there will still be an appreciable number of women of child-bearing age who are either illiterate or whose level of

**Box II-6 (concluded)**

education is low, and their reproductive behaviour will depend largely on the performance of the fertility variable in the future. Moreover, this is a high-risk group, especially from the point of view of infant and maternal mortality.

Finally, it should be borne in mind that although education may be regarded as a key factor in and a necessity for the development of appropriate, responsible attitudes to health care

and disease prevention and for the adoption of reproductive behaviour concomitant with a couple's needs and desires, it may not be regarded as a tool for attaining quantitative goals or for establishing short-term policies, since it is impossible to tell precisely what the effects of various types of education will be, how they will interact with other services provided by the social system and what impact they may have on the level and rate of decrease of fertility in different social groups.

countries lies in the context in which their processes of quantitative expansion takes place. In the Asian and European countries, expansion is produced after the objective of providing universal primary education has been met, with relatively abundant financial resources. In Latin America, on the contrary, expansion takes place with primary educational goals still unmet and in the framework of a serious financial crisis and a significant reduction in both public spending on education and in the capacity of families to pay for schooling themselves.

## 2. Regional research and scientific and technological developments

Current production of scientific and technological knowledge in Latin America and the Caribbean can be described as displaying four basic characteristics: insufficient effort, persistent regional heterogeneity, concentration of expenditures in sectors with limited competitive potential and predominance of academic science.

### a) *Insufficient effort and results*

Despite the region's attempts during the 1960s and 1970s to increase its scientific and technological capacity – as shown by the rise in the number of researchers and in the amount of resources allocated for that purpose – Latin America still has an extremely weak presence at the world level in generating and using knowledge (see table II-9). The

Table II-9  
LATIN AMERICA AND THE CARIBBEAN:  
ECONOMIC AND TECHNOLOGICAL  
WEIGHT, AROUND 1985  
(Percentage of world total)

Population	8.3
Gross domestic product	6.0
Manufacturing output	6.0
Capital goods	3.2
Engineers and scientists	2.5
Exports of manufactured goods	1.8
Resources allocated for research and development I&D	1.3
Scientific authors	1.3

Source: Fernando Fajnzylber, *Industrialization in Latin America: from the "Black Box" to the "Empty Box". A Comparison of Contemporary Industrialization Patterns.* (LC/G.1534-P), Cuadernos de la CEPAL series, No. 60, Santiago, Chile, ECLAC, 1990. United Nations publication, Sales No. E.89.II.G.5, table 11.

region's contribution to the world total declines as the intellectual value added to the different variables increases. The situation is particularly serious with respect to resources allocated for research and development and the number of scientific authors.

In an international comparison (see table II-10), towards the end of the 1980s the region lagged far behind not only the OECD countries as a group and the southern European countries but also the newly industrializing economies of East Asia.

Table II-10  
**SCIENCE AND TECHNOLOGY INDICATORS FOR GROUPS OF SELECTED COUNTRIES**  
*(Different years between 1988 and 1990)*

Indicator	Latin America <sup>a</sup>	OECD countries <sup>b</sup>	East Asian newly industrializing economies <sup>c</sup>	Southern European countries <sup>a</sup>
Per capita research and development expenditures (US\$)	10	448	23	44
Percentage of GDP allocated for research and development	0.5	2.5	1.4	1.0
Research and development expenditures per engineer or scientist (US\$)	34 858	141 861	50 160	60 647
Engineers and scientists per 100,000 economically active persons	650	115	185	
University graduates per 100,000 inhabitants <sup>e</sup>	156	592	478	191
Percentage of university graduates in engineering and technology (%)	19.5	15.6	19.6	17.5
Research and development expenditures by source (%) <sup>e f</sup>				
i) Public sector	78.8	43.1	35.6	46.4
ii) Entrepreneurial sector	10.5	52.5	61.4	49.5
iii) Funds from abroad	3.4	0.4	2.9	3.9
iv) Other	7.3	4.0	0.1	0.2
Research and development expenditures by activity (%) <sup>e g</sup>				
i) Basic research	20.9	14.1	21.1	19.0
ii) Applied research	52.4	26.5	30.4	39.7
iii) Experimental development	26.7	59.5	48.5	41.2

Source: Joint ECLAC/UNIDO Industry and Technology Division, on the basis of official information.

<sup>a</sup> ALADI countries plus Cuba. <sup>b</sup> Excluding Spain, Greece, Portugal, Turkey and Yugoslavia. <sup>c</sup> Newly industrializing economies, including Hong Kong, Korea, Singapore, Philippines and Thailand. <sup>d</sup> Includes Spain, Greece, Portugal, Turkey and Yugoslavia. <sup>e</sup> Data for the mid-1980s. <sup>f</sup> Data do not include Turkey. <sup>g</sup> Includes only Argentina, Cuba, Mexico and Venezuela; Spain and Portugal; and the Group of Seven, except Canada, in their respective regions.

The percentage of GDP dedicated to research and development in Latin America and the Caribbean is only a fifth of the proportion the OECD allocates and barely a third of that of the Asian newly industrializing economies. The region's lag with respect to the number of engineers and scientists per capita, as well as research and development expenditure per scientist, is also a matter of concern. This latter variable indicates that the average scientist in the region works with a third less funding than a scientist in a developed country. The smaller number of scientists and engineers per capita seems to be due more to the lower percentage of university graduates in the population (156 graduates for every 100,000 inhabitants, as opposed to 592 in the more developed countries and 478 in

East Asia), since the percentage of engineers and scientists in the total number of graduates (19.5%) is about the same in the region as it is in East Asia and even above that of the OECD countries.

This lag can be seen in the region's foreign trade (see table II-11). Even though the ratio of exports to the gross value of production in the main sectors marked by technical progress (capital goods, electrical and non-electrical machinery, transport equipment) has increased in the region between 1970 and 1988, its level is still far below that of the newly industrializing economies of Asia and the more developed countries of southern Europe. Moreover, unlike these countries, Latin America has lowered its ratio of imports of capital goods, owing more to the widespread recession of the 1980s than

Table II-11  
INDICATORS OF TECHNOLOGICAL INTENSITY IN EXTERNAL TRADE  
IN SELECTED GROUPS OF COUNTRIES

(Percentages)

	Exports/Gross value of production			Imports/Gross value of production		
	1970	1980	1988	1970	1980	1988
<b>Non-electrical machinery</b>						
Latin America <sup>a</sup>	6.6	9.0	15.5	105.3	61.6	49.0
East Asian newly industrializing economies <sup>b</sup>	27.7	39.3	99.0	452.7	167.3	163.3
Southern European countries <sup>c</sup>	20.0	21.5	36.3	149.6	65.4	114.1
OCDE countries <sup>d</sup>	23.0	33.5	34.8	16.0	21.5	28.4
<b>Electrical machinery</b>						
Latin America <sup>a</sup>	3.1	4.4	6.7	34.7	36.2	26.7
East Asian newly industrializing economies <sup>b</sup>	23.1	63.5	59.5	109.5	66.4	49.4
Southern European countries <sup>c</sup>	11.6	13.9	20.8	28.9	23.5	45.5
OCDE countries <sup>d</sup>	12.7	20.0	21.1	9.3	15.1	20.1
<b>Transport equipment</b>						
Latin America <sup>a</sup>	0.9	4.9	12.3	22.7	21.4	13.4
East Asian newly industrializing economies <sup>b</sup>	9.1	28.9	30.9	95.5	68.2	30.2
Southern European countries <sup>c</sup>	12.5	17.9	26.2	38.9	24.5	36.3
OCDE countries <sup>d</sup>	18.5	27.1	25.8	12.5	18.2	21.4

Source: Joint ECLAC/UNIDO Industry and Technology Division, on the basis of official figures.

<sup>a</sup> Argentina, Bolivia, Brazil, Colombia, Costa Rica, Chile, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Panama, Peru, Dominican Republic, Uruguay and Venezuela. <sup>b</sup> Korea, Philippines, Malaysia, Singapore and Thailand. <sup>c</sup> Spain, Greece, Israel, Portugal, Turkey and Yugoslavia. <sup>d</sup> Germany, Australia, Canada, Denmark, United States, Finland, France, Italy, Japan, Norway, New Zealand, Netherlands, United Kingdom and Sweden.

to any attempt at efficient import substitution.

The decline in imports of high technology goods is particularly serious. Between 1979 and 1989, imports of high technology goods fell more than the overall contraction of imports into the region from the OECD countries (-42% and -35%, respectively). By incorporating fewer high technology goods, the region's very basis for developing its competitive advantages has been weakened. The task for the 1990s must be to try not only to equal the modernization rate of its competitors, but also to narrow the gap, for example, with East Asia, whose high technology imports grew by more than 60% during the 1980s.

#### b) Persistent regional heterogeneity

The differences in technological efforts between the countries of Latin America and the Caribbean are comparable to those between the region as a whole and the developed and more dynamic East Asian countries. Structural heterogeneity, already largely diagnosed by ECLAC in the 1960s<sup>35</sup>, is clearly seen in relative per capita expenditures and percentage of GDP allocated for research and development (see table II-12). Although some countries increased their efforts considerably over the course of the 1980s, the differences between the more advanced and those further behind run normally around five to one, and surpass

35 See, for example, Aníbal Pinto, "La concentración del progreso técnico y de sus frutos en el desarrollo latinoamericano", *Inflación: ratces estructurales*, Mexico City, Fondo de Cultura Económica, 1973.

Table II-12  
LATIN AMERICA AND THE CARIBBEAN: EXPENDITURES FOR  
RESEARCH AND DEVELOPMENT

	Percentage of GDP		Dollars per capita	
	Early 1980s <sup>a</sup>	Late 1980s <sup>b</sup>	Early 1980s <sup>a</sup>	Late 1980s <sup>b</sup>
<b>Large countries</b>				
Argentina	0.47	0.44	24.2	12.6
Brazil	0.58	0.61	9.3	14.3
Mexico <sup>c</sup>	0.27	0.50	6.1	8.2
<b>Andean countries</b>				
Bolivia	0.07	n.d.	1.1	n.d.
Colombia	0.15	0.37	1.6	4.4
Chile	0.41	0.63	8.6	10.6
Ecuador	0.13	n.d.	1.5	n.d.
Peru	0.30	0.22	3.7	2.4
Venezuela	0.43	0.38	16.8	11.7
<b>Other South American countries</b>				
Paraguay	0.12	n.d.	1.5	n.d.
Uruguay	0.20	0.20	4.4	3.7
<b>Central America</b>				
Costa Rica	0.16	0.26	2.2	4.1
El Salvador	0.10	0.16	0.7	1.4
Guatemala	0.22	0.50	2.1	3.7
Honduras	0.10	n.d.	0.6	n.d.
Nicaragua	0.10	n.d.	0.7	n.d.
Panama	0.18	n.d.	3.3	n.d.
<b>Caribbean</b>				
Cuba	0.72	0.93	19.8	23.0
Jamaica	0.10	0.03	1.0	0.3
Dominican Republic	0.35	n.d.	0.7	n.d.
Trinidad and Tobago	0.10	0.08	4.4	5.1

Source: Joint ECLAC/UNIDO Industry and Technology Division, on the basis of official data, and Francisco Sagasti and Cecilia Cook, "La ciencia y la tecnología en América Latina durante el decenio de los ochenta", *Comercio Exterior*, vol. 37, No. 12, December 1987.

<sup>a</sup> Various years 1978-1984. <sup>b</sup> Various years 1984-1990.

<sup>c</sup> Data for early 1980s are estimates based on science and

technology expenditure as a percentage of GDP.

20 to one for the extreme cases. Available information about the number of scientists and engineers working in research and development shows that they are concentrated in Argentina, Brazil, Colombia, Cuba, Chile, Mexico and Venezuela.

*c) Concentration of efforts in academic institutions*

In the region, some 75% of research and development capacity is concentrated in the more important universities, which have a greater number of active researchers in the basic, engineering and social sciences. Between 1980 and 1985,

close to 90,000 scientists and engineers were working in science and technology. Most of them worked in the framework of an academic science. A smaller proportion, different in each country, was involved in government-sponsored science, and a numerically insignificant minority was active in the private sector (see table II-10).

Given this glaring weakness in the private sector's efforts in science and technology, the region allocates a lower percentage (26.7%) of its total research and development expenditures for experimental development than do the developed countries (59.5%) and the more successful East Asian countries (48.5%).

Table II-13  
**LATIN AMERICA AND THE CARIBBEAN: DISTRIBUTION OF EXPENDITURES  
 FOR RESEARCH AND DEVELOPMENT BY SECTORS**

(Percentages)

	Argentina 1980	Brazil 1984	Colombia 1982	Costa Rica 1981	Venezuela 1980
1. Natural resources	7.1	4.6	9.9	6.4	7.8
2. Agriculture, hunting, forestry and fishery	26.2	48.3	51.8	45.7	26.7
3. Mines and quarries	1.6	3.6	0.3	0.6	3.1
4. Manufacturing	6.3	11.5	5.1	2.0	9.6
5. Energy	4.0	10.8	12.0	5.3	3.0
6. Housing	1.8	0.2	1.0	1.3	2.3
7. Transport and telecommunications	1.8	2.0	0.5	0.2	1.3
8. Health care	22.0	5.2	9.5	15.1	22.5
9. Social development	17.9	10.2	6.6	19.2	14.3
10. Basic knowledge	3.4	3.6	n.d.	4.2	2.9
11. Other	7.9	-	3.3	-	6.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: Francisco Sagasti and Cecilia Cook, "La ciencia y la tecnología en América Latina durante el decenio de los ochenta", *Comercio Exterior*, vol. 37, No. 12, December 1987, Statistical appendix, table 11.

Less experimental development means less dynamism in incorporating new goods and more modern production processes, which explains the above-mentioned modest results in terms of international competitiveness.

*d) Concentration of efforts in only a few economic sectors and scientific areas*

Research and development in the region is basically concentrated in agriculture, forestry and fishery; much less is done in manufacturing (see table II-13). Even though this kind of specialization partially reflects the region's competitive advantages, it has a limited effect on its international competitiveness and ability to penetrate high value added markets. Although an indiscriminate bias in favour of industry is not recommendable, there is no doubt that among the more dynamic goods produced and traded world-wide, the main ones are manufactured goods not based on natural

resources and those that transform and process those goods, areas to which the region gives relatively little technological support.

From the standpoint of scientific production by area, biological and medical sciences predominate, together representing close to 63% of total mainstream science publications originating in the region, a rate which coincides with trends in scientific literature in the rest of the world.

The region's contribution to the total number of scientific publications in this category world-wide is marginal and is generated by only a few countries.<sup>36</sup> Thus, during the 1973-1984 period, of a world total of 3.4 million mainstream scientific articles, Latin America and the Caribbean provided some 35,000, or barely 1% of world production. As often noted, even though this kind of measurement does not adequately reflect the real magnitude of scientific production in the developing countries or its local effect,<sup>37</sup> it does

<sup>36</sup> Inter-American Development Bank (IDB), *Economic and Social Progress in Latin America. Annual Report, 1988*, Washington, D.C., 1988.

<sup>37</sup> Lea Velho, "Indicadores científicos na América Latina: antecedentes teóricos, experiencias empíricas e proposta de estudos", Bogotá, International Development Research Centre (CIID), 1988, unpublished, contains an extensive bibliography on this point.

suggest a basis for comparing the development of this level of science between regions and through time.

In this regard, fewer scientific articles were published in Latin America in 1984 than at the beginning of the 1980s, a situation which could be attributed to the economic crisis, and particularly to the reduction of public spending on research and development. However, since a similar decline occurred between 1973 and 1977, a time when expenditures for research and development probably increased, a more complete explanation must be sought.

These four factors together comprise a troublesome scenario regarding the amount of effort needed in the region to absorb technical progress, in the context of the ongoing technological revolution and the increasingly aggressive competition it entails.

### 3. Adult training and education

Adult education programmes in Latin America have three distinct but complementary components: literacy training and general educational courses for adults; in-service training in enterprises; and training offered by public technical training institutes.

#### *a) Literacy training and adult education*

The struggle against illiteracy passed an important milestone in 1985, when for the first time progress in literacy training surpassed the rate of population growth. The absolute number of illiterates, which had continued to increase up to that time despite decreasing rates, stabilized and began to decline. In 1987, there were an estimated 42.7 million illiterates in Latin America and the Caribbean, close to 16% of the population above 15 years of age.

The most important progress was made among young people. The illiteracy rate of the 15-19 age group (7%) was less than half that of the 31-40 age group (15%), and a quarter of the rate of the group

above 40 years of age. At present, the problem tends to be most serious in six countries of the region (Brazil, Dominican Republic, El Salvador, Guatemala, Haiti and Honduras), although illiteracy is still a significant problem among indigenous populations, particularly indigenous women, in another four countries (Bolivia, Ecuador, Mexico and Peru). Close to half the region's illiterates are in Brazil, and of those, more than half live in urban areas.

Over the last few years, most of the countries in the region carried out at least one major literacy campaign, reaching a total of some five million people (see box II-7). The limited data available suggest that women take less advantage than men of opportunities offered by campaigns or other informal kinds of literacy training. Indeed, 4% of women between 25 and 34 years of age participated in such programmes, compared with 6% of men.<sup>38</sup>

With the progress made in eliminating absolute illiteracy, efforts and resources can now be concentrated on functional illiteracy. Despite difficulties in measuring it precisely, the region's prospects in this regard are especially alarming. In 1980, practically 60% of the population above 15 years of age, and close to 50% of young people (15-19) had not completed primary school, while measurements of the quality of education and repeater rates pointed to several deficiencies in teaching reading and writing.

In fact, such a lack of basic knowledge has often limited the effects of agricultural extension and training services for informal-sector workers. Moreover, resources for such programmes diminished drastically during the 1980s, and in some countries, the public agencies fulfilling those functions have even disappeared, with non-governmental organizations and private agencies assuming their tasks (see box II-8).

Generally speaking, assessments of literacy and adult education programmes have been negative, emphasizing their limited scope, problems of quality and the

<sup>38</sup> E. Schiefelbein and S. Peruzzi, "Education opportunities for...", *op. cit.*

## Box II-7

**THE MONSEÑOR LEONIDAS PROAÑO NATIONAL LITERACY CAMPAIGN,  
ECUADOR, 1989-1990**

The Monseñor Leonidas Proaño National Literacy Campaign was officially announced to the country by President Rodrigo Borja on 8 September 1988, on the occasion of International Literacy Day. As an inspiration to the campaign and to underscore its social and educational bias, it was named after Monseñor Leonidas Proaño, an illustrious Ecuadorian bishop who had died a few days previously.

The three major objectives of the campaign were as follows:

a) To bring all young people and adults who had been unable to benefit from an education at the usual time in their lives into the world of written communication;

b) To make all Ecuadorian society aware of the need to know more about the life of the country, its geography and history, its linguistic and cultural diversity, its social and economic problems and its role in Latin America and the rest of the world;

c) To reactivate the spirit and meaning of democracy, setting the stage for fuller participation, for dialogue, for critical thought and open and pluralistic discussion in the task to be carried out by the literacy campaign, which was an exercise in democracy in and of itself.

The campaign was viewed as a national task in that its goal was to make people at all levels of society aware of the need for literacy and to keep them informed and motivated. The National Promotion Department prepared a strategy making use of the mass communications media. The motto of the campaign was "Give your all to Ecuador".

The main purpose of the campaign was to teach people to read and write. The teaching materials were prepared on the basis of a study of a large sample of literacy training materials produced in advance in Ecuador and other Latin American countries. Importance was attached to the training of the teachers who would participate in the campaign from national to

grass-roots level. In addition to direct training, distance training was provided on the basis of 32 working documents, as many as 200,000 copies of which were produced each week as the campaign progressed. Participants in the campaign included nearly 73,000 literacy trainers, the majority of whom (90%) were students in their final years at school or teacher training institutions, with the remainder made up of adults with certificates from the National Department of Continuing Education of the Ministry of Education and Culture, rural primary school teachers, literacy experts recruited for the campaign and volunteers. The literacy trainers operated in brigades under the direction of coordinators.

The campaign was directed towards people over 12 years old who did not know how to read or write. A total of 285,350 people were enrolled. When the campaign ended, that number had dwindled to 180,381 people, which means that the drop-out rate was 36.7%.

The total cost of the campaign was US\$3 million. It was supported by UNICEF, UNESCO, the Spanish Agency for International Cooperation, UNDP, the United Nations Population Fund and the International Plan. It was also supported by various non-governmental bodies.

In 1989, the campaign received the 1989 Latin American Human Rights Award granted by the Latin American Association for Human Rights and the Coral Award for the best documentary video, which was won by the video "Ponle Tu Nombre" presented at the tenth International Film and Video Festival at Havana, Cuba. In addition, a national survey carried out by CEDATOS found that the campaign was one of the five most outstanding events of 1989.

There are plans to follow-up on the campaign through the national programme "El Ecuador Estudia", which covers the post-literacy training part of the campaign from 1990 on.

lack of follow-up to systematically ensure that learning continues.

The two deficiencies of public programmes most mentioned are the predominance of strictly educational objectives, with no relation to employment or other basic issues, like health care and housing; and the lack of adaptation of traditional teaching

methods to the requirement of those who need these programmes, mostly young day-school drop-outs working in unskilled occupations. Literacy programmes that use communications media, especially radio, seems to have positive results, but that method is insufficient in itself, and there is usually no coordination with other actions in the

## Box II-8

## TRAINING FOR MICRO-ENTERPRISES IN EL SALVADOR

The 200,000 micro-enterprises (less than five workers) in El Salvador, which account for nearly half of the urban economically active population, are served by a number of training institutions. Some of these, such as the Integral Community Development Programme (PRIDECO) and the Community Development Department (DIDECO) belong to the public sector. The majority, however, are non-governmental organizations and trade associations. These include the Association of Medium- and Small-Scale Salvadorian Entrepreneurs (AMPERS), the National Federation of Small Businesses (FENAPES), the Programme for the Promotion of Small-Scale and Micro-businesses of the Salvadorian Economic and Social Development Foundation (PROPEMI-FUSADES), the Centre for Support of Micro-businesses (CAM), the Entrepreneurial Foundation for Educational Development (FEPADE), the Ricaldone Institute and the Association of Young Entrepreneurs. In general, the training programmes are accompanied by financial support.

The majority of the training programmes concentrate on providing entrepreneurial training for the purpose of strengthening micro-businesses and giving micro-entrepreneurs the basic know-how they need to plan, organize, direct and manage their businesses. Nearly all of them provide training in the general principles of administration, accounting, production costs, marketing, sales and credit management.

In the majority of the cases, the training is financed by the owner of a micro-enterprise, who pays either for the cost of matriculation or for a percentage of the credits involved. Close to 25,000 micro-businesses have received entrepreneurial training in the past five years. One third of the training programmes include advisory assistance to the businesses in order to facilitate the application of the material learned.

Some enterprises provide technical training in order to improve the design and organization of their production processes and to introduce effective quality control systems. The coverage provided by this kind of training is very small, and it is estimated that no more than 500 micro-businesses have access to it. In general, it is aimed at students at technical institutes who have set up their own micro-businesses.

The variety of methodologies used by the training programmes has resulted in a high level of flexibility and creativity, which has made it possible to meet the needs of the owners of micro-businesses. However, an effort is also being made to reach a consensus on minimum content and basic methodological criteria, as has been suggested by the Programme for the Promotion and Development of Small-Scale and Micro-businesses and by other bodies. Technical training programmes, which are vital if the quality of products produced by micro-enterprises is to be raised, must also receive more support.

field.<sup>39</sup> The growing participation of non-governmental organizations in vocational training has made it more flexible and allowed it at times to reach segments of the population traditionally left out, although at the cost of greater fragmentation of the services offered and little coordination between formal and informal programmes.

*b) On-the-job training in enterprises*

While in some developed countries, on-the-job training has become quite

widespread the scant information available indicates that the extent of this activity in Latin America and the Caribbean is rather modest. According to a study done in Mexico at the beginning of the decade, enterprises allocate few resources for training their personnel. In fact, 70% of those surveyed said that they had no specific item in their budget for training, while 22% allocated an annual amount below US\$5,000.<sup>40</sup> That information concurs with an earlier study which said that Mexican enterprises provide training for an average of 10% of

<sup>39</sup> ECLAC, *Educación y transformación...*, op. cit.

<sup>40</sup> Jorge Padua, *Educación, industrialización y progreso técnico en México: un estudio de caso en la zona conurbada de la desembocadura del Río Balsas*, Mexico City, El Colegio de México, 1984.

their labour force, spending less than US\$30 a year per worker.<sup>41</sup> If these figures represent what is happening in the other economies of the region, expenditures for training in Latin American and Caribbean enterprises, in the best of cases, would barely reach 0.5% of GDP.

Moreover, it would seem that most of the few programmes that do exist are concentrated in larger enterprises. They absorbed, for example, 85% of the tax exemptions granted for such activities in Chile in 1990. Even large enterprises, however, do not provide systematic training. The region traditionally seems to have a sporadic and short-term training policy, in the sense that enterprises normally responded to immediate technological demands with short courses, narrowly focused on specific points, instead of anticipating future demands for skills. The main justification for that approach is the risk of not profiting from investments in human capital, since trained personnel can be lost to competitors. Therefore, in general, most enterprises feel that the government and formal educational system should provide technical training.<sup>42</sup>

In economies like those of the region, more often than not a vicious circle is created: enterprises complain of the poor vocational training of their employees, but they do not invest in training for fear of losing their investment. Thus, the few training programmes that are available are designed for employees with a higher educational level (supervisors or managers), while, generally speaking, unskilled or semi-skilled workers "learn by doing" and are only trained in the case of substantial changes in the technology of production. In this regard, recent technological changes and growing international demands for quality seem to have led export-oriented enterprises in the region to offer their employees more

training. In several countries, that has led to a dynamic market for training services in enterprises, mostly dedicated to communication (languages, computers, etc.). Nevertheless, the limited information available in this regard does not indicate a widespread change in traditional entrepreneurial views on training (see box II-9).

### c) *Public training institutes*

Public training institutes have become widespread in Latin America and the Caribbean as a form of training that serves as an intermediary between the formal educational system and enterprises. They came into existence around 1940, at the beginning of the new phase of industrialization. The demand for skilled labour arising from this process could not be met by the educational system, which was more concerned with satisfying the growing need to provide young people with a basic education. The original purpose of these institutes was to make up for this lack and provide workers, often from the countryside, with the occupational skills and work habits needed by industry. In most cases, public initiative and entrepreneurial support joined in this purpose, in substantive as well as financial matters.

The first public training institutes were in Brazil, with the creation of the National Industrial Training Service (SENAI) in 1942 and the National Commercial Training Service (SENAC) in 1946. These pioneer institutions, closely linked to the private sector, served as a model for most of the institutes created later in the other countries of the region, with different institutional forms from one country to another. For example, the National Training Service (SENA) in Colombia, the National Institute of Educational Cooperation (INCE) in

41 Mexico, Department of Employment and Occupational Training, *Investigación sobre necesidades de capacitación*, Mexico City, 1976, unpublished.

42 Jorge Padua, *Educación, industrialización...*, op. cit. Note that most of the workers interviewed in this survey felt that the beneficiary of the training provided was the enterprise, not the workers themselves.

## Box II-9

## HUMAN RESOURCES POLICIES OF EXPORT ENTERPRISES IN URUGUAY

Industrial modernization is hardly a standardized process, much less a unified one, but rather an undertaking fraught with tensions and imbalances, generally characterized by a disparity between the training of qualified human resources and the physical modernization of enterprises. Human resources training changes more slowly, and may lag behind technological changes. This delay is compounded not only by legitimate difficulties in retraining personnel, but also by a short-sighted human resources policy and an antiquated entrepreneurial mind-set, which focus on the immediate requirements of technology and not on the burgeoning technological process's future demands for qualified personnel.

This situation was apparent in a 1991 survey of a representative sampling of export enterprises in Uruguay. The survey revealed a broad sector of enterprises which had consistently undertaken partial modernization measures in respect of industrial organization in the area of equipment, but with no corresponding improvement in the educational level of human resources, to begin the transformation of manpower. In general, this partial modernization represents a first step in response to a demand for a specific level of quality, attainable only with a given supply of equipment, by the market in which the product is to be sold. However, this rationale is not complemented by a corresponding human resources policy. Moreover, many enterprises have accumulated knowledge in the practice and acquisition of a kind of "expertise" from human resources with little formal education but long experience. This type of enterprise can be said to have a development "ceiling" because it cannot turn experience into methodologies, and must depend on the criteria and advice of

equipment and input suppliers. This system is workable with highly automated technologies that carry out repetitive, routine processes, except in the areas of maintenance and quality control; under such circumstances, an enterprise can maintain personnel who are mostly unqualified, but assiduous and trained in their equipment-operating duties. At the other extreme, some enterprises usually those with limited capital make the opposite investment, which consists of overloading production and support services with university-level professionals to compensate for equipment limitations. In contrast, when production is carried out with modern, automated equipment, but with constant innovation in processes and products, the personnel profile is characterized by a large group of qualified staff; in this case, an active and continuous training and monitoring policy is required if the enterprise is to adapt to changing production patterns.

In view of these differences, it is not surprising that the training practices observed vary widely, even among enterprises with similar levels of technology. However, most of the enterprises have made impressive efforts in the areas of education and training, utilizing methods that include in-house training, the retention of technical instructors to provide regular training within the enterprise and the sending of personnel to national or foreign training centres. Yet these individual efforts are not integrated into a broader policy of training by sector or of contacts with educational units, or even into a demand for public policies in support of vocational education and training to make such activities more accessible to smaller-scale enterprises which are unable to organize such services on their own.

Venezuela and the National Institute of Vocational Training (INACAP) in Chile were established outside the educational system and remained linked to the respective ministries of labour. To the contrary, the National Council for Technical Education (CONET) in Argentina

and the University of Labour in Uruguay remained within the educational system.<sup>43</sup>

The main characteristics of public training institutes in Latin America have been their closeness to the working world, financing through a payroll tax, and

43 Inter-American Center for Research and Documentation for Vocational Training (CINTERFOR)/ International Labour Organisation (ILO), *Vocational Training on the Threshold of the 1990s. A study in two volumes of changes and innovations in specialized institutions of Latin America*, II vols., PHREE Background Paper series, No. PHREE/91/35, Washington, D.C., The World Bank, February 1991.

frequent tripartite management with the participation of representatives of government, workers and employers. These characteristics give these institutions a certain autonomy, financial stability and a capacity for dialogue with the working world. The number of these institutes grew to be considerable, with enrolments in some countries representing 4% (Brazil) and up to 12% (Venezuela) of the active population towards the end of the 1970s.

After first orienting their efforts to training young people to work in industry, these institutes later gave priority to equity-related objectives, offering training to those who had had no access to formal education and promoting social programmes, beyond vocational training as such, for those excluded from the modern sector of the economy.

The public institutes produced skilled workers for several decades and facilitated training for different sectors of the population marginalized from the educational system. However, they became increasingly rigid in their response to the needs of enterprises. Indeed, since they were ensured financing, these institutes demanded little of their students, administration gradually became bureaucratic, and their links with the productive sector were reduced to formal exchanges at the board of directors level, with no particular impact on concrete decisions affecting programmes to be developed and carried out. In general, these institutes have displayed little capacity to adapt to the changing demands and trends in the productive sector, with the result that their programmes, equipment and the knowledge of their professors have become obsolete. Moreover, financial difficulties in recent years have worsened the situation.

The crisis of the 1980s changed the environment in which these public training institutes functioned. Financial resources declined, owing to budgetary constraints on the public sector. Demand

for skilled workers fell, first because business was slow, and later because businesses preferred to obtain the training they needed in a dynamic market of private firms producing these services. Overall, the weakening and abandonment of the import substitution model – the original basis for developing these institutes – deepened the crisis they were undergoing.

Given this situation, several of these institutes reduced their activities, changed their way of functioning or disappeared. Thus, for example, Bolivia founded a new institution with more flexibility and dedicated to directly responding to the needs of enterprises (see box II-10). In Chile, INACAP was privatized and became self-financing by selling its services to enterprises. Several other institutes are in the process of changing and diversifying, providing not only vocational skills but also supporting enterprises in their efforts to reorganize their production and absorb new technologies.<sup>44</sup>

However, these efforts have not reversed the gradual decline of government-sponsored vocational training. Barely 2% of the region's labour force attended courses at these institutions in 1987, with an average length of between 80 and 120 hours. That is the equivalent of an average of two weeks of training every 50 years for each worker in Latin America and the Caribbean. Assuming, probably optimistically, that enterprises provide the same amount of training, either in the workplace or in outside private centres, the average worker in the region receives a maximum of four or five weeks of training throughout his working life.

---

#### 4. The end of a cycle

---

Despite efforts made during the post-war period to develop national systems for education, training and technological and scientific research, the region's existing human resources training capacity is still weak. It is especially inadequate in the face of the new challenges posed by interaction

---

44 Ibid., chapter III.

## Box II-10

**BOLIVIA'S NEW VOCATIONAL EDUCATION AND TRAINING INSTITUTE**

The Vocational Education and Training Institute (INFOCAL) was established in December 1988 to replace the National Manpower Training Service (FOMO), the entity previously responsible for training in Bolivia. Its objective is to provide training to the labour force in the public and private sectors, as a means of promoting the country's development by improving productivity.

INFOCAL is administered at the national level by a tripartite council in which the Government, the Confederation of Private Enterprises of Bolivia and the Bolivian Labour Union are represented. At the regional level, the departmental directorates have a similar structure. Operations are decentralized and resources are generated locally, but work programmes are elaborated by the national office.

The institute offers courses in automobile mechanics, electricity, welding, carpentry, engineering, electronics and graphics, as well as in areas related to construction, trade and the agricultural sector. Fields of study are selected in consultation with enterprises and on the basis of a national survey conducted to determine vocational training needs. The training is provided in both permanent and mobile facilities. Of the total number of participants, 13.7% work in the public sector, about 40% in

private enterprises and the rest in the informal sector, in addition to those who are students or unemployed.

Most of the financing for INFOCAL comes from dues paid by private enterprises, in an amount equivalent to 1% of their payroll expenses. About 3,000 firms, or 32% of the potential total, are currently contributing. The institute hopes to increase the percentage of contributing firms by convincing the private sector of the need to improve their employees' skills. One of the modalities used is the conclusion of bilateral training agreements between INFOCAL and individual firms, such as the agreement reached with the hotel industry.

One important factor in the institute's development has been the support it has received from international cooperation agencies. It maintains relations with the Inter-American Research and Documentation Centre on Vocational Training (CINTERFOR) of ILO and with other vocational training institutes in the region. Under an agreement with the National Industrial Apprenticeship Service (SENAI) of Brazil, training fellowships are awarded to INFOCAL instructors. The survey on training needs was made possible by cooperation with Spain. Agreements are also in force with the Danish agency Danchurch Aid and the German Development Agency.

with the international economy. Sustained quantitative expansion undoubtedly took place at all levels, especially in the formal educational system, which drastically reduced the rate of absolute illiteracy in the region; the primary schooling rate almost doubled and is close to total coverage in most countries, and access to secondary and higher education was extended to new strata of the population. Nevertheless, the region's educational profile still suffers from serious defects. The average educational level is barely six years of schooling, and almost half the Latin American labour force has not completed primary education. Massification was inadequately funded and inequitable, benefiting more the children of medium- and high-income groups. Moreover, the education that most children receive is lacking in quality

and often unrelated to the needs of society. Efforts to expand research and development capacities only concentrated them in a few universities, unconnected with production, and with little participation in the international context of science and technology. Even government training institutes, established explicitly to connect the formal educational system with enterprises, have become outdated and have lost their capacity to respond to a new situation. Their training activities, apart from being meager and limited to specific tasks for a given occupation, have distanced themselves from the main dynamic activities of the economy, while a training market has sprung up which acts with neither sufficient transparency nor public regulation.

These characteristics of human resources training in Latin America and the Caribbean have been produced by the overall evolving situation of the various societies, as well as by more specific factors, the most noteworthy of which are as follows:

- The economic development model, together with persistent problems of social integration and poverty, undoubtedly influenced the generation and dissemination of knowledge, giving them a "polarized character incapable of integration";<sup>45</sup>
- The expansion of education and, to a lesser extent, scientific, technological and training efforts responded more to socio-political pressures than to development requirements;
- The administration of these subsystems became so bureaucratic that they closed in upon themselves and answered to no one. The resulting organizational isolation and deficient management were exposed by the crisis of the development model and the financial crisis that took place during the 1980s.

Together, these factors led to a radical separation between human resources training and development needs, making it almost impermeable to the concerns and challenges arising from the new socio-economic context and the international discussion about the future of education.

Indeed, if this historic trend of the last decade continues, the region would still be 11% illiterate in the year 2000, and 40% of young people would not have finished primary education. Moreover, the average worker, without having finished even primary school, would receive barely one month of training during his working life. For its part, industry throughout the region would be able to count on only

about 35,000 engineers and scientists working on experimental research to develop new products or production processes. These prospects, although tentative, confirm that a process of educational development has come to an end, through which the region obtained important quantitative achievements at the expense of efficiency, quality and equity. Moving beyond this system to one that gives priority to the quality of education and its effective extension to all levels of society, as well as to the synergies between different processes for generating and disseminating knowledge and between these processes and the economy, constitutes the primary task for Latin America and the Caribbean for the next decade.

Employers and the general population are beginning to change their perceptions about the need to place education among their priority demands and investments. Illustrative of this phenomenon are the results of a recent survey commissioned in Argentina by a large computer corporation and a private bank. These results were analysed and discussed in an important seminar for employers. According to this survey, the population's demands for education have become as important as wage demands, and a surprising percentage of those interviewed (almost 90%) called for more collaboration from employers to improve the quality of the school system. An opinion poll in Mexico towards the end of 1989 also confirmed the general population's opinion of education: 83% of those interviewed considered education to be a lever for the country's development; 79% held that personal success depended on education, and 27% said that they planned to continue their studies.<sup>46</sup> Similar statements could be quoted from other countries.<sup>47</sup> Everything

45 Germán Rama, "Educación y democracia", *El sistema educativo...*, op. cit., p. 119.

46 Gilberto Guevara Niebla, "Los mexicanos ante la educación", *Nexos*, No. 159, March, 1991.

47 For reasons why priority must be given to education, formulated by educators, employers, church leaders, politicians, parliamentarians and academics, see the works presented at the round table of national agreements concerning education held during the Fourth Meeting of the Major Project of Education. See UNESCO Regional Office for Education in Latin America and the Caribbean; *Bulletin The Major Project of Education in Latin America and the Caribbean*, No. 25, Santiago, Chile, August 1991.

seems to indicate that the crisis and the relatively low prestige of educational credentials have not led to a questioning of education's vital role in the region's social consciousness, but have rather reinforced demands to constantly raise the educational level from one generation to another. Thus, for example, although only 12% of the Mexicans interviewed had studied at the post-secondary level, 38% hope that their children reach that level—a figure which more than doubles the present higher education enrolment in that country.<sup>48</sup>

Educational authorities agree about the need to radically reform educational management styles in order to face the challenges raised by a change of production patterns, political democratization and social equity. In April 1991, at the Fourth Meeting of the Intergovernmental Regional Committee of the Major Project of Education in Latin America and the Caribbean, sponsored by the UNESCO Regional Office for Education in Latin America and the Caribbean (OREALC), the ministers of education adopted a declaration and a recommendation which reflected a radical change in the way in which educational problems are confronted<sup>49</sup> (see box II-11).

Concern about education has also been on the agenda of recent meetings of Latin American presidents. The Declaration of Guadalajara, signed by the Presidents of Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Chile, Dominican Republic, Ecuador, El Salvador, Spain, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Portugal, Uruguay and Venezuela

emphatically pointed out that "...aspirations for economic, social, technological and cultural development demand that a decisive impetus be given to education and culture, which would simultaneously strengthen our identity and give us solid bases to ensure a suitable insertion of our countries in an international context characterized by scientific and technological innovation".<sup>50</sup>

Nevertheless, regional awareness of the centrality of human resources training is still fragmentary and incapable of totally changing conceptions and outlooks on educational development. Nor has it produced actions to radically change the orientation, administration and operation of the system to generate and disseminate knowledge. Innovative experiments are few and far between and have not established a sustained trend of institutional and pedagogical renovation in the region's educational systems. Perceptions of changes taking place are often haphazard, incomplete, poorly disseminated and badly systematized. Even so, employers and public opinion in general gather information, through travel, business and the communications media, on experiences and the discussion taking place outside the region about human resources training systems. Economists and social scientists have begun to revise their theoretical and empirical reference models for integrating a new relation between education, the economy and society. The following chapters present a panorama of recent trends in both disciplines, in order to provide a broader and better founded perspective of the situation in the region.

48 Gilberto Guevara Niebla, "Los mexicanos...", op. cit.

49 At that meeting, ECLAC's proposal "Changing Production Patterns with Social Equity" and the main ideas of the strategy presented in Part Three were explained. The complete documentation and report of that meeting can be found in UNESCO Regional Office for Education in Latin America and the Caribbean, *Bulletin The Major Project of Education in Latin America and the Caribbean*, No. 24, Santiago, Chile, April 1991.

50 See the Declaration of Guadalajara, point 12.

## Box II-11

## A NEW STAGE OF EDUCATIONAL DEVELOPMENT: THE QUITO DECLARATION

The Intergovernmental Regional Committee for the Major Project in the Field of Education in Latin America and the Caribbean, consisting of the ministers of education of all the countries of the region, held its fourth session in Quito, Ecuador in April 1991.

At this meeting, convened by UNESCO, the Quito Declaration was adopted. This document bears witness to the acute awareness among education authorities of the obsolescence of traditional strategies, and to the solid consensus on the guidelines for change that should direct the actions of the education sector.

The Quito Declaration explicitly recognizes that "we have reached a time of great historic importance, when it will be necessary to embark on a new stage of educational development to meet the challenges of changing production patterns, social equity and political democratization". On the basis of this premise, the ministers of education declared:

1. That "education must be the subject of broad national consensus guaranteeing the commitment of society as a whole to educating its future generations and the continuity of the policies and programmes put under way to attain these objectives".

2. That "a radical change must be brought about in traditional educational management, making it possible to link education effectively with economic, political and cultural demands, bringing educational action out of its isolation".

3. That, pursuant to the principle that education is the responsibility of everyone, it is necessary to "devise and develop mechanisms and strategies for consultation among the

various government sectors and between the latter and non-governmental organizations, private companies, the media, church bodies, trade union and community organizations and the families themselves".

4. That, in the area of planning and administration, there is a "need to step up moves towards decentralization, regionalization and deconcentration, to devise streamlined machinery for the evaluation of results, to implement effective programmes of compensatory education, to boost emergency programmes having recourse to exceptional measures to deal with the crises affecting poor and marginal population groups, and to design information and research systems for decision-making as ways of improving management capacity".

5. That changes in management and commitment on the part of all those involved are necessary but not sufficient conditions of the new educational strategy, so that they must be supplemented by new classroom techniques and more relevant curriculum content".

6. That the international community, through the commitment it entered into at the recent World Conference on Education for All and the World Summit for Children, highlighted the importance of investing in individuals as a guarantee of development and of peace and understanding among peoples, and should, therefore, translate that commitment into concrete support for the educational programmes being promoted, both individually and collectively, by the countries of the region.

## Chapter III

# THE INTERNATIONAL DEBATE ON EDUCATION AND TRAINING OF HUMAN RESOURCES

### 1. Competitiveness, technological change and training of human resources

The debates on industrial reorganization and competitiveness in the industrialized countries are centred on human resources training.

In the developed countries, vocational and youth training are provided under a wide variety of patterns. In countries such as the United States, Japan and Sweden, most youth of a specific age group are trained under the same structure. In other countries, on the other hand, part-time education is combined with on-the-job training; this is what happens under the apprentice-training schemes in Germany, Austria and Switzerland. A third group of countries which includes France, the United Kingdom, Italy and the Netherlands has a more varied pattern that includes schools, colleges, apprentice-training schemes, various training schemes and programmes, some of which are specifically targeted to "hard-to-employ populations" (for example, unemployed youth).<sup>1</sup>

As far as the training provided under the formal system of education is concerned, a variety of models is also applied in the OECD countries. One of the main differences between them is whether or not there is a sharp distinction between compulsory education and instruction

and training provided after the compulsory stage; in other words, whether there is a clear break between the first cycle of secondary education where children receive general training and the second cycle during which one or more vocational functions are taught.

The various patterns also differ in terms of the linkage between secondary education and higher education. The system of higher learning may include establishments belonging to one or more sectors that are directly geared to occupational training. In some countries, most vocational training is done at this level and includes adults or persons with work experience.

The training provided outside the formal educational system is not restricted to initial preparation for employment but also includes tracks of continuing education and training for employees. Strictly speaking, this part of the system covers the wide range of training opportunities for upgrading existing skills which include remedial courses provided by firms; facilitating worker adaptation to advanced technologies or new problems at work and retraining workers whose skills have become obsolete.

Generally speaking, firms are playing an ever-increasing role in this type of training, although in-house training opportunities usually favour managerial

<sup>1</sup> Richard Kazis, Education and Training in the United States, Working paper for the MIT Commission on Industrial Productivity, Cambridge, Mass., MIT Press, 1989.

staff and more skilled workers. These types of training exist side by side with the traditional forms of adult education involving schools, universities, non-governmental organizations, religious institutions, etc.

Finally, in most of the developed countries, a genuine training services market comprising commercial training agencies that offer programmes directly geared to firms and consumers is springing up.

Recently, a number of comparative studies have tried to carry out an in-depth analysis of the role of human resources training systems in the growth of industrial productivity. A comparison of the educational levels and productivity of German and British workers showed that the differences between the levels of education and systems of apprenticeship in both countries had a strong influence on the variations observed between levels of productivity and could lead to considerable differences in the organization of work within firms. It was observed that training increases worker flexibility, heightens the satisfaction and dedication of employees, mitigates problems of coordination and raises productivity.<sup>2</sup>

A study by the Massachusetts Institute of Technology (MIT) concluded that the drawbacks of the system of human resources training in the United States had a considerable impact on the economy's relative loss of competitiveness and indicated that investment had to be made in human capital in order to permit the country to regain its productive edge.<sup>3</sup> A recent OECD report showed that the likelihood of a critical number of firms in a country organizing work more efficiently –improving the patterns established when

large-scale mass production was predominant– and their capacity for doing so largely depended on how well the educational and training systems and the labour market functioned. Its conclusions highlight among other things that the technical or economic potential of the new technologies cannot be fully tapped without making concurrent or prior changes in institutional and social aspects; in this regard, changes in the systems of education and training are particularly important.<sup>4</sup> Other comparisons between the United States and Japan and between Germany and France arrived at similar conclusions, –i.e., better training permits the optimal use of new technologies.

Reversing the equation, and looking at human resources from the demand side, many studies have been carried out on firms to identify the changes in the methods of organization of production that are attributable to recent technological changes and their impact on educational and training requirements in general. These studies<sup>5</sup> show that there are two opposing trends in the organization of work: one tries to strengthen the tradition of large-scale mass production with piecemeal, limited tasks in a context of greater automation, while the other emphasizes centralization, delegation of responsibility, team work and investment in human capital. Although the organization of production based on large-scale mass production continues to be the dominant trend in some sectors and countries, the trend towards decentralization is expanding faster and is acquiring a growing number of supporters among entrepreneurs, owing to better prospects of adaptation to new technologies, the new world economic environment and the improved performance observed today of firms that

2 Ibid.

3 Michael L. Dertouzos and others, *Made in America: Regaining the Productive Edge*, Cambridge, Massachusetts, MIT Press, 1989

4 Organization for Economic Cooperation and Development (OECD), *New Technologies in the 1990s. A Socio-Economic Strategy: Conclusions and Recommendations of a Group of Experts on the Social Aspects of New Technologies*, Paris, OECD, 1989.

5 OECD, *Background Report Concluding...*, op. cit.

have adopted it. Indeed, faster changes in products and services, demands for better quality and the shortening of product cycles force firms to develop more flexible methods that emphasize job versatility, communication skills, and problem-solving and entrepreneurial abilities. Employers expect their employees to have a better and broader range of general skills and also expect them to train throughout their working lives, that is, to have the ability to continue learning and to be able to respond to changes (see box III-1).

The bulk of the impact of changes in the occupational structure triggered by the new technologies is in the more routine and less complex jobs that are usually automated; the result is a relative decline in the less skilled jobs especially in the services sector and in the administration offices of firms. At the same time, there is a trend towards smaller production units, often with shorter

chains of command and greater participation by workers in decision-making. Both phenomena affect the overall employment structure since the conventional pyramid with a large number of unskilled or semi-skilled workers at the base is changing into a sphere-like structure where the largest number of workers are concentrated at the intermediate levels.

One of the key conclusions of these studies is that the introduction of new technologies into firms is not limited to only one impact; there are various options for using the same technology to organize work and human resources; each of these options is related to such factors as the history of the firm and the type of market it operates in, among others. However, although no single profile exists, human resources are undoubtedly becoming a new variable of competitiveness in almost all the business scenarios. Firms therefore

#### Box III-1

##### THE NEW EDUCATIONAL QUALIFICATIONS DEMANDED BY FIRMS

Studies of the new patterns of organization of work in manufacturing firms show that new educational requirements have been added and that such requirements in turn define a new worker profile. The introduction of new production processes requires operators to have three new skills: first, the ability to simultaneously fulfil the requirements of product quality and meet production deadlines; secondly, the ability to regulate, as part of a team, production flows to satisfy demand as well as the need to optimize the use of human resources and the firm's physical facilities at a given point in time; in this connection, workers assume a substantial portion of the functions that used to be carried out by supervisors; thirdly, the workers must be able to participate in design-related activities, since they have to contribute actively to the application and refining of production processes that are changing continuously.

The new profile does not eliminate previous practical technical training requirements but adds the need to have greater evaluation and conceptual management skills and aptitudes for verbalizing and transmitting information that are more than the intuitive knowledge previously considered as crucial in worker training. The other conditions required to work

well are flexibility and the ability to understand new standards and situations.

Changes have been noted in the procedures for hiring and training bank employees that are somewhat similar. In various OECD countries, financial institutions hire youth with educational qualifications that are markedly higher than the previous standard, and several years of post-secondary studies are often required for posts that used to be filled by candidates who had not completed their secondary education. The firms also provide training primarily in three areas: first, the development of new patterns of behaviour stressing communications skills with clients and other employees and the ability to settle conflicts and understand the firm's strategic objectives; secondly, providing a thorough knowledge of the specific products and markets of the firm; and finally, promoting a semi-entrepreneurial approach among the staff of the firm from the shop floor up as the basis for the greater independence expected of them. Increasingly, financial institutions are using part-time employment and subcontracting as a means of boosting the flexibility of labour in the performance of high-skill or low-skill tasks that the firm does not specialize in.

have to design new strategies that allow them to coordinate their tangible and intangible investments, introduce new technology, organize labour and train personnel.

In this context, it is the firms' responsibility to increase their training efforts, since changes are reflected faster and more clearly on the job. However, at the same time, there is mounting pressure on the educational system to transmit general and sound basic knowledge to the whole population. It is to be hoped, therefore, that educational reform will be placed high on the political agenda of the countries. In fact, almost all the developed countries have started or are contemplating reforms of their educational system. In all these countries, the debate on education is in full cry. What follows is a summary of the main topics of this debate and the main lessons that can be learnt from it.<sup>6</sup>

## **2. Some of the main issues of the international debate on education and training of human resources**

There is no doubt that considerable differences exist among the various educational systems of the countries and the problems and challenges that each system faces, just as there are substantial differences in their economic, social and political organization. Notwithstanding these country differences and the specific nature of national problems, there are some common aspects that characterize the current state of education and help to focus the contemporary debate with respect to human resources training on certain common topics.

The first aspect is related to the longer time spent in school which is not in response to laws extending compulsory education. In fact, a growing percentage of youth remain in the educational system well beyond the compulsory age; this is a reflection of a growing social demand for

education (see table III-1), owing partly to the expected economic benefits (especially in the stagnant European labour market) and partly to the premium placed by society on education.

Another apparent trend which stems in part from the foregoing is the search for alternative fiscal revenues for financing education. The share of education in public budgets has tended to shrink, especially in Europe, as a result of the increase in welfare benefits for the unemployed. Although accurate figures are not available, it is probable, on the other hand, that private spending by both families and firms has increased. The distribution of the funding effort has therefore been a bone of contention in most of the developed countries. The rise in family spending is usually concentrated on two categories of expenditure: payments of registration fees for higher education and spending on additional teaching materials and extracurricular education. Only for the first of these categories are subsidy or compensatory credit programmes available to low-income households. Higher family spending on education as a whole could therefore be contributing to making the educational system less equitable.

The global changes in the participation of firms have, in turn, been the result of opposing trends. The general trend has been towards less participation of firms in the financing of the formal system of technical and occupational training of youth and a corresponding rise in public participation. This reflects, to a considerable extent, the switch in objectives of such programmes which favoured job placement over job training. Conversely, the firms seem to have substantially increased spending on the training of their own employees, basically in response to the need to introduce new production technologies. The dissemination of such practices in the business community has differed from

<sup>6</sup> Annex I gives an outline of the current debate on education and training of human resources in eight countries (Germany, the Republic of Korea, the United States of America, France, Italy, Japan, the United Kingdom and Sweden).

Table III-1  
**SCHOOL ENROLMENT RATE BY AGE GROUP, IN SELECTED COUNTRIES**  
*(Percentage of the corresponding age group)*

	Schooling global (3-24 years)		Pre-school (3-5 years) 1986	Compulsory post-secondary (17 years) 1986	Post-secondary (20-24 years) 1986		
	1975	1986			Total	Men	Women
Germany	74	74	93	100	30	34	26
Republic of Korea	-	-	-	78 <sup>a</sup>	38	50	24
United States	70	71	36	89	60	56	64
France	73	77	100	80	30	29	31
Italy	67	64	89	46	25	26	23
Japan	64	69	44	91	29	36	21
United Kingdom	70	70	31	49	22	24	21
Sweden	64	70	95	86	31	29	33
OCDE average <sup>b</sup>	64	68	59	73	32	33	31

Source: Joint ECLAC/UNIDO Industry and Technology Division, on the basis of figures provided by OECD and UNESCO.

<sup>a</sup> Net school enrolment rate of population age 12-17.

<sup>b</sup> Simple (unweighted) average, excluding Turkey.

country to country. In Italy, for example, small and medium-sized firms have followed this trend; in the United Kingdom and France, on the other hand, the bulk of such spending has been on the part of large firms.

Finally, in the Latin American countries efforts are being made to match education with the needs of the economy and to mould the educational system to the requirements of firms. Although this phenomenon does not replace the social and political approaches traditionally associated with education, the new concern for the economic effects of education substantially changes its perception and use. Indeed, the coexistence of these social, political and economic approaches seems to be generating a kind of tension which is making it difficult to adopt clearly defined educational policies and is even creating situations where simultaneous objectives are being pursued which, on the face of it, seem to be contradictory.

Such tension is reflected at three parallel levels: that of objectives; that of

policy tools on human resources training; and that of the institutional framework.

i) *Objectives: professionalization or extension of secondary education.* The tension in the relationship between education and the economy is reflected more clearly at this level. Traditionally, the most important function assigned to education in Western societies has been that of preparing citizens and generating a common culture regarded as necessary for the proper operation of democracy. Although education also had an economic function, it was considered as secondary and subordinate to the primary function.

As a result of the new conditions of globalization and international competition, greater importance has been given to the economic function of education by assigning a crucial role to human resources and manpower training mechanisms as factors of international competitiveness. This does not mean, however, that the importance of education's socio-political function has been downgraded among other things because growing international migration is putting greater pressure on the

integrative function of the national educational systems of developed countries while the pronounced changes in production and employment structures are creating severe social tensions that will have to be defused within a framework of equity.

The situation becomes even more complicated inasmuch as achieving each one of these political, social and economic objectives of education means maintaining the precarious balance between general and specialized education. The competitiveness of the countries depends on their ability to provide the majority of the labour force with both broad-based general education and specific, functional skills. This two-fold objective is reflected in the labour market, where firms are trying to recruit people who have a combination of a higher basic level of education and training on the job.<sup>7</sup>

In turn, the exercise of citizenship depends on access to a common culture, the ability to be independent, ready access to information and the capacity to express constructive criticism.

These inevitable clashes in objectives are reflected in the two-fold trend towards retraining and providing post-secondary training outside the formal school structure, as has been observed for example in Germany, Sweden and the United Kingdom. In other words, at the same time as concepts relating to the world of work are covered in the general curriculum of schools including secondary schools, attempts are being made to strengthen the general education components of the training programmes of firms.

ii) *Policy tools: how can efficiency and equity be maximized?* The national cases considered in annex I show that to achieve the objectives of competitiveness and citizenship the system's efficiency and equity have to be maximized

simultaneously. Equity means equal access, treatment and achievements. Efficiency in turn covers two aspects: external efficiency in terms of the requirements of the economic and social system; and internal efficiency with respect to the systems's own goals and the performance of the inputs used.

The determinist human resources planning models traditionally used for maximizing the external efficiency of education have been virtually abandoned by the West, but no alternative models have emerged.

In the face of growing tensions between economic and social demands, particularly in the context of the sluggish European labour market, most European governments have implemented a more flexible and pragmatic version of the old planning model.

On the one hand, they are promoting the extension of schooling; while organizing training programmes for the unemployed on the other. Both actions combine a short-term social objective (reducing youth unemployment) with a long-term economic objective (increasing the availability of skilled manpower). Another benefit of this dynamic type of policy is that it increases the quantity of information in the system, heightens the community's awareness of education, promotes collaboration between various actors and facilitates the development of more suitable institutional schemes.

The measurement of the internal efficiency of the system and its establishments requires the application of appropriate performance evaluation schemes and therefore reference standards and approaches. Relatively homogeneous performance standards and approaches could in turn play a general informative role and permit the identification of those establishments and groups having the most problems, thus

7 It is estimated that six years of basic education are the minimum requirements for any subsequent apprenticeship. For example, the United States company Motorola requires all its staff, including production line employees, to have the equivalent of a seventh-grade education. Moreover, most stable jobs, including high-level professions (lawyers, doctors, managers, etc.), now require practical pre-employment experience.

facilitating the adoption of targeted compensatory policies.

The contemporary debate shows, however, that a common evaluation standard should not be allowed to become an exclusive mechanism that heightens social differences. The particular difficulty in this connection is deciding between uniform or multi-track secondary education.

Overcoming the dilemma between efficiency and equity calls for the extensive involvement of social actors especially firms, in defining reference approaches as well as flexibility in the application of such approaches.

Finally, the State should ensure the efficiency of the educational system as a whole. An educational system, like any other systemic arrangement, is composed of the sum of elements that have multiple relationships not only with their environment but also with each other. Such interaction is crucial to ensuring the overall efficiency of the system. The lack of continuity at some levels or between levels of the system or a weak system of higher education, for example, negatively affect not only performance but also the equity of educational investment as a whole.

Educational policy should therefore promote the synergies between the different levels and parts of the system so as to make the system more efficient internally and externally.

iii) *Institutional schemes: Should the educational system be decentralized or integrated?* This objective affects the institutional organization of education in countries with centralized educational systems as well as in those with decentralized systems.

As annex I shows, all the countries appear to be moving towards a combination of both systems so that the autonomy of individual educational units increases as mechanisms are established or strengthened to produce a system that is integrated inwards and equitable outwards.

It is generally recognized that educational units need to be independent

in order to adapt to the diverse and changing requirements of their environment. Autonomy is particularly important in contexts of growing ethnic and social heterogeneity, because without such autonomy the schools might elicit reactions of rejections and become unruly.

The new institutional schemes adopted by countries with centralized systems of education therefore seek to promote diversity instead of uniformity and treat differences as a source of collective enrichment. This calls for both the active participation of teachers in designing the school curriculum and for vigorous action to develop and enhance the leadership capacities of school administrators.

At the same time, an attempt is being made to ensure that all students have equal opportunities by maintaining a uniform national system that avoids social, ethnic or regional segregation that might occur in systems that are too decentralized. The challenge seems to be, therefore, to promote integration and variety concurrently by promoting decentralization of the system under schemes that ensure its coherence at the national level and an equitable distribution of opportunities and achievements. The countries discussed in annex I recognize that such a challenge calls for the State to assume a new role that encompasses regulation, evaluation, development and financing.

In practice, however, it has not been easy for the State to play this new role. A common problem in almost all the countries appears to be the division of responsibility between the State and firms in the area of technical and vocational training, often accompanied by a problem of delimiting the areas of competence of central, regional and local authorities. The most successful method of overcoming such clashes appears to be to seek a consensus that would permit all the actors to participate jointly in the elaboration and implementation of objectives as well as to analyse their continuing adaptation to new circumstances.

### 3. Eight specific lessons derived from the international debate on education and human resources training

Apart from these general considerations, at least eight specific lessons can be learned from the international debate (see annex I).

i) *A fresh opportunity is at hand.* It can be concluded from the international debate that education has become a priority in discussions on national strategies for growth and development. In the advanced countries, it is recognized that successes and failures in the economic, social and political aspects of the development of nations depend to a considerable extent on their educational systems. This recognition takes on even greater relevance in terms of future challenges. All the countries are reviewing their educational systems to bring them in line with new requirements. They have all detected deficiencies, limitations and shortcomings. Innovations and reforms are therefore widespread. It would be absurd for the Latin American countries to design strategies that copy those of the developed countries; but it would be even more absurd not to take into account their experiences in order to learn from their successes and mistakes.

Obviously, education's impact on the behaviour of the region's economies and societies is different from its impact on the developed countries. However, in terms of the future and the challenges of changing production patterns with social equity, the international debate shows that the depth and speed of changes confronts all the countries with similar challenges. None of them are sure about the future. The main thing is to consider the present as a fresh opportunity to make up for lost time.

ii) *No one innovates from scratch.* Although innovation is widespread, the international debate reveals that innovations are carried out on the basis of accumulated knowledge and experience. An astonishing range of methods is used to solve similar problems,

so that there is no need to work from scratch. Similarly, the cultural traditions and characteristics of the educational systems of each country are the mandatory starting point for any large-scale educational reform. Consequently, the idea is not to copy blindly but to learn and cooperate.

iii) *Prior consultation and consensus are a must.* The international debate indicates that a common feature of all the experiences, which is reflected by various methods adapted to the national situation, is that new forms of consultation are being defined between the different actors involved in education, training and technological innovation. The application of educational strategies and their evaluation requires continuity and stable conditions to be able to develop. The priority now assigned to education reflects the fact that appropriate conditions exist for such alliances. In turn, these alliances can help to change the way in which individual actors define their courses of action.

Businessmen could be expected to take greater interest in the benefits arising from general educational policies on the basis of which specific occupational training could be efficiently carried out. Governments should give greater decision making authority to bodies whose activities do not depend on the government in power. Teachers and internal actors of the system should assume greater degrees of autonomy by participating in decisions and publicly assuming responsibilities for results. In short, the international debate shows that educational strategies are being conceived more as national policies, based on broad agreement, than as short-term government policies.

iv) *Considerable ability to forecast is needed.* As the educational strategies are not short term and require the consensus of different actors for their execution, they need to be able to forecast future demands and problems. Various elements are needed to be able to forecast properly: accurate diagnosis of the situation to be changed, considerable knowledge and

information on world trends, a general agreement governing the behaviour of actors in line with national goals, and willingness to take risks together with evaluation mechanisms that allow appropriate adjustments to be made to the processes of change without waiting for the confirmation of results and corrections that might become expensive and difficult to implement.

v) *Institutional changes are priorities.* The international debate assigns priority to institutional changes; that is, to the forms of organization and management of educational activities. These aspects are stressed because it has been demonstrated that the failure of the usual strategies is partly due to the resistance of the institutional structure and partly to the traditional styles of educational management. Both generally refuse to make allowance for the current requirements for greater linkage between education and the demands of society. The traditional styles of educational administration contributed to the growing isolation of schools and to prevailing corporate pressure within the governing bodies of educational systems. On the contrary, the linkage of such systems with the processes of social and economic developments in a context of rapid change requires flexible institutional mechanisms that ensure the efficient use of available resources.

In this debate, it is equally important to appreciate each country's efforts to come up with methods that enable them to achieve the proper balance between institutional autonomy and local and national requirements for integration, equity and compensation of disadvantaged groups and individuals.

The stage where any problems could be solved by pouring in more resources, particularly funds, is over. Changing the system of education does not mean increasing already available resources but rather reorganizing the way in which such resources are used. Such a change is even necessary for resources to be increased. The international debate assigns considerable strategic importance to the

question of changes and innovations at the institutional level. The autonomy of institutions, responsibility for achievement, the drive of actors, etc., are crucial issues in designing new methods of educational activity.

vi) *The evaluation of performance as a factor in change.* As the international debate shows, changes are no longer made on the basis of guidelines provided by ideological paradigms but on the basis of information derived from the assessment of the results of ongoing activities. The international experience indicates that all decisions are taken on the basis of exhaustive and reliable information about the performance of institutions, their results, etc.

vii) *Equitable access to education means access to socially meaningful knowledge.* The international debate reveals considerable concern for the issue of equity in the distribution of educational opportunities. However, this concern is relevant to the linkage between education and economic growth. Experience appears to indicate that disregard for equity in education has an adverse impact in the short, medium and long terms on the behaviour of society and on economic performance. In this connection, the novelty of the international debate lies in the fact that equity is no longer simply considered a matter of increasing coverage. The debate is now focused on the quality of educational opportunities and the efficiency of the strategies applied to solve the problem of those who do not have access to education and training.

In that regard, the international experience shows that coverage can be expanded without a considerable reduction in quality. It moreover indicates the convenience of combining global policies when defining formal patterns of education for the entire population and combining project-by-project targeted actions when solving the problems of specific sectors of the population that cannot benefit from the general opportunity.

viii) *Priority to the results of education.* The international debate also shows

considerable concern for the results of educational activity; that is, for what pupils actually learn at specific periods. In this regard, the most important change is that the skills required for the job market and those required for citizenship are tending to converge and coincide in many aspects. These core skills, based on the mastery of the basic cultural codes of modern living and the development of

man's ability to solve problems, take decisions and continue learning in turn constitute a yardstick for assessing the design of curricula and the efficiency of methods applied to the learning process. Consequently, teachers who are responsible for defining appropriate strategies for achieving these objectives have to take these new requirements into account.

## Chapter IV

# TECHNOLOGY AND EDUCATION: THE PRODUCTION AND ACCUMULATION OF KNOWLEDGE AS THE MOTOR OF DEVELOPMENT

Studies and reflections on the role played by the production of knowledge in the economic development process are tending to occupy an increasingly prominent place in the debate on the factors or motive forces of development. This has been a constant concern of analysts belonging to the structuralist school,<sup>1</sup> but it did not occupy a leading place in the models and bodies of theory based on neoclassical thinking.<sup>2</sup>

Over the last decade, however, models have been developed in works on economic theory, business management analyses and prospective studies which, on the one hand, reflect the interest aroused by the subject of education and technical progress and, on the other, represent significant contributions to the evaluation of the decisive effect that the production of knowledge has on the economic growth rate and, ultimately, on the long-term well-being of the population.

Only a few of these contributions have been taken up by the mass media; most of

them still remain within the field of academic reflection. The aim of this chapter is to outline the contributions made by analyses of business management, prospective studies and economic theory. These conceptual advances and the policy proposals arising from them may serve as means for designing measures that can heighten the effect of the production of knowledge on the economic growth rates of the countries of the region.

### 1. Expansion of the store of knowledge as seen by the neoclassical theory of economic growth: an exogenous or unrecognized factor

#### a) *Main contributions of traditional theory*

What is now considered as the traditional neoclassical theory of economic growth was developed in the 1950s and early 1960s and is based mainly on the work of Solow and Denison,<sup>3</sup>

1 See ECLAC, *Education, Human Resources and Development in Latin America* (E/CN.12/800), Santiago, Chile, 1968. United Nations publication, Sales No. E.68.II.G.7.

2 See ECLAC, *Changing Production Patterns...*, op. cit., chapters IV and V, where the ECLAC approach is integrated with contributions by authors linked with the "Neo-Schumpeterian" school (C. Freeman, R. Nelson, C. Pérez, G. Dosi, B. Lundvall and others).

3 See R. Solow, "A contribution to the theory of economic growth", *Quarterly Journal of Economics*, 70, 1956; "Technical change and the aggregate production function", *Review of Economics and Statistics*, 39, 1957, and E. Denison, *The Sources of Economic Growth in the United States*, Committee for Economic Development, New York, 1962.

whose aim was to determine and quantitatively evaluate the main features of the long-term growth of the United States rather than to formulate an economic development theory.

In spite of the simplicity of their assumptions, the traditional models made it possible to focus attention on two of the objectives put forward by Solow and Denison: on the one hand, measurement of the effect of different exogenous variables on the growth rate of the product, and on the other, discussion of the possible effects of policy measures in so far as they affect the levels of income of the population or the long-term growth rate of such income.

The main contribution of the traditional neoclassical model was to provide a framework for quantifying the effects of different variables on growth; this contribution is known as "growth accounting". In a 1957 article, Solow showed that it was possible to attribute the economic growth of the United States to different explanatory variables, and he measured the effect of technical progress, using the methodology which he himself had developed the year before. He estimated that 87.5% of the total increase in the product per man-hour was attributable to technical progress, while the remaining 12.5% was due to the increase in the stock of physical capital.

The breakdown of the total productivity of the factors (capital and labour) and of technical progress represented an important advance in the analysis of growth. Since the 1950s, efforts have been made to reduce the size of the residual component of technical progress by improving the measurement of the factor products. With regard to physical

capital, it was proposed to improve its measurement through the inclusion of technical progress in successive generations of capital, thereby reflecting the idea that capital goods incorporate technical progress.<sup>4</sup>

Although such adjustments to the capital factor have not been universally accepted, the corrections to the measurement of the labour factor, in contrast, have spread to the great majority of the studies carried out on these topics. The process of "enhancement" of labour has led to the successive inclusion of the annual average hours worked, weighting the hours worked by the relative average income, and adjusting those hours by the changes in the structure of the labour force by age and sex. In particular, importance has been given to the enhancement of labour through education. As from the work of Schultz (1961)<sup>5</sup> most of the studies on growth accounting have included education as an important factor in explaining it.<sup>6</sup> Estimates of the effect of education have given differing results, however. Denison calculated that the contribution of education to United States growth between 1929 and 1982 came to 14%. Maddison arrives at similar results for Western Europe between 1913 and 1987 (a contribution of 16%).<sup>7</sup> For shorter periods (for example 1950-1962), the estimates give lower figures for Western Europe (a contribution of 5%), whereas in the United States the figure remains virtually unchanged (15%).

There are practically no studies on growth accounting for the Latin American countries, and very few of those that do exist give an estimation of the specific contribution of education. Correa estimates that in the period 1950-1962, that

4 See K. Arrow, "The economic implications of learning by doing", *Review of Economic Studies*, vol. 29, 1962.

5 Theodore Schultz, "Investment in human capital", *American Economic Review*, vol. 51, No. 1, March 1961.

6 When they include education among the elements taken into account, growth accounting exercises measure the effect on productivity either of improvement in the education of the whole population, or that of the labour force. Ideally, of course, changes in the level of education of the total labour force should be taken into account.

7 A. Maddison, *Dynamic Forces in Capitalist Development*, London, Oxford University Press, 1991 (in the press).

contribution ranged from 16% for Argentina to 1% for Mexico. More recently, Elías estimates the contribution at 18% for Argentina for the period 1970-1980, while ECLAC estimates it at between 27% (Argentina) and 9% (Colombia) for the period 1950-1989.<sup>8</sup>

*b) The distinction between policies which affect income levels and those which affect growth performance*

In addition to their contributions to the quantification of growth, the neoclassical models have highlighted the distinction between growth effects, which involve changes in parameters that affect growth rates throughout balanced development paths, and level effects, which lead to changes that increase income levels without modifying the long-term growth rate. This distinction is fundamental for understanding the importance of the accumulation of knowledge and education in the growth process.

Policy measures which affect fundamental macroeconomic variables, such as the rate of saving, for example, change the level of income achieved by a country, but will not have any effect, within the framework of the traditional model, on the rate of growth. Thus, a country which saves more will become richer than a country which saves less, but it will not necessarily grow more quickly.<sup>9</sup>

The foregoing theory naturally raises the question of what changes will indeed have growth effects. Within the traditional neoclassical model, the answer is clear: variations in the population growth rate and in the rate of technical progress or the production of knowledge. Both of these are considered exogenous variables,

outside the explanatory scope of the model, however.

*c) The limits of traditional theory*

The main limiting factor of the traditional models stems precisely from the foregoing point. The most important phenomena for explaining the continuity and rate of growth are extra-economic: that is to say, they are considered as given quantities which cannot be included in the logic of the model, so that they are outside the reflections of economic policy.

Assuming that there is no mobility of the factors of production, the model predicts that countries with the same preferences and technologies will converge towards identical levels of income and similar growth rates. Since this assertion does not reflect reality, it is necessary –if it is desired that the model should fit in with the variations actually observed between countries– either to postulate substantial differences in the parameters or to assume that the countries have very different initial levels of technology.

Population growth and the share of wages in income (two basic parameters of the model) differ from one country to another, but not enough to explain the differences in income. By assigning such an important role to exogenous variables as the source of growth, these models necessarily assign a smaller role to all the others, which makes it more difficult to explain the big differences in levels of income and growth rates between the countries.

In short, the assumption made in the conventional model that there is a tendency towards equalization of remuneration of the factors of production

8 See H. Correa, "Sources of economic growth in Latin America", *Southern Economic Journal*, July 1970; V. Elías, "El crecimiento económico argentino y sus determinantes: 1970-1980", *Ensayos económicos*, No. 21, Banco Central de la República Argentina, March 1982, and ECLAC, "Explaining Economic Growth 1950-1989", Santiago, 1991 (unpublished). This latter study estimates the contribution of education at around 15% for the Republic of Korea, Thailand and the Chinese province of Taiwan, and at 19% for Spain and Portugal.

9 Naturally, the Keynesian and post-Keynesian growth models (for example, those of Domar and Harrod) reject this assertion in view of the role they assign to investment in the generation of effective demand, as well as the role it plays in increasing capital stocks.

between countries deprives it of validity as a theory for explaining the differences between countries and demands new ideas for understanding the causes of these differences.

## 2. The new growth models: emphasis on the production of knowledge and its endogenization

### *a) New perceptions and new answers*

The limitations of the conventional model summarized in the preceding section were present from its very origin, but during the last decade even those supporting this line of thinking acknowledged them, thus leading to the generation of new answers to the traditional questions regarding development.

Certain characteristics of development processes have traditionally been generally accepted: that per capita product grows with time, that the shares of capital and labour in the aggregate product are relatively stable, and that there is a positive correlation between the level of the product and the share of the industrial sector in it.

However, some new facts were gradually perceived as being of fundamental importance during the 1980s:

- a) The accumulation of physical capital had been overestimated as a growth factor: the differences between rates of accumulation do not explain the differences between the growth rates of countries.
- b) There is a high degree of positive association between the growth of a country and its level of technological development (measured in various ways: through its stock of scientists and engineers, the use it makes of them, the amount spent on research and development, the number of patents granted and the number of scientific publications, etc.).
- c) Growth tends to be accompanied by an increase in the stock of human capital (measured, for example, through the level of education).

- d) Capital flows tend to go to the developed countries, in spite of the fact that capital is already relatively abundant in those nations.
- e) Skilled labour tends to emigrate from the underdeveloped countries, in spite of the fact that it is in relatively short supply there.
- f) Growth is accompanied by growing volumes of international trade.

The widespread perception of the importance of these facts led to the development of new models which seek to answer questions of the following type:

- a) What factors explain the differences observed in the levels and rates of growth of the product between countries?
- b) What is the role of the external sector in promoting the growth of countries?
- c) Through what mechanisms can the economic authorities exert a positive influence on the growth process?

### *b) A multitude of models with a common growth motor: endogenous production of knowledge*

The new growth models developed during the 1980s do not form a homogeneous body of theory. They do share, however, the objective of making the sources of sustained growth endogenous, which they propose to do basically by including in the model such aspects as investment in human capital, learning by doing, the external economies derived from specialization, and the incorporation of new goods into the structure of production. The endogenous generation and accumulation of knowledge involves costs and benefits, both social and private, which mean that it can be explained as a function of economic factors.

i) *Investment in human capital.* Before analysing the growth models based on investment in human capital, it is worth summarizing the main contributions and limitations of the conventional models which proposed to incorporate technical progress by including it in investment in physical capital.

The first attempts to achieve endogenous technological progress ran into the problem of reconciling the presence of increasing returns to scale with the existence of a competitive equilibrium. The production function adopted involved constant returns to scale with respect to changes in capital and labour, for a given stock of knowledge. By permitting changes in the stock of knowledge, the aggregate production function would give increasing returns to scale with respect to changes in the capital and labour factors and the stock of knowledge.

One way of obviating the problem was to assume that knowledge is a public good and that only capital and labour receive remuneration, which is not satisfactory because it makes it impossible to explain the growing share of private activity in the generation and spread of knowledge. An alternative means then explored was to assume that the stock of knowledge forms part of the flow of physical capital, as proposed by Arrow. The creation of new knowledge would therefore be a by-product of investments in physical capital. In this case, the production function gives decreasing returns in terms of physical investment, and all growth comes from an increase in the labour force. This solution is also unsatisfactory, however, because: i) proposing an exogenous variable (growth of the labour force) as the motor of growth does not make it possible to explain the nature of the processes of technological change and their relation with economic growth, and ii) it is incompatible with the evidence,

which suggests an inverse relationship between growth of the labour force and growth of per capita income.

An alternative model, developed by Romer,<sup>10</sup> accepts the existence of non-diminishing returns on the capital factor. In this case, the motor of growth becomes investment, and no pattern of convergence is imposed on the levels and rates of growth of the product between countries starting from different stages of development. The growth rate will depend positively on the rate of saving and per capita income, and negatively on the capital/labour ratio. In contrast with the traditional model, this indicates that the government can permanently influence the evolution of the product through stimuli which tend to increase the rate of saving.

In the specific models based on investment in human capital, the aggregate production function depends on the stock of physical capital, the labour force, and the stock of human capital incorporated in the labour force. The evolution of the accumulated human capital depends on the amount of the resources devoted to the sector whose function is to produce human capital, and on the nature of that function. Lucas<sup>11</sup> and Uzawa,<sup>12</sup> among others, in particular assume that the production of human capital itself makes intensive use of human capital.

Growth is maintained because the production of human capital gives constant returns. The function of the production of final goods gives increasing returns, because of the positive

10 Paul Romer, "Increasing returns and long-run growth", *Journal of Political Economy*, vol. 94, No. 5, October 1986.

11 The study by Robert Lucas, "On the mechanics of economic development", *Journal of Monetary Economics*, vol. 22, 1988, represents the most important contribution so far to what has been called the "new theory of growth". A detailed review of this essay and of others belonging to the same body of theory may be found in the report prepared for ECLAC by the consultant Patricio Mujica, entitled *Nuevos enfoques en la teoría del crecimiento económico: una evaluación* (LC/R.933), Santiago, Chile, ECLAC, October 1990.

12 H. Uzawa, "Optimum technical change in an aggregative model of economic growth", *International Economic Review*, vol. 6, 1965.

externalities associated with the investment in human capital.<sup>13</sup> It may be deduced from the two models that the growth rate of the product is sub-optimal from the point of view of society, because the private agents cannot internalize all the gains associated with investment in physical or human capital. Consequently, the amounts of investment in physical or human capital will be sub-optimal.

An important thesis of Lucas is that the movement of capital between countries does not eliminate differences of wages between them. The combination of increasing returns and similar real interest rates means that wages are higher in the countries with a bigger endowment of physical and human capital. This explains the migratory movements of labour from poor to rich countries already referred to. In the developed countries, labour of all levels of skills receives higher wages than in the underdeveloped nations.

Within a more general frame of analysis, it is possible to show the features of the growth process based on investment in human capital, using the concept of the effective labour force (that is to say, measured in units of efficiency), which is defined as the product of the average stock of human capital and total employment. In this case, the function of the average production of human capital (in per capita terms) depends on the per capita amount of capital and labour taken away from the activities producing goods and services. In this case, too, the growth rate of the product depends on the rates of accumulation of physical capital, growth of employment and increase in the average stock of human capital. If we assume constant returns in the production of human capital, then this rate will depend on the percentages of total resources (capital and labour) devoted to the production of human capital and on the physical capital/labour ratio, measured in units of efficiency.

This reasoning suggests two important considerations regarding the

relation between the characteristics of the system of production of human capital and the nature of the historical growth processes:

- The higher the proportion of the saving of physical capital with respect to the stock of human capital, the higher will be the growth rates of the average saving of human capital and of the aggregate product. This means that there is a complementary relationship between the two types of capital, and it directly links the rate of saving with the growth process. An increase in the rate of saving means that, for similar rates of allocation of factors to the production of human capital, there will be an increase in the growth rate of the capital stock, and this brings with it an increase in the ratio between physical capital and labour, which in turn increases the growth rate of the stock of human capital and hence of the product.
- In accordance with the equation for the growth of the stock of human capital, the changes which take place on a once-for-all basis in the nature of the function of the average production of human capital or in the proportion of resources devoted to its production will have a permanent effect not only on the stock of human capital, but also on its growth performance and, in general, on the evolution of the other macroeconomic variables.

The disparities in the initial factor endowment of two economies will mean that there will be differences between them in the level of the product and also in its growth rates.

In order to complete this examination, it must be noted that these models also show the fundamental impact of the external effects of the accumulation of human capital on the average efficiency of an economy. The theory of human capital, in its strict sense, is centred on the fact that the way an individual shares out his time among various activities in the present

<sup>13</sup> Romer assumed that the externalities came from investment in physical capital, which gave increasing returns (see P. Romer, *op. cit.*).

will influence his productivity in the future. In addition to the effects of investment in human capital by an individual on his own productivity (internal effects), the new growth models consider the extent to which the average level of human capital also affects the productivity of all the factors of production. These effects, which go beyond the traditional partial equilibrium framework of the theory of human capital, are strictly speaking external, because although all those concerned benefit from them, no individual decision regarding the accumulation of human capital can significantly alter the average level, and the latter will therefore not be taken into account in individual decisions on the allocation of efforts.

As in the case of external effects, in the models analysed the accumulation of human capital has a "social" aspect which is not usually taken into account by economic theory. The technology of the accumulation of human capital is based on the assumption that the initial level of each person is proportional to that already attained by the older members of his family. The accumulation of human capital is perceived as a social activity, involving human groups in a manner which does not have any equivalent in the accumulation of physical capital.

ii) *Growth with learning and the growth of learning.* The literature on growth and productivity has emphasized the importance of formal education and research activities for the accumulation of knowledge. Recently, Lucas<sup>14</sup> and Stiglitz<sup>15</sup> have highlighted the importance of learning for growth, with learning understood to mean accumulated experience and information provided by the markets. These authors note that the differences in levels and growth rates of the product between countries may be

attributed to disparities in their rates of learning, which may be the result, in turn, of differences between the rates of learning of the various sectors of production and between the patterns of specialization.

Unlike the models based on investment in human capital, where the decision to accumulate this type of capital (for example, by going to school) is equivalent to withdrawing resources from production, in the models based on learning the stock of human capital grows with the effort devoted to the production of goods. As in the previous models, if there is learning the equilibrium growth rate is less than the optimum rate and there is a loss of well-being associated with the inability of producers to internalize the external effects deriving from the fact that the accumulation of skills by an individual (learning) depends on the average level of the skills learnt by an industry.

As in the case of the models of accumulation of human capital, an education subsidy could improve the optimum allocation of resources; in this case, promotion of the production of goods involving a high rate of learning would be economically efficient. The selection of production techniques and the general allocation of resources must be carried out in such a way that the agents can act with a long-term view, which highlights the fact that decisions that concentrate too much on the short term are not the best ones.

The introduction of international trade elements makes it possible to draw very interesting conclusions from the growth models based on learning. It may be demonstrated, on the basis of very convincing assumptions, that the countries which produce goods that offer wide possibilities of learning register higher growth rates than the countries

14 Robert Lucas, "On the mechanics...", op. cit.

15 J. Stiglitz, "Learning to learn, localized learning and technological progress", *Economic Performance and Technological Change*, P. Dasgupta and P. Storeman (eds.), Centre for Economic Policy Research, Cambridge, Mass., Cambridge University Press, 1987.

specializing in goods which involve a low content of learning.<sup>16</sup> Indeed, the very logic of the model itself suggests that countries specializing in this latter type of goods may be trapped in a vicious circle which takes them from low learning to slow growth and once again back to low learning.

If the countries accumulate skills by doing what they already know how to do efficiently, then they intensify their initial comparative advantages, which tends to fix them permanently in a given production pattern unless changes in the structure of demand or the introduction of new goods alter the international distribution of production and the corresponding growth rates.

The concept of protecting infant industries fits in with these models, provided that such industries can effectively develop in the environment in question; if not, then a policy of this type will merely serve to eliminate the possibility of consuming goods with a high learning content.<sup>17</sup>

iii) *Specialization and dynamics of the structure of production.*

a. *Models based on specialization and monopolistic competition.* Previously, it was stated that the solution proposed by Arrow (1962), namely, that of assuming that innovation is a public good in order to get round the problems deriving from the existence of growing returns to scale, was not consistent with the growing importance of research and development activities in the private sector. The solution chosen by Romer (1987), was to leave out the assumption of perfect competition. Thus, the social benefits associated with the creation of knowledge are largely internalized by producers, as a result of the monopoly they exert over the production of goods incorporating technological innovation. In this case, a

competitive equilibrium would be sub-optimal, because of the presence of externalities.

In this model, it is held that the expansion of the market helps to increase the specialization of production, which has positive effects on economic growth. The technology for the production of the final goods, which is developed under competitive conditions, depends on the labour force, the human capital, and an unlimited variety of specialized inputs. The possibility of reproducing the production of final goods means that this gives constant returns to scale. However, the production of final goods registers growing returns with respect to the increase in the diversity and specialization of the intermediate inputs. In the production inputs market there is monopolistic competition: such goods are near but not perfect substitutes.

The limit on the increase in the specialization of the inputs market is determined by the existence of fixed costs resulting from the presence of an original input of which there is a given quantity and which does not have any alternative use in the economy. These fixed costs mean that the variety of inputs is limited by the amount of the original input.

Development of the model makes it possible to indicate that:

- The specialization in supply is sub-optimal. To the extent that those requiring inputs appropriate part of the social benefit deriving from the introduction of new inputs, their producer does not internalize the whole of the gains generated by his actions. This may make necessary public intervention in order to correct this externality.
- External trade makes it possible to expand the variety of specialized intermediate inputs initially available

16 If the effects of the deterioration in the terms of trade due to the increased supply of the good which has an intensive content of learning is greater than the effect of technical progress on productivity, then countries with rapid technical change will have the lowest growth rates.

17 G. Grossman and E. Helpman, "Trade, innovation and growth", *American Economic Review*, vol. 80, No. 2, 1990, have pointed out in addition that if activities for the accumulation of formal human capital compete for resources with production activities that involve a high level of learning, then promotion of the latter could reduce the rate of innovation.

and thereby exert positive effects on development. This argument in favour of trade openness is only applicable in the context of intermediate goods. Restrictions on the importation of consumer goods could have repercussions on well-being but would not necessarily influence the growth rate of the product.

b. *Models that involve changes in the structure of production.* A problem raised by the incorporation of learning into growth models is that, unlike formal accumulation of human capital, where it is easy to assume non-decreasing returns at the family level, learning seems to give decreasing returns at the level of each type of good. This makes it necessary to develop models which take account of the continuous introduction of new goods, which have decreasing returns in each of them, but which inherit the specialized human capital used in the production of the previous goods. Stokey introduced this type of model, based on changes in the structure of production as between final and intermediate goods.<sup>18</sup> New goods of higher quality are created which replace the traditional goods, as the result of a process of learning which takes place within each sector but has repercussions on the economy as a whole.

In this case, the effects of trade openness will depend on the local or global nature of the innovations associated with the learning process. If this process is specific and is concentrated on existing goods, then the openness will tend to strengthen the prevailing patterns of specialization and restrict the possibility of introducing new goods. If, on the contrary, the learning in a sector spreads to the rest of the economy, then greater openness does not limit the incorporation of new goods of higher quality. Even when learning is located in a particular sector, an import substitution strategy may be efficient provided that the growth of the sector where the

innovations associated with learning are concentrated is stimulated through the application of trade barriers.

It may be inferred from this model that:

- It is important that the effects of learning should cover a wide range of goods. If not, this will simply strengthen the existing production patterns, making it more difficult to introduce new goods and eliminate traditional ones.
- In order for the new goods to be incorporated, the effects of the learning on the structure of production must be stronger in a forward direction than a backward one.
- If there is a preference for a varied range of consumer goods as an aim in itself, it is not easy to do away with the traditional products, which will only be eliminated as the result of changes in individual preferences or in the relative cost structure (technology).

### c) *Conclusions*

i) *The fundamental importance of the production of knowledge in growth dynamics.* The production of knowledge, both in the formal version of the accumulation of human capital and through learning in the production of goods, is of fundamental importance for attaining a sustainable long-term growth rate. The prevailing growth rate over the equilibrium level is essentially insensitive to changes in the parameters of the production function (those basically affecting levels of income), and only the population growth rate and exogenous technical progress can make the conventional model give a convincing expression of a sustained growth path.

The incorporation into the new models of the accumulation of human capital and learning makes it possible to do away with the exogenous nature of the technical process and provide an explanation for growth in which this does

<sup>18</sup> Nancy Stokey, "Learning by doing and the introduction of new goods", *Journal of Political Economy*, vol. 96, No. 4, 1987.

not stop in the long term and in which it depends on forces that are internal with respect to the economic system. This opens up the possibility of discussing economic policies for education, training and technology in an analytical framework with strong quantitative potential.

ii) *External economies, non-efficient competitive equilibria, and the need for public policy.* The presence in learning of effects which cannot be internalized by the decision-makers, together with the specialization and accumulation of human capital, give grounds for asserting that there will be a permanent discrepancy between optimum resource allocation from the social point of view (maximization of the well-being of individuals) and solutions involving the free play of a competitive economy. This situation is even clearer in the case of economies with monopolistic competition deriving from the presence of growing returns to scale.

The amounts of resources which the market allocates to activities furthering learning, the accumulation of human capital and technological development will always be sub-optimal. It is the responsibility of public policy to correct this shortcoming. According to the theory of welfare economics, one solution could be the provision of subsidies, financed with a neutral tax, for these activities, while a second possibility would be the direct provision of such services by the State. Considerations of efficiency at the level of partial and general equilibrium suggest that the first option would be preferable.

Policies to further the accumulation of skills and knowledge are not only important in order to increase the growth rate, but they are also economically efficient for increasing collective well-being. The arguments in favour of these policies increase in proportion as the effects of learning and the accumulation of knowledge are more widespread and hence less internalizable.

iii) *Accumulation of knowledge, learning and the achievement of an optimum position in*

*the international economy.* The entry of a country into the international economy involves a structural change with long-term effects on the levels and growth rates of the product. The levels may be raised through the elimination of inefficient trade barriers. Increasing the growth rates will depend substantially on the sectoral impact of greater trade openness. Intensity of use of human capital and learning varies from one sector to another. A structure of production based on sectors with comparative advantages and a low content of learning may mean being trapped in a mechanism of low growth and limited learning. In view of the importance of the initial conditions in the new models studied, sectoral policy decisions may affect the long-term economic growth rate either positively or negatively. For better or for worse, in an open economy the initial pattern of comparative advantages is intensified in proportion as production increases.

iv) *The central role of the agents: families, entrepreneurs, and intermediate-level social groups.* The role of families in the accumulation of human capital was extensively highlighted by Lucas' model: the younger family members begin their productive life with a stock of human capital which is proportional to the stock of the older members. The social aspect of the accumulation of human capital is also clear in the accumulation of learning, in which the external effects are predominant and lead to a definition of skills which are localized at the level of regions, cities or even smaller areas specializing in particular activities (such as the financial districts of all big cities). The definition of those with whom interaction takes place is of crucial importance for determining the average productivity of an activity. In this respect, it is worth noting that national aspects of productivity, in their strict sense, are abstractions of little operational use.

The role of the entrepreneurs is of fundamental importance in the process of accumulation of knowledge, both because of the role of learning and because of the

importance of enterprises in disseminating the knowledge acquired. It has been indicated that countries whose frontiers of knowledge are at similar levels of development can incorporate different levels of knowledge in the production process, depending on the degree of development of their entrepreneurial capacity. In particular, Schmitz has developed a model which links entrepreneurship, imitation and growth.<sup>19</sup> Firms invest resources in the application of existing techniques, and the generation of new knowledge is a by-product of their production activities. The differences in growth rates would be the result of the differences between the systems of incentives for entrepreneurial activities of imitation or innovation.

v) *The fundamental importance of the initial conditions.* Emphasis has been placed a number of times on the fundamental role played in the new models by the historical stock, that is to say, the initial conditions from which a growth path begins. These conditions have served to rationalize the persistence of situations of slow growth, low accumulation of human capital and limited learning. The long-term growth rates of different types of countries are very different, but they tend to display exceptional stability over time. The possibility of being trapped in a low growth path is clearly visible thanks to the contributions made by the new models. A country cannot always select the best possible set of initial conditions, but it can optimize those conditions which are under its control.

vi) *Breaking tendencies towards slow growth as a result of great events or a conscious effort to invest in the production of knowledge.* Finally, the question arises of what events or conditions can explain radical changes in long-term growth rates, such as those displayed for two decades by various Southeast Asian countries. Stiglitz points

to the role of great events such as plagues or wars, which may create favourable conditions for changes of the magnitude of those experienced by these countries. The models summarized earlier, however, give rise to the more convincing suggestion that the accumulation of human capital, learning and specialization was given an initial boost in those countries which subsequently enabled them to embark on paths of high growth and heavy accumulation of knowledge. It must perhaps be recognized that the decision to give such an initial boost was not connected with the economic system and may have been linked with some great event. Nevertheless, the subsequent growth path of these countries can indeed be explained by the new models.

### 3. The view taken by business management analysts

#### a) Introduction

A review of the theories of the main analysts of business management and strategy is particularly important because of the repercussions their propositions have in forming opinion within the community of entrepreneurs and managers at all levels of the business organizational structure. Although these propositions are made in the context of highly developed societies, they have also captured the interest of the developing countries, which are engaged in trying to improve their international competitiveness. There are many mechanisms for the dissemination of the ideas of these analysts,<sup>20</sup> so that they have achieved exceptionally wide dissemination. Another factor which makes the contributions of these analysts particularly important is their highly concrete nature, due to the need to bring out in their works the elements of a

19 James Schmitz, "Imitation, entrepreneurship and long-run growth", *Journal of Political Economy*, vol. 97, No. 3, June 1989.

20 Books which immediately become best sellers, textbooks for graduate and postgraduate schools, television programmes, or videotaped series.

normative nature, that is to say, those that can serve as a guide for business activity.

The contributions of three authors –Peter Drucker (Claremont College), Kenichi Ohmae (Director of McKinsey & Co., Tokio) and Michael Porter (Harvard Business School)– have attracted the attention of business circles as “authorities who have something to say”. In the following pages, special prominence will be given to the views of these authorities on the role of education, training and innovation. These contributions do not have, and do not claim to have, a common message other than that implicit in the search for success in the business world. Although their reflections and recommendations (especially those of Drucker and Ohmae) are based on the experience, potential and demands of the developed countries, their influence on business circles in Latin America has nevertheless been considerable.

**b) Education as a social demand and responsibility**

Drucker’s contribution to the debate on the role of education in contemporary society is particularly interesting because it emphasizes not only specific policy aspects but also the great humanistic principles which should guide them.<sup>21</sup> Drucker starts from the hypothesis that an economy in which knowledge has become the main wealth-producing resource naturally presents educational institutions with new and challenging demands for greater effectiveness and responsibility. The active members of a society do not need only a basic education, but rather one which must be expanded to incorporate knowledge of informatics and technology (their features, dimensions and rates of change), which are aspects that were not considered essential even as little as one decade ago. This will lead to profound changes in education in coming decades: changes greater than all those which took place over the last three

centuries, since the use of printed books became widespread.

However, the many sources of information available, which will increase still further in the future, cannot take the place of the school as the mechanism for formal education, since it is only through organized and systematic learning with well-defined objectives that information can be transformed into knowledge and this can be used as a means for individual and social change.

According to Drucker, present-day education shows its clearest limitations in the aspects related with its instrumental nature. Educational systems, especially in the United States, the United Kingdom, and the countries which take these countries as their inspiration, start from the erroneous assumption that it is necessary to train independent professionals or social leaders, whereas real life shows that the great majority of the students of these systems will be working as wage-earners in complex organizations. The educational institutions, he maintains, are incapable of providing their students with the most elementary techniques for coping with the realities they will have to face, that is to say, how to earn a living within a large or small organization. In particular, they do not teach the most elementary techniques of how to be effective members of an organization: the capacity to present ideas briefly, simply and clearly; the capacity to work in a group, and the capacity to direct one’s own work. In other words, they do not provide the necessary techniques for making the organization an instrument for their own aspirations and for the realization of human values.

Drucker’s view is that the type of education that will be needed in the future must not only have this pragmatic function, but must also be centred on the transmission of social responsibility, which demands ethics, values and morality. It is in this respect that American schools are most clearly lacking, and not

<sup>21</sup> See Peter F. Drucker, *The new realities: in Government and in society, in the economy and economics, and in world view...*

because they have ceased to know what their mission is or because fulfilling that mission was particularly difficult. According to this author, the recipe that must be applied on the supply side is well-known and quite basic: to demand high standards and student discipline. On the demand side he suggests that it would be possible to progress towards greater equality of opportunity through public subsidies for compulsory education (funds directly supplied to the families, regardless of whether their children attend a public or private school), together with scholarships and credits at the level of higher education.

The specific requirements of the new education will vary according to the different forms adopted by the "knowledge society", but some of the main guidelines for the future may already be discerned:

- i) Education will have a social purpose, and it will not be devoid of values: indeed they never have been absent in any system.
- ii) The educational system must be open, with upward mobility, as all the great educational reforms ever since the Renaissance have tried to ensure, except for the English Public Schools. This is an outstanding feature of the United States educational system, according to Drucker, and may stimulate students to return to formal education, years after having left it, in order to obtain their secondary or higher-level diplomas.
- iii) In the "knowledge society", the concept of completed education has no sense. Ongoing education, especially of persons of high academic level, will be a flourishing activity in the future, even though schools and universities still look upon it with some mistrust or, if they can, do not even consider it at all.
- iv) Education cannot be confined only to the schools. In particular, every institution that provides employment can at the same time be an educational

centre. In this respect, the country with the clearest advantages would be the United States, since employers devote considerable resources and efforts to the training of their employees (especially those with the highest level of existing training), spending as much as all the colleges and universities together on this purpose.

- v) Formal education must take seriously the principle that students must learn for life and not for the school: something which neither teachers nor students have done so far. Drucker says that he has not found any educational institution which makes any effort to find out what its graduates remember of the subjects learnt, 10 years after having obtained excellent qualifications.
- vi) A radical change in approach is needed for this purpose. The educational system has specialized in problems: it is concerned primarily with the weak points of its students. Although it is true that it is necessary to ensure a basic common level of skills, no-one can organize efficiency on the basis of weak points, even by correcting them. The educational system must be built on the skills of the students. The shortcoming is clear: "Bright students do not cause problems, and the way education is organized in the schools mainly focuses on the weak points of the students".<sup>22</sup>
- vii) Education has a responsibility to prevent meritocracy from degenerating into plutocracy. The children of parents who are well off or who have a high level of training will always have advantages, but those advantages should not be an insoluble obstacle for other young people. Since there is no reason why taxpayers should subsidize students, one mechanism which could compensate for these disadvantages would be to finance studies through scholarships

<sup>22</sup> Ibid.

and loans, in anticipation of the additional income that education will generate during the life of the student.

The new requirements facing education can be satisfied by using new technologies. Television, video cassette recorders and computers, in particular, will be increasingly dominant instruments in education, despite the resistance of the schools to using them as anything more than a teaching supplement.<sup>23</sup> The new technologies open up new possibilities, but they may also increase the frustration and disappointment of the students, who may be obliged for a time to use modern media based on technologies which have reached high levels of sophistication, handled with internationally competitive professionalism (television and video cassette recorders), under the control of teachers who are not able to show the same degree of sophistication and international competence. In the new technological context, the work of the teachers will consist much more in guiding, directing, giving examples and animating the students than in merely passing on the contents of the course material.

In short, the "learning society" will demand changes in the schools and in education, which will be promoted by the learning technologies that that society puts into effect. Drucker thinks that this veritable educational revolution will begin in the United States, because that is the country which has the educational system that is most open, most flexible and least centralized and regulated. It could also be because that is the country which is least satisfied with its present educational system.

c) *The inseparable link between education and the style of business management*

According to Kenichi Ohmae,<sup>24</sup> few observers have understood the critical importance of primary education in Japan. The message it has transmitted since the end of the Second World War –namely, "the choice is between exporting added value or dying of hunger"<sup>25</sup> is considered to have been the guiding thread which has made it possible to progress towards being a country with a unified system of values, in spite of the absence of any formal policy in this respect.<sup>26</sup>

Education tends to emphasize harmonious team work: the brightest children are taught to use their higher intelligence to help their slower-learning comrades and smooth out inter-personal relations. According to Ohmae, this is precisely the talent that a Japanese executive needs at the present time. Without this type of training, he says, the typical features of Japanese management approaches and techniques (quality control circles, suggestions boxes, lifetime employment, etc.) could not work as well as they do.

Since Western education places greater stress on individualism, it seems only logical that one of these individualists, employed in a big company, may sometimes show complete indifference to the well-being of the organization as perceived by the management of the enterprise. Ohmae suggests that any Western country which might be tempted to copy the Japanese management approach should consider with the greatest attention this fundamental difference which begins from the earliest stage and is strengthened

23 Drucker draws an interesting comparison between the resistance of present-day schools to the use of the new technologies and the opposition of schoolmasters at the end of the fifteenth century and during the sixteenth century to the use of printed books.

24 See Kenichi Ohmae, *The mind of the strategist: the art of Japanese business*, New York, McGraw-Hill, 1982.

25 Until then, it had been considered that the alternative to the country's shortage of natural resources was territorial expansion through militarism.

26 In this respect, Ohmae highlights the identity of views which exists, for example, between the Ministry of International Trade and Industry and the Ministry of Education.

by divergent styles of education. Consequently, it is not so much that the special style of management derives from the Japanese character, but it is due rather to the content and methods used in Japanese education.

In short, this author holds that the Japanese work ethic is a direct result of the educational system. The Government, for its part, played an important role in guiding and furthering the long-term national objective which the country set itself after 1945: namely, to attain economic success without having to reconstruct its military power.

*d) The generation of competitive advantages at the national and company level*

The basic concern of Porter is to study the reasons for successes and failures in international competition and to design mechanisms for improving the competitiveness of countries, as expressed through the competitiveness of their enterprises.<sup>27</sup>

Porter's analytical framework permits the definition of four groups of factors which determine national advantages:

- The quantity, and especially the quality, of their factors of production (human resources, natural resources, knowledge and capital and infrastructure).
- Conditions connected with the nature of domestic demand.
- The existence or absence of industries supplying inputs, or having some other kind of linkage, which are internationally competitive.
- Business strategy, the organizational structure of enterprises, and the degree of rivalry existing between the firms in a particular market.

The competitiveness of a country depends much more on its capacity to create productive factors than on the stock

of such factors which it possesses to begin with. Outstanding among the mechanisms for improving competitiveness are those which are designed precisely to create such factors of production.

*i) The creation of factors of production.*

Since the level of competitive advantage that a country's companies can attain is determined by the quantity and quality of the factors to which they have access, governments have an important and positive role to play in creating such factors, but this task cannot be left exclusively in the hands of the authorities.

In almost all the competitive industries studied by Porter, the leading firms had taken concrete measures to create factors of production, to arrange for the establishment of institutions to create them, or to influence the existing institutions so that they would create them. These companies did not simply accept the *status quo* with regard to the development of factors but sought to improve the existing situation, and they invested directly in the creation of factors connected with training, research and development, and construction of infrastructure. In particular, the most competitive firms generally had good internal training programmes and devoted more resources than their rivals to research and development.

It is worth highlighting Porter's rejection of the argument, which is fairly widespread in the United States, that companies should not invest in the creation of factors of production because this generates externalities which cannot be internalized and there is a risk of losing the investment through staff turnover. According to this author, this argument is simply a survival of a static concept of competition. Few of the most competitive companies studied acted as though they felt that this was a real problem.

Failure to invest in the creation of factors is a fatal error in international

<sup>27</sup> In *The Competitive Advantage of Nations*, New York, The Free Press, 1990, Michael Porter makes an in-depth study of the conditions responsible for the competitive advantages or disadvantages of 10 countries: Denmark, Germany, Italy, Japan, the Republic of Korea, Singapore, Sweden, Switzerland, the United Kingdom and the United States.

competition. Although the investments made by a company will always benefit its competitors in some way, in the long run it is these investments which enable it to attain a higher rate of innovation. It is maintained that in companies that invest in their staff and are innovation-oriented, the turnover of key personnel is usually low. The fact that the staff are considered as a permanent resource creates greater incentives for both the company and its own staff to invest in the improvement of their skills.<sup>28</sup>

Still more important is the observation that the key factor for maintaining a competitive advantage is rapid and continuous technical progress rather than a particular isolated discovery. A company which is afraid of giving benefits to its competitors and therefore uses the strategy of copying the inventions of others will finally lose, because it will always be in the rear.

ii) *Sectoral programmes to create factors.* Just as important as the efforts of companies to create factors within their own organizational structure is the stock of specialized factors available in the country. Companies can influence the size and quality of this stock through sectoral programmes which support the creation of information centres, training schools, and research infrastructure and institutions which benefit the whole of their industrial sector in various ways; one of the most efficient ways of doing this would be through sectoral business organizations.<sup>29</sup>

Porter mentions numerous cases of the effective use by companies of traditional mechanisms for inter-enterprise cooperation (subcontracting,

licensing of technology, promotion of sectoral training centres, etc.), but views with distrust cooperative programmes of research and development between direct competitors, since quite apart from the practical problems involved in running them, they may do away with the incentives for innovation and eliminate experimentation with alternative approaches.

iii) *Company influence and participation in the creation of factors by the government or community.* The most successful firms have exerted an influence, through their active participation, in the efforts of government bodies, educational institutions and the local community. Companies which want to be competitive have the duty, to say nothing of their own interest, to influence the type and nature of educational programmes, lines of research, and the quality of public services.<sup>30</sup>

Companies have intervened in the establishment of educational institutions in many ways: for example, by sponsoring students or sending staff from the firm to study in those institutions. Other mechanisms used have been the provision of active assistance to such institutions in identifying the needs of the industry in question, collaboration in the design of their study programmes, recruitment of their graduates, and provision of support in the form of financial resources for the acquisition of equipment and installations, the hiring of lecturers, the award of scholarships, and the establishment of prizes for distinguished professors and students. Some firms have established permanent working relationships with the teaching staff in

28 Naturally, the greater stability of staff in Japanese and German firms than in United States companies enables firms in the first two countries to benefit more directly from their investment in human resources, but nevertheless the experience of such companies as IBM, DuPont and Hewlett-Packard shows that ongoing investments in technology and human resources can give high yields in respect of international competitiveness.

29 An example in this respect is that of the clothing, footwear, ceramics and furniture industries in Italy.

30 Examples of this are the establishment by the Nestlé Company, of the International Management Institute (IMI) school of business administration in Geneva or the establishment of relations with universities by German chemical firms and their financing of institutes concerned with chemical research.

subjects of interest to them, including regular visits by the professors to the research laboratories of the firm, the establishment of programmes under which researchers from the firm spend part of their time on work in the university laboratories and vice versa, and participation in programmes of company support for educational institutions. Companies have also supported the establishment of new university departments or research institutes in fields of technology which are important for their own industrial sector.

Certain firms have played an active role by giving advisory assistance in the design of research programmes and the setting of priorities. Porter highlights in particular that the time and attention that the private sector gives to educational institutions and government research bodies are just as important as the money they spend.<sup>31</sup> If a firm takes a shortsighted view and does not support university research programmes because it will not have exclusive access to the results, or if it does not support the establishment of vocational training schools because this would also benefit its competitors, this reflects a narrow and inadequate vision of the way competitive advantages are created. A company has a vital interest in the stock of factors to which it can gain access, even when (and indeed, *particularly* when) they also benefit its suppliers, consumers and competitors. The existence of world-level suppliers, buyers and related industries in the country is particularly valuable for improving the competitive advantages of a particular firm.

iv) *Government support policies for the creation of factors.* It is generally considered that governments are the main moving force in the creation of factors, and their

role in this respect is justified in so far as externalities exist. However, government mechanisms for the creation of factors are rarely in themselves a source of competitive advantage. The direct efforts of the government are appropriate in general spheres, but the most important factors in the creation of competitive advantages are of a specialized nature and are inevitably linked with sectors or groups of industries. In the industries studied by Porter, it was the companies themselves which were responsible for the generation of the most important factors, sometimes in collaboration with government bodies.

Government efforts aimed at creating specialized factors run the risk of creating the wrong factors at the wrong moment. Educational bureaucracies are usually years behind in identifying the needs for new types of training or training in new fields such as informatics, in spite of the pressures from industry. The conclusion is that the government and industry should invest jointly in the creation of factors.

Porter's research leaves few doubts that education and training are decisive factors in national competitive advantages.

The nations studied which invest most in education (Germany, Japan and Korea) have advantages in many sectors, which are easily attributable to human resources. Moreover, in all the nations studied, the industries that were most competitive were those where the specialized investments in education and training were exceptionally high.<sup>32</sup>

Education and training are perhaps the most important long-term base that governments have for improving the competitiveness of industry. The optimum functioning of the general educational system must be an essential

31 Such participation is characteristic of Germany and Switzerland. As noted in annex I, in Germany almost all important firms participate in training programmes in technical schools, maintain close contact with the relevant departments of local universities, and support research in independent institutions. The scanty linkages of industry with these types of institutions are a weak point in Japanese firms, however, where the creation of more advanced factors takes place mainly within the company itself.

32 For example, the United Kingdom in chemicals and pharmaceuticals, Sweden in mechanical engineering and the United States in the aerospace industry and pharmaceuticals.

priority of the government. It must be an item of economic policy as well as social policy. It must be borne in mind that, since the general educational system is not enough on its own to ensure national advantages, it is also important to establish policies linking the educational system with industry and supporting the training efforts of enterprises, in order in this way to ensure the creation of the specific factors of production needed by each industry.

v) *The right educational policy.* Although the effectiveness of an educational system is a function of the amount of money spent on it, equally or more important is the educational strategy adopted. Education and training policies must naturally reflect the particular circumstances of each country, but on the basis of his research, Porter suggests the following general features that a proper educational policy should have.

a. *Educational standards must be high.* Students must compete in order to get on. In this respect, the government has a fundamental role to play, since it is difficult to achieve high standards without State intervention in fixing them and furthering them. In terms of social justice, high standards are by no means incompatible with open access to the educational system; compatibility between the two may be achieved by giving financial support to students and pre-university programmes in order to improve the level of preparation of candidates for entry into more demanding programmes.

b. *Teaching must be a profession with high prestige and status.* This will take the form of social respect and adequate income levels.

c. *Most students must receive education and training with some kind of practical orientation.* Most of the students must receive at least the basic knowledge which will make possible their future training in industry or work.<sup>33</sup> The training of a

proportion of the best students of a country in science and engineering seems to provide the best probability of improving the economy.

d. *In addition to the universities, there must also be other respected higher educational institutions of high quality.* An economy cannot improve rapidly unless the students who did not have access to higher studies can acquire the skills they need for their professional development, together with the specific skills needed in each industry. Technical universities and professional schools are institutional alternatives which enjoy a good deal of respect in a number of countries.<sup>34</sup> The fact that a high percentage of young people may be engaged in university studies is not an unmistakable sign of the most efficient development of human resources. For developing specific factors, a specialized system of professional and technical training at the industry level is a central priority for any advanced economy.

e. *There must be close links between the educational institutions and employers.* These links will be improved if the educational institutions have the flexibility to adapt themselves to the special demands of local industries. In this respect, rigid centralized control, although beneficial for maintaining high standards, may militate against the creation in regionally concentrated industries of specialized factors whose development is of fundamental importance for improving their competitive advantage. Where success has been achieved in this respect, there is generally a close link between research institutions and industry, thanks to the existence of research institutions specializing in particular industrial sectors, research contracts between enterprises and universities, and explicit dissemination mechanisms.

f. *Companies must make considerable investments in internal training either on their own account or through associations*

33 According to Porter, particularly important subjects in this respect are mathematics, computation, writing, basic sciences and languages.

34 For example, in Germany and the Republic of Korea.

*within their industry.* There is a variety of examples of complementation of research and development activities with training efforts within enterprises. In order to progress in the achievement of competitive advantages, the government must not hinder these efforts by applying taxes on profits which are invested in training or by enacting labour laws that make it more difficult. Experience shows, however, that there is no evidence that subsidies need to be given to in-company training.<sup>35</sup> Such subsidies, like those for research and development activities, are not necessary when entrepreneurs and workers have a standing commitment with their enterprise and are faced with vigorous competition. Such a commitment is not facilitated by policies which directly or indirectly isolate the enterprise from market conditions.

*g. Immigration policies must permit the entry of persons with specialized skills.* In the short term, measures of this type can reduce the shortage of skilled human resources.

#### *e) Conclusions*

Examination of some aspects of the proposals made by the three business management and strategy analysts considered above permit the following conclusions to be drawn regarding their view of the role of education in society and in company performance.

i) The pragmatic aspect of education is of fundamental importance, but education's role as a generator of social responsibility must not be forgotten, which means that its ethical content and the values it imparts are also of the highest importance. In the final analysis, what is explicitly involved is the classical ideal of "virtue" as the goal for which education should strive in knowledge-based societies. Rejecting this approach would mean running the risk of producing only "educated barbarians" (in the classical sense of the term).

ii) The conjunction of technology (possibility) and knowledge-based society (demand) gives reason to expect that the coming decades will witness changes in education even more momentous than those which took place over the previous three centuries.

iii) The practical experience of the educational system and the content of the education provided will determine what types of business management principles are applicable in a society. Thus, for example, the distinction between individualism and development of team spirit is felt to be of crucial importance for explaining the differences between Western and Japanese management techniques.

iv) The best companies of the most competitive countries on the world market make exceptional efforts in the areas of internal training and support for education, training, and research and development.

v) It is a shortsighted policy not to invest in activities which give rise to externalities that cannot be totally appropriated by their producer. Competitive advantages are obtained from investments in such activities precisely because of their external benefits for suppliers, consumers and related enterprises, including competitors. Living in an internationally competitive environment is the best situation for ensuring that a company develops competitive advantages.

vi) Education is one of the main instruments available to governments for improving the competitive performance of industry.

vii) The principles guiding educational policies of proven success seem to be shared by the various different national cases: high levels of quality, high prestige and status of teachers, and close links between the educational system and companies or business associations.

<sup>35</sup> Porter gives examples of firms in Germany and Japan which invest in training because of the pressure of competition and not because of subsidies.

#### 4. The transformation of education, as seen in some recent prospective analyses

In some recent prospective analyses,<sup>36</sup> the subject of the transformation of education is seen as a fundamental aspect linked with the leading role assigned to knowledge because it is considered the most important factor in the new productive paradigm. The breadth of its treatment varies according to the length of the studies and whether their approach is global (Naisbitt and Aburdene, Toffler, and Gorz) or by individual subjects (Gaudin and Reich).

Naisbitt and Aburdene refer specifically to the subject of education in analysing the prospects of the Pacific area, which they consider to be one of the most important developing areas of the future; they note that the importance given to education in that area has been turned into a great competitive advantage and, within it, the countries which invest most in education will have the greatest capacity to compete. "Pacific Asia has shown ... that a poor country can develop, even without abundant natural resources, provided it invests enough in its human resources."<sup>37</sup>

Toffler dwells at length on the idea that knowledge is a central element of post-industrial society and that its importance will continue to grow in the future. He says that "the twenty-first century path to economic development and power is no longer through the exploitation of raw materials and human muscle but ... through application of the human mind"<sup>38</sup> and "because it reduces the need for raw materials, labour, time, space and capital, knowledge becomes the central resource of the advanced economy."<sup>39</sup>

In Toffler's opinion, knowledge is in the process of ceasing to be an offshoot of wealth or force, which were the decisive power factors in previous phases, and is becoming instead their main foundation. Hence, the struggle for control of knowledge is intensifying all over the world. For the author, this process constitutes a democratizing factor, since knowledge can be infinitely expanded, reproduced, used many times without being exhausted, and, unlike force and wealth, is within the reach of the poor. Moreover, knowledge—considered as a form of power—is not expressed in material objects, but in symbols which are, so to speak, within the brains of the workers. This means, in turn, that workers become less and less interchangeable.

All this makes knowledge the most significant power factor. On the basis of this preeminence of knowledge, Toffler highlights the importance of education and the need to make changes in it, although he hardly refers to this subject in his last book because, as he says, it calls for separate treatment. Nevertheless, he does say that "...our mass educational systems have become largely obsolete... education will require a multitude of new channels and great expansion in its variety of programmes"... "A system in which choices abound must take the place of the present system in which they are in short supply". He adds that the links between education and the principles governing the system of new communications media—interactivity, mobility, convertibility, connectivity, ubiquity and globalization—have only been analysed to a very slight extent. Overlooking the relations between the educational system and the system of communications media in the future would mean short-changing

36 John Naisbitt and Patricia Aburdene, *Megatrends 2000*, New York, William Moore and Company Inc., 1990; Alvin Toffler, *Powershift*, New York, Bantam Books, 1990; Thierry Gaudin (ed.), *2100: récit du prochain siècle*, Paris, Editions Payot, 1990; André Gorz, *Metamorphose du travail*, Paris, Editions Galilée, 1988, and Robert B. Reich, *The Work of Nations*, New York, Alfred A. Knopf, 1991.

37 John Naisbitt and Patricia Aburdene, *Megatrends ...*, op. cit., p. 199.

38 Alvin Toffler, *Powershift*, op. cit., p. 400.

39 *Ibid.*, p. 88.

the students who will receive their training through both systems.

Education –says Toffler– has come to be a priority “for the advanced sectors of business... since its leaders increasingly recognize the connection between education and global competitiveness”.<sup>40</sup> Consequently, in dealing with the subject of education companies are now reappraising some of its pure achievements: creativity, the capacity to solve problems, etc. Toffler introduces the concept of “highbrow” and “lowbrow” companies, depending on how knowledge-intensive they are. In this respect, the difference between a “highbrow” company and a “lowbrow” firm lies not only in the amount of knowledge and information used, but also in the distribution among the staff as a whole. In traditional companies, knowledge is concentrated at the top, whereas in modern companies it tends to be spread over the whole staff. As the author says, “The goal is a better-paid but smaller, smarter work force”.<sup>41</sup>

In view of the constant need to renew their products and processes, companies will have to continually call on imagination and develop greater tolerance towards departures from the norm, individuality, and curiosity for discovering new things.

Knowledge may be seen as “anti-capitalist” in the sense that it will progressively reduce the amount of capital needed per unit of output.<sup>42</sup>

Returning to the subject of the close relationship between the educational system and the communications media, Toffler says that “A key objective of those who want an advanced economy, therefore... is to make sure that all citizens, poor and rich alike, are guaranteed access to the widest possible range of media...”<sup>43</sup> and “if the essence of the new economy is knowledge, the democratic ideal of freedom of expression becomes a top

political priority”. In conclusion, he notes that “With the revolutionary rise of the new wealth-creation system, it is not a fraction of the working population, but a substantial and ever-expanding number whose productivity depends precisely on the freedom to create everything from new product designs to new computer logics, metaphors, scientific insights, and epistemologies. Super-symbolic economies grow from cultures constantly provoked by new, often dissenting ideas, including political ideas”.

The prospective study carried out by a team of French researchers working under the direction of Thierry Gaudin differs from the above studies in two aspects. Firstly, its time horizon is longer, and secondly, in addition to offering an overall view the study also centres on a number of specific topics, including that of education.

The study begins with a review of the present state of education, from which it is concluded that today’s schools owe the essence of their structures and organization to the nineteenth century. This is because this form of education arose in response to two demands of industrial society: on the one hand, the need to lengthen the training period in order to obtain skilled labour and technicians capable of reading plans, making calculations and operating complex machines, and on the other, the need to generate ideological consensus around the values of the dominant élite.

Consequently, its content in terms of values was impregnated with a strong sense of “nation”, of respect for institutions, and faith in progress and technology, while its methodology was based on the appreciation of accuracy, preciseness and formalism, intellectual rigidity, and lineal and mechanical reasoning. In short, as noted in the study, clear priority was given to orderly and

40 Ibid., p. 361.

41 Ibid., p. 75.

42 Ibid., p. 86.

43 Ibid., p. 361.

methodical qualities, at the expense of creative faculties.<sup>44</sup>

As the productive paradigm of the industrial society loses its validity, however, the effectiveness of such schools goes down and they are less and less capable of satisfying the demands of society.

Even in the developed countries there are serious problems. Illiteracy, which had been virtually eliminated, has now reappeared in a new form: functional illiteracy (between 20% and 25% of the population have forgotten nearly everything they learnt in school). After twelve years' schooling, 40% of young people in the United States are incapable of understanding an article from the New York Times and, what is much worse, cannot read and understand a bus timetable.<sup>45</sup>

The educational system is leading to a dual situation: the spread of ignorance, on the one hand, and an excess of education, on the other. This imbalance seems to be particularly marked in regions such as Latin America. Gaudin notes that the overproduction of educated persons without taking account of conditions on the labour market produces a "lumpen-intelligentsia": a kind of marginalized intelligentsia, young but full of frustrations, which is linked in the poorer countries with a form of power exercised in the public sector and is only modern in its efforts to bring its consumption habits in line with those of its opposite numbers in the developed world. All of this probably contributes to economic and social segmentation, increased marginality, and -in some regions of the world- to the emergence of a form of integrism which is against evolution.

For these reasons, the present phase, which Gaudin calls the "show society", will be replaced in the early twenty-first century by an "education society" which

will strive primarily to integrate marginalized sectors of the population through the extension of compulsory education to 18 years of age and the imposition of a technical and ecological culture on an entire generation; this will make possible in the following phase -"the liberation society"- the full flowering of research and creative capacity, which are the key elements in competitiveness.

In these new phases, it will be impossible to enter the labour market without having a certain minimum of skills. These, for their part, will not be obtained through learning factual data, which will be far too numerous (and in any case all easily obtainable and usable), but through acquisition of the methodological bases which make it possible to find them, and, as Gaudin says, to learn to navigate in this sea of knowledge, which will in fact assume the proportions of an ocean.<sup>46</sup> According to this author, the information industries, with their enormous data banks interconnected throughout the entire planet, will provide the means for such navigation, but it will be necessary to possess the intellectual instruments which make it possible to determine one's position, identify the routes to follow, and thus arrive safely in port. Navigation in the sea of knowledge is not knowledge itself, but a form of know-how.

As from the end of the twentieth century, half the skills of an engineer will be obsolete five years after acquiring them. The fundamental qualities will be renewal, flexibility, and knowing how to do things and how to produce things, in order to change one's methods in good time. Learning cannot be limited to a particular period of life, but will form part of the exercise of a profession itself.

Education will become a vital function, both for companies and for individuals. It will be integrated in working time and will not take place in

44 Thierry Gaudin (ed.), *2100: récit du...*, op. cit., p. 526.

45 Quoted from Marvin J. Cetron in *The Futurist*, vol. XXII, No. 6, November-December 1988, in Thierry Gaudin (ed.), *2100: récit du...*, op. cit., pp. 527 and 528.

46 Thierry Gaudin (ed.), *2100: récit du...*, op. cit., p. 534.

isolated episodes, as in the heyday of "recycling" –says Gaudin– but instead will be daily and continuous, and will not be imposed from above by companies or the State, but will be seen as a necessity by the individual himself.

The prestige of degrees and diplomas will tend to diminish. Individuals will be judged rather on the basis of their real skills than on that of the theoretical knowledge that goes with a diploma. Progress in a worker's professional career will take place in a more informal manner, on the basis of his everyday practical activity.

Gaudin's team also links the educational system with the communications media, whose use, he says, will settle down at around two hours per day and will offer a wide variety of options. The quality of the medias' content will register a marked improvement, but even so they will still only serve as a vehicle for a form of disorganized and incoherent knowledge which cannot take the place of the educational system. In the new universe of relations which will emerge, these will be more numerous, multivalent, and involve an eclectic form of sociability with partial and revocable commitments. A new type of social cohesion will begin to appear which will mean that individual independence is not at variance with relations with other people. The individual will have a growing awareness of not being a finite piece of data locked up within himself. His previous relationship of domination over nature will become one of symbiosis. Ecology will teach him to think in terms of complexity, coherence, and globality.

The manner of thinking of the members of the industrial society was mechanically oriented, but that of the post-industrial society will tend to follow the forms of biology and of living beings. In this context, relations of an authoritarian type will be almost impossible. Superiors will be able to induce their subordinates to do what is expected of them, provided they give

them the room for initiative which they demand.

In order to satisfy so many demands, the education market will expand at a dizzy pace; whole chains of private schools will launch ongoing research and training programmes with highly sophisticated methods such as those of digital simulation, which will increasingly take the place of abstract teaching by putting the student in concrete situations that he has to solve. The schools will cease to be hamstrung by tradition and administrative routine. There will be less emphasis on transmitting factual knowledge and greater efforts to train open spirits capable of finding solutions for themselves. It will be a kind of training which is not based on the imitation of models but on invention; not on passivity and docility, but on initiative and creativity; in short, a form of education adapted to movement and complexity, which are the two main features of modernity.

However, these private school systems will make education more expensive and give rise to social segregation, and this tendency will have to be offset by public efforts involving greater resources, higher status for teachers, and increased autonomy of educational establishments, which, the study says, will have the right to administer the major part of their activities and decide on their programmes, teaching methods, staff recruitment and wages.<sup>47</sup>

Intermediate structures will be generated between these autonomous establishments and the places where production takes place. The emphasis in educational values will shift to some extent from discipline, precision, rationality and objectivity towards other broader qualities which will include creativity and autonomy.

The top élite, who were the guardians of the industrial model, will lose their reason for existence. In their place, there will be more numerous groups of well-trained individuals capable of

---

47 Ibid., p. 544.

of competence is the most indispensable and effective means of combating the dualization of society.<sup>50</sup>

In short, the relatively pessimistic view taken by Gorz also sees the educational effort as the most effective long-term means of avoiding segmentation and favouring social integration.

The subject of segmentation is also dealt with by Robert Reich, who refers basically to the United States in his analysis.

This author maintains that in the present global economy, the well-being of Americans (or people of any other nationality) no longer depends on the sporadic successes of their companies, corporations or national economies, but on their ongoing competitiveness, which is a function of the value that individuals are capable of adding to the global economy through their skills and knowledge.

In future, it will be the recognition of the value of each individual in the international labour market which determines his level of well-being. In this sense, the destiny of the inhabitants of the country will no longer be shared but individual, depending on the international valuation of each one's activity.

With regard to this new factor of discrimination, Reich identifies three categories of labour: routine production services, personal services, and symbolic-analytical services.

*Routine production services* represent the work done by industrial workers, non-manual workers and even data processors, who carry out standardized routine activities for the mass production of goods and services. They are guided by standardized procedures and sets of regulations and supervised in terms of the satisfactory fulfilment of routines. They need a number of basic skills which the present educational system provides, and the virtues demanded from them are loyalty, reliability, and the capacity to

carry out orders. In the United States, the number of jobs of this type could amount to some 25% of the total jobs, with a tendency to decline.

*Personal services* are also simple repetitive tasks which –unlike the foregoing, since they are on a person-to-person basis– do not participate in the global economy; they call for little education and are directly supervised. The people who carry them out must be credible, punctual and likeable, and their wages are generally lower than those of the preceding category. They represent 30% of the jobs in the United States, and their numbers are on the increase.

*Symbolic-analytical services* are the tasks carried out by persons responsible for identifying and solving problems, generating initiatives, creating and innovating. These services may be offered and acquired internationally, and they must compete at this level, but they are not included in the trade in standardized products. The goods produced are manipulations of symbols, data, words and oral and visual representations, in a broad field which includes artistic creation, science, technology, law, finance, design, etc. The skills needed are originality, intelligence, rapidity in identifying and solving problems, and creativity. Those who carry out these jobs do not have a well-defined hierarchic career, and they have university degrees and postgraduate qualifications. Their income is high but irregular. They represent 20% of the workers in the United States, and their number is increasing. This category tends to enjoy increasing advantages in the new economy, where the capacity to make creative use of knowledge is becoming the main consideration.

In general, education has fallen behind with regard to this type of work, and possession of a diploma does not guarantee that the holder has the skills needed to carry out this work. Moreover, adds Reich, a type of professional education which has emphasized the

<sup>50</sup> André Gorz, *Métamorphose du...*, op. cit.

accumulation and storage of knowledge to the detriment of original thinking may subsequently hold back this capacity.<sup>51</sup>

In order to explain the growing inequality which is occurring in the United States society, Reich says that the essential reason does not lie in unemployment, or fiscal policies, or the reduction of social expenditure, but in the competitiveness of the function that each individual must discharge. The position and income of those who work in routine production and personal services will tend to go down more and more, even more rapidly in the case of the former than in that of the latter, while those who work in symbolic-analytical services will increase their lead still further.

The fundamental factor in the advantage of the latter will be the type of education received. In Reich's opinion, in this respect Americans have a good base to build on, thanks to the education given to their elites (15% to 20% of young people), which is totally opposed to that given by the traditional educational system, with its emphasis on the accumulation of knowledge and its view of knowledge as being divided into watertight compartments.

A type of education which aims to prepare for the functions of symbolic-analytic workers would foster the following characteristics: capacity for abstraction, development of a complex and interrelated form of systemic thinking, skill in experimentation, and the capacity for collaboration, team work, and interaction with one's peers. It would be a fluid and interactive form of education, capable of generating a questioning, inquisitive and creative mind.

### 5. Conclusions

It may be inferred from the prospective studies reviewed above that:

a) It seems obvious that there is a deep gulf between the traditional educational system, whose bases were designed in the nineteenth century, and the demands of

the society which is taking shape for the twenty-first century, with a paradigm of production which is changing at a dizzy rate and whose development is increasingly based on knowledge, technical progress, innovation and creativity.

b) These studies also agree that in order to increase their competitiveness, the biggest challenge faced by the countries is the transformation of their educational quality: they will need larger and larger numbers of individuals with good training; access to the cultural codes of modernity will have to include the acquisition of new values; they must get away from the mechanical accumulation of knowledge; and instead of a rigid hierarchical spirit it will be necessary to promote individual autonomy and the capacity for innovation, renewal, creation and participation: all essential conditions for the exercise of modern citizenship and for giving a good performance in the world of work.

c) There is also general agreement that the transformation of education will depend on the efforts of many agents, especially those acting in the labour market. Closer links between the educational system, the world of communications, and the sphere of work will be of fundamental importance for developing internationally competitive persons and active citizens of the world of the coming century.

d) The educational function of the future cannot be carried out through a routine, hierarchical structure, with teachers who think like civil servants and a society which is indifferent to the educational system's financial needs. Autonomy, administrative responsibility, experimentation and close links with the community should be the features of all places where the educational process is carried out.

As well as emphasizing the need for these decentralizing impulses, however, the prospective studies warn that this will bring with it a high risk of disintegration

<sup>51</sup> Robert B. Reich, *The Work of...*, op. cit., p. 82.

and multiplication of inequality, which could lead to growing differentiation between minorities trained to manage the future and majorities linked with the past or excluded from the dynamic progress of modernity. Consequently, together with decentralization, emphasis is placed on the importance of integration, social compensation for the underprivileged, and policies aimed at checking the segmentary tendencies of the market and education.

e) In short, the prospective studies show that since knowledge will be the central element of the new paradigm of production, educational change will become a fundamental factor for developing the qualities of innovation and creativity, together with integration and solidarity, which are key aspects both for the exercise of modern citizenship and for attaining a high level of competitiveness.

## Final reflections: perceptions and trends

In the three preceding chapters, an analysis was made of the regional experience, with its successes and failures, the lessons to be derived from the debate on the system of training human resources in different countries, and the recent convergence of the approaches of economic theory, business management and prospective studies. All these elements lead to the conclusion that Latin America and the Caribbean need to make profound changes in the ways they transmit, produce and apply knowledge. In order to gain the capacities needed to give some significance to the notion of citizenship and to achieve growth and a better place in the international economy, their systems of education and training, as well as the volume and organization of activities in the area of science and technology, must be subjected to profound changes in order to meet the challenges posed by the new international economic context.<sup>1</sup>

It has been said that "To the extent that new technologies and production processes change the international economy, the future of world development and the place that each nation will occupy in it now depend, much more than they did a generation ago, on the capacity to acquire, transmit and apply knowledge to work and daily life".<sup>2</sup> This statement applies in full to the region and the countries which make it up.

The design of a strategy aimed at increasing and improving the competitiveness of Latin America and the Caribbean in the area of education, training and research and development (the "vital triangle"), calls for a review of the assumptions on the basis of which action has been taken so far. Such a review may be summed up in some shifts of the conceptual approaches which will serve as the starting point for the design of the strategy (Part III) and the identification of the scope of the policies needed for its application (Parts IV and V).

### *a) The role of the State: systemic approach, strategic view, equity and financing*

i) *Systemic approach*: There must be a transition from an approach in which education, training and research and development are seen as watertight compartments in which activities are run from above, to one involving the conception and formulation of policies which systematically integrate the three dimensions with each other and with the productive sector.

ii) *Strategic view*: The idea that these systems and their functions can only be developed properly under administrative control and bureaucratic management must be abandoned in favour of a preference for mechanisms and incentives which facilitate their ongoing adaptation with each other and with their environment, within the framework of policies which ensure the integrated and coherent nature of the system through regulation from a certain distance. The idea of a State which runs the whole show and provides resources in a paternalistic manner must be replaced by a State which appraises the situation, provides incentives, and generates medium- and long-term policies.

---

1 ECLAC, *Changing Production Patterns...*, op. cit.

2 Wadi Haddad and others, op. cit., p. 67, and Carlota Pérez, "Nuevo patrón tecnológico y educación superior", *Nuevos roles de la educación superior*, Caracas, UNESCO Regional Centre for Higher Education in Latin America and the Caribbean (CRESALC) vol. IV, 1991.

iii) *Equity*: Instead of a type of education which tends, in practice, to heighten still further the initial inequalities, there must be a form of education which, by assigning its best resources to the places which need them most, will help to improve social equity. This is the compensatory function of the State.

iv) *Financing*: In place of the reasoning whereby the State should finance all or almost all the cost of education, training and research and development, efforts should be made to find various sources for each system and function, with growing participation of private resources. The financing of the "vital triangle" should be the shared concern of the State, the companies, and the other users.

**b) *Institutional change: openness and decentralization***

i) *Openness*: Instead of seeing these systems and their functions as being destined entirely or mainly for their self-perpetuation, the satisfaction of their own inherent values, and control by their own members, they should be viewed in an open-minded manner which defines and appraises them as a function of the benefits they provide for the economy, society and culture. Educational and techno-scientific corporatism should be abandoned in favour of a participative and flexible system open to its environment.

ii) *Decentralization*: The idea that education, vocational training and research and development activities should be organized in a centralized manner should be abandoned in favour of a decentralized concept which seeks to strengthen the independence of the establishments, sectors and mechanisms so as to increase their flexibility to adapt themselves to the changing needs of their environment. Priority should be given to operational principles based on self-regulation and freedom and flexibility of the institutions.

**c) *Policy guidelines***

i) *Performance*: Instead of giving explicit or tacit priority to the supply side in education, training, and the generation of knowledge by research and development activities, the leading place should be assigned to demand and the means by which it is expressed: the needs of development, users, the labour markets, the companies that make use of knowledge, etc. There should be an economic, but not economicist, approach instead of a sectoralized view of culture and its content.

ii) *The quality of education*: Instead of putting the emphasis on quantity –size of enrolment, number of vacancies, number of courses, size of the teaching staff, etc.– the accent should be placed on effectiveness, which should be evaluated on a permanent basis, and on the subordination of the means to the ends. As a corollary of the foregoing, there should be a transition from concern almost exclusively with coverage and its expansion, to a preoccupation with the quality of educational practices and their results. On the substantive level, concern with ethical considerations and values rather than with the provision of solid high-quality training should be replaced by a conception of ethics and values as necessary elements in the training of a citizen to assume his responsibilities in the processes of which he is a part: that is to say, ethics and values should be seen as elements in imparting social responsibility.

iii) *Enhancement of the professional status and role of teachers*: Instead of the underprivileged economic and social status of teachers and academics as persons trapped in an activity which has been losing validity and prestige and which finds it difficult to achieve internal reorganization and recruit young people and older staff with talent and a calling for teaching, education should be transformed into a socially valued profession, adequately paid and organized on the basis of merit, requirements and performance.

iv) *Training*: Instead of training for work being given by bodies and establishments which are cut off from production and are often run in a humdrum or bureaucratic

manner, there should be a new relation between education, training and the enterprise, in which the latter acts as a leader in the training of human resources and the State carries out a compensatory function in respect of traditionally neglected groups. It is necessary to create a training system, for increasing output and raising productivity, which pays special attention to the needs of small and medium-sized firms.

v) *Science and technology*: Instead of viewing science and technology as sheltered areas of academic activity, research and development should be seen as part of a joint effort by universities, enterprises, government institutions, and independent workshops and laboratories to increase the capacity for the incorporation and use of knowledge and, hence, the competitiveness of the economy.

Making these changes in conceptual outlooks is both necessary and possible. The results of four decades of development in Latin America and the Caribbean, although uneven, inequitable and unbalanced, are nevertheless impressive. While it is true that education, training, and the scientific and technological effort have helped in many respects and in many countries to widen economic, social and cultural gaps, it is also true that the younger generations, especially among the poorest strata, have made great strides in reducing illiteracy and gaining greater access to formal education and the social communications media. These changes have opened up for the peoples of Latin America and the Caribbean –more for some than for others, but at all events much more than for the preceding generation– the possibility of gainfully participating in the new achievements of the economies and societies of the region.

**Part Three**

**PROPOSED STRATEGY**

## Chapter V

# OBJECTIVES, CRITERIA, GUIDELINES

### 1. Introduction

---

#### a) Purpose

The purpose of the proposed strategy is to help create, over the next ten years, conditions in the areas of education, training and absorption of scientific and technological progress that will enable the region to change its production patterns in a context of increasing social equity.

This objective can only be reached via broad-based reform of the region's existing educational and vocational training systems, and by developing endogenous capacities to take advantage of scientific and technological progress.

Such reform is indispensable for stimulating changes in economic structures, increasing the region's competitiveness and entrenching the institutional organization and values of democracy. Obviously, the elaboration of a strategy for such changes is not the task of an individual or of any single group or sector. As noted in this chapter, one of the conditions for the success of this type of strategy is national consensus on its components. However, it is necessary to define at least the basic outlines of strategies for action, to illustrate the possibility of change and the existence of ways to accomplish it.

From this standpoint, the practical objective of this chapter is to *stimulate and guide a discussion of these strategy guidelines to arrive at a consensus among the decisive agents*, including Governments,

enterprises, universities, political parties and legislators, educators, education researchers, churches and trade unions.

#### b) *Idées-force*

The proposed strategy is built around objectives, policy criteria and guidelines for institutional reform. It seeks to transform education, training and the use of scientific and technological potential in the region to meet two objectives simultaneously: *the building of modern citizenship and international competitiveness in the countries of the region.*

To attain these twin objectives, it must be borne in mind that education and knowledge are integral parts of the cultural identity of peoples. They are the foundation for a common language and a common heritage. It is through them that the creative abilities of individuals and groups are transmitted, developed and expressed.

The strategy and policies aspire to enrich Latin American cultural identity in its multiple manifestations. Their primary commitment, therefore, is to the community and variety of experiences that make up the region's shared history.

The building of modern citizenship and international competitiveness presupposes the continuity of this historic unity, which constitutes the sole basis on which the countries of the region can hope to transform and enrich their identity.

In this regard, the potential of local, popular and community cultures in all of

their diverse manifestations of neighbourhood, religion, solidarity, productive work and mutual assistance should hold a central place in the strategy and policies to be adopted in the field of education and the utilization of knowledge.

Likewise, both education and the generation and social use of knowledge are called upon to redefine the relationship between development and democracy. They must act as links between those concepts, in terms of citizen participation and economic growth. Development and democracy are, in fact, closely related in the current phase of social development. A number of past experiences demonstrate the importance of civic participation in achieving sustained economic growth. Growth and competitiveness, in turn, are the economic basis on which the exercise of citizenship becomes possible. The proposed strategy is based on the assumption that education reform and the absorption and dissemination of technical advances help to reconcile the exercise of citizenship, popular participation and social solidarity with the requirements of changing production patterns.

It should be noted here that ethics and the inculcation of social values play a basic role in the education of modern citizens. Growth with social equity, based on environmental sustainability, is not a mechanical process but a cultural act that involves both a personal and a collective reorientation of its participants. The training of citizens in an awareness of social responsibility enhances their solidarity and activity in working as members of an organization with a common task. Thus, ethics are not only a precondition for economic growth, but also a touchstone for ensuring that it benefits the whole person and the whole of mankind. In this way, education can contribute decisively to development.

The policies proposed to implement the strategy must meet two essential criteria: *social equity and performance*.

The first criterion aims at equality of opportunity, compensation for

differences, balanced development and cohesion of society as a whole; the second, at effectiveness (goals) and efficiency (methods), by evaluating results and encouraging innovation.

Lastly, in the area of institutional reform, the strategy pursues a dual aim: *integration and decentralization*. The first component takes place at the central level, through the strengthening of national institutional capacities to guarantee social equity and the inclusion of all citizens in common social codes, values and capacities. The second occurs at the local level, through the decentralization and increased autonomy of institutions to enable them to implement educational programmes with greater relevance, accountability and effectiveness in allocating resources.

Institutional reform is the key to attaining the strategy's objectives. The changes proposed herein stress autonomous management of educational, training and scientific and technical development establishments; the professional responsibility of their agents; and continuous openness to and interaction with the larger environment.

Also emphasized is the need to establish coordination mechanisms in respect of national development objectives to compensate for inequities and delays in the provision of services.

In the past, *citizenship* was often referred to as a strategic objective, *social equity* as a policy guideline and *national integration* as the basis for the institutional system. Although significant progress was made on all three levels, the deficiencies of each are at least partially due to the omission of the other three components of the current strategic proposal: *competitiveness* as an objective, *performance* as a policy guideline and *decentralization* as a feature of the institutional system. In the 1980s, some who championed these underrepresented topics strayed into the opposite bias: that competitiveness, performance and decentralization should be pursued at the expense of the formerly prevailing motivations. The present proposal

assumes that all of these tensions are relevant (citizenship versus competitiveness, social equity versus performance and integration versus decentralization) and emphasizes the complementarity that exists at each of these levels, as explained below.

## 2. Strategic objectives: citizenship and competitiveness

Changing production patterns in a context of growing social equity involves a painstaking revision of the cognitive, instrumental and ethical content of the education which society provides to new generations.

From this viewpoint, it must be accepted that contemporary citizenship-building is not confined to the political sphere of voting and formal equality before the law. While those elements are still of the essence in Latin America, given the authoritarianism and political violence that characterized many societies in recent decades, the exercise of citizenship comprises other factors, which tend towards social cohesion, equity in the distribution of opportunities and benefits, and solidarity within a complex and diverse society. By this definition, educational systems face the challenge, in citizenship-building, of:

- ensuring equitable distribution of knowledge and mastery of the codes in which the information necessary for civic participation is transmitted, and

- providing instruction in ethical values and principles and developing individual talents and skills to enhance performance in various aspects of social life: the workplace, family life, environmental protection, culture, political participation and community life.

With respect to competitiveness, the countries of the region appear to agree on the priority of strengthening their international integration as a prerequisite for stimulating growth, promoting the absorption of technical progress, increasing productivity and raising

the population's standard of living<sup>1</sup> (see box V-1).

To attain this strategic objective, a new relationship must be established between education and production. The question is how to realign the two with each other, bearing in mind that the two areas education and labour are becoming more closely related and are overlapping in many and diverse ways.

It is therefore necessary to conceive, design and develop education in accordance with the contemporary requirements of production and labour, without reducing the formative aspect of society to purely instrumental notions. At no time or place has education ever had an exclusively instrumental function. It has always addressed a variety of subjects in different cultures, such as the environment, the culture's world view, values, institutions, technology and machinery, basic reading, writing and mathematical skills, social interaction skills, responsibility, competition, caring for others, using the mind and body, art, history, adult forms of behaviour, science, personal safety, music, games, etc.

The scope of education has never been broader than it is today, nor has there ever been such a wide variety of methods and mediums for gaining access to knowledge and information.

The development of efficient interaction among scientific developments, technological advances and their application to production activities is a basic prerequisite for progress towards the objectives of competitiveness and citizenship. The incorporation of the countries of the region into the contemporary international economic market and the participation of the entire population in active citizenship call for the wide dissemination and efficient use of modern production, information and communication technologies.

To utilize education as a means of advancing towards the objectives of competitiveness and citizenship, it is indispensable, given the magnitude and

1 ECLAC, *Changing Production Patterns...*, op. cit.

## Box V-1

## HOW APT IS THE TERM "COMPETITIVENESS"?

In interviews and consultations held during the preparation of this document, there was some discussion on the appropriateness of using the term *competitiveness* in conjunction with *citizenship* in identifying the objectives of the proposed education strategy.

Those who criticized the use of this term argued, in general, that:

- a) Linking education to competitiveness can cause an economics-oriented bias in the former;
- b) Competitiveness can be understood, in the context of current debates in the region, as a term relating only to such factors as liberalization of international trade, tariff reduction, emphasis on exports, deregulation of national economies, privatization of public enterprises, scaling-down of the State and regulation of wages;
- c) Since "competitiveness" usually connotes competition among individuals, groups, enterprises or nations, it may imply that all aspects of existence and social organization should be subject to market forces and to unceasing rivalry, which would threaten to discount the civic, ethical and community values of education.

From the standpoint of the education strategy contained in this document, competitiveness aims, first and foremost, at generating and expanding the endogenous capacities necessary to sustain economic growth and national development within a framework of increasing globalization and internationalization.

Among these capacities, qualified human resources and the whole array of educational and other institutions for generating and applying knowledge are the most important; thus the close relationship between competitiveness, education, training, science and technology.

Therefore, from the perspective adopted herein, national competitiveness is primarily concerned with the building and refinement of national capacities. However, it also entails an effective integration and social cohesion through which these capacities can be fully utilized in the context of successful integration into the world market. Its ultimate goal is to provide citizens with a higher standard of living. Here lies the difference between the "genuine competitiveness" sought by this orientation and the "spurious competitiveness" based on declining wages or the plundering of natural resources.

characteristics of the strategy here proposed, to make use of new technologies, whose incorporation requires considerable social absorption capability and general acceptance of these innovations, which must be supported by educational progress.<sup>2</sup> The relation between technology and education derives not only from the overriding importance of production and the use of knowledge in the current technological revolution (due to the increased knowledge-intensiveness of innovation), but also from the effect of new techniques on production and the dissemination of knowledge.<sup>3</sup>

The dimensions of active citizenship that concern access to basic goods and services are highly dependent on technological progress. In many countries of the region, accumulated social problems are so serious that they cannot be solved without intensive application of science and technology; such is the case in the areas of food, preventive medicine, public housing, low-cost public transportation and reduction of the effects of poverty-level conditions on environmental degradation. Scientific and technological efforts themselves have an important role to play in satisfying these social demands.<sup>4</sup>

2 See Carl Dahlman and Richard Nelson, *Social Absorption Capability, National Innovation Systems and Economic Development*, Republic of Korea, Korean Development Institute, 1991.

3 See OECD, *Background Report Concluding...*, op. cit., Román Mayorga, *Reduzcamos la brecha: hacia una estrategia regional en ciencia y tecnología*, Nota técnica series, No. 3, Washington, D.C., Project Analysis Department, Inter-American Development Bank, April 1989.

4 See ECLAC, *Información y telecomunicaciones: vector de la transformación productiva con equidad* (LC/R.1102), Santiago, Chile, December 1991.

The effective exercise of citizenship entails a level of participation in public decisions and in the workplace that can only be reached through mass absorption of new communication and information techniques.<sup>5</sup> These techniques represent a unique opportunity for giving individuals and social organizations more control over their own development and their relationship with government and economic powers.

### **3. Policy guidelines: social equity and performance**

Social equity is linked to access to education i.e., to equal enrolment opportunities and to the distribution of chances for obtaining a quality education. In other words, it concerns opportunities for similar treatment and results in education.

Within the proposed strategy, social equity also involves the orientation and operation of the system and, finally, the policies that guide its development.

It would not be acceptable, nor would it meet the proposed strategic objectives, to implement educational reforms which, guided only by considerations of competitiveness, autonomy and performance, neglected the goals of citizenship, integration and social equity. Each set of goals must be complemented by the other.

To guarantee effective performance in a context of growing social equity, the system of human resources training must comprise establishments that are effectively equal in their basic features. Only under these conditions can they all be placed on the same footing and required to answer publicly for the results of their activity.

The strategy can be applied successfully in this area only through active State participation in compensating for unequal starting points, ensuring equality of opportunity, subsidizing those in need of assistance, strengthening

educational capacities in more backward and remote localities and regions, etc.

In this context, the strategy seeks to link effective performance with social equity, as underlying criteria for policies and specific measures.

The system is performing effectively when the country reaches the goals defined in its development strategy and when educational institutions reach the goals set in their projects. Performance therefore involves institutional projects and their implementation; more specifically, their goals, quality and results (see box V-2).

In other words, the State is called upon to act along the "goal-setting/performance evaluation/incentive-offering" axis to enhance the system's effectiveness and equity and to bolster the autonomy and initiative of educational institutions.

This axis, which is the functional equivalent of the "effectiveness/quality and efficiency/social equity" axis, also illustrates the new relation that must be established jointly by the educational system, the State and society in order to attain the lofty objectives pursued under this strategy.

### **4. Institutional reform: integration and decentralization**

At the institutional level, the proposed strategy entails a reorganization of education administration, directed towards decentralizing and increasing the autonomy of schools and other educational institutions on the one hand, and integrating them into a common framework of tactical objectives on the other, since such integration is the only means by which education can help fortify the cohesion of increasingly fragmented societies. The strategy also necessitates new ways of structuring training procedures, i.e. in response to the demands of production units, and the strengthening of national science and

<sup>5</sup> See Francisco S. gasti, "Crisis y desafío: ciencia y tecnología en el futuro de América Latina", *Comercio Exterior*, Vol. 38, No. 12, Mexico City, December 1988.

## Box V-2

## EFFICIENCY AS A POLICY CRITERION

On various occasions, the persons interviewed during the preparation of this document pointed out the misunderstandings that may arise from the use of the concept of efficiency.

It was noted that, in the debate on educational policies, efficiency could easily be misunderstood and misapplied through association with one of the following phenomena:

- a) Reducing all activities to considerations of mere economic profitability;
- b) Confusing the striving for efficiency with the adoption of personnel reduction and rationalization measures;
- c) Limiting the evaluation of institutions solely to their attainment of financial goals or financial self-sufficiency;
- d) Promoting unprogrammed "privatization" processes on the assumption that public institutions cannot operate efficiently.

In this document, efficiency is understood as a basic criterion, closely linked to that of social equity, for the formulation of policies directed towards well-defined strategic objectives: the participation of the entire population in the prerogatives of modern citizenship and its contribution to the enhancement of the society's overall competitiveness.

Efficiency cannot, therefore, be reduced to mere considerations of economic profitability, which nevertheless cannot be ignored in the context of the overall strategy presented herein. Rather, in a sense closer to the classical use of the term, efficiency is understood as both the optimization of institutional results with a given level of resources and the degree of social

relevance of their operations reached within existing budgetary constraints. The first aspect focuses on the internal efficiency of establishments and systems; the second, on their external efficiency in relation to national development priorities.

This definition of efficiency does not, however, assume any rationalization of institutional activity, nor does it necessarily entail personnel reductions. It may include or exclude such measures, depending on the circumstances in each case, but the range of action set in motion by the introduction of this criterion is much broader and may include various initiatives in different sectors and levels of an organization.

In fact, educational, training and research and development (R&D) institutions have multiple purposes and an extremely complex internal organization, so that they cannot be analysed solely from the viewpoint of fulfilling economic goals or the principle of financial self-sufficiency.

Thus, neither can efficiency be confused with institutional "privatization" or the transfer of operating costs to private agents. In reality, a vast and essential set of educational, training and research and development activities must be undertaken by society and supported by public sponsorship and financing. But the latter, as well as the overall workings of the public establishment sector, must also be subject to stringent efficiency criteria, for which purpose they must implement the appropriate institutional reforms, financing policies and incentive and evaluation mechanisms.

technology systems to enable the countries of the region to absorb technical progress into their economies, as a requirement for competitiveness.

It should be noted that integration and decentralization must not be understood as belonging exclusively to the administrative sphere. In this context, they imply a fundamental change in the very principles of the institutional organization of education, operating at two levels: in educational units and in the system.

*a) First level: decentralization and greater autonomy of institutions*

The advantage of educational systems is that even though they make up a mega-structure, they operate through thousands of smaller units that can be administered with enough flexibility to respond fairly readily to changes in outside conditions.

Thus, educational systems are theoretically capable of functioning as responsive, flexible, adaptable sets of machinery. The fact that they are rigid and slow to react in practice, and remain

impenetrable to external demands and challenges, is a consequence of their centralization, bureaucratization and collective isolation.

Given this situation, each educational institution must be designed and administered as a project intellectual and institutional and given the necessary freedom of initiative to carry it out. Institutional identity is one of the factors most commonly associated with academic success.

This autonomy implies that educational institutions should be integrated into the local and regional environment and should function within the conditions thereof, without being confined by them. Education must always look beyond the local and temporal horizon. In addition, the administrative hierarchy must be as close as possible to the local level of the school, and the right of teachers to participate in the administration must be recognized.

Genuine decentralization, therefore, means autonomy, a "project" mentality, institutional identity, initiative and management capacity rooted in the educational institutions themselves. These factors, though essential, are not an end in themselves, but only preconditions for the integration and adaptation of educational institutions to the larger environment.

These educational units, empowered to take initiatives and free of a draining bureaucratic dependence on a central body, will be in a better position to respond to the requirements of their environment and to assume responsibility in public, before the community and the country, for the results of their activity.

The current uniformity of the educational and training system is eliminating diversity. In the formal education system, it often seems that public schools try not to differentiate themselves from one another. Private institutions often base their distinctiveness solely on their selective recruitment standards. Technical and training centres tend to offer standardized courses which are generally out of date

and unrelated to the production processes of the enterprises around them.

Instead of recognizing and capitalizing on the diversity of modern culture, the multiplicity of its forms and the enormous variety of possible approaches to teaching, the educational system, shackled to the purposes and modalities of the last century, continues to seek uniformity, centralism, hierarchy and rigidity. As a result, it grows stale and provokes rejection and rebellion.

What is suggested, on the contrary, is that autonomy and joint administration of the educational agenda at the level of each unit of the system should be utilized to generate new domestic labour conditions. The proposed strategy should make it possible to establish integrated institutions characterized by teamwork and shared responsibilities and challenges (see box V-3).

Nevertheless, it must be borne in mind that the structural uniformity towards which current educational opportunities are inclined coexists with a pronounced real disparity in terms of financial and technical resources. The process of strengthening local capacities to promote the decentralization and autonomy of institutions to achieve greater equity must be accompanied by equally vigorous measures to compensate for differences and to transfer resources, in which the role of the central administration will be of decisive importance.

*b) Second level: system-wide coordination and national integration*

The greatest challenge faced by decentralized teaching systems (meaning those that give educational institutions a large measure of autonomy and freedom of initiative) is how to maintain adequate coordination to prevent or eliminate disparities between educational institutions arising from their location and the social situation of their students, and how to contribute to the nation's social cohesion and integration.

## Box V-3

## ADVANTAGES AND RISKS OF DECENTRALIZATION

In the interviews and consultations held during the preparation of this document, a number of questions and criticisms arose concerning the possible repercussions of an extensive process of decentralizing educational systems.

Although there seems to be general consensus on the desirability of decentralizing these systems, the following observations bear consideration:

- a) Educational decentralization could cause a loss of coherence in the system and prevent the adoption of national policies under a strategy like the one proposed herein.
- b) Educational decentralization could be understood by some as no more than a path to educational "privatization", which could further debilitate the sector most in need of reform: the public education sector.
- c) Educational decentralization could reinforce the system's tendency towards heterogeneity and fragmentation, which might exacerbate inequities in the distribution of opportunities, the treatment of students and the results obtained.

The identification of possible risks or threats posed by educational decentralization is important and, as previously indicated, an integral part of the debate on the future of education in developed and developing countries alike.

First of all, as some interviewees pointed out, a process of educational decentralization should not be confused with a movement towards fragmentation and dispersal of the system, which would, in such a case, be exposed to the risks identified.

Decentralization must be conceived and carried out in a manner which helps to improve,

not worsen, the system's equity, as the only way of guaranteeing the system's ability to help build a common culture of modern citizenship. Indeed, the proposed strategy takes this consideration fundamentally into account, and stresses how each suggested measure can further this goal of growing equity.

This process can be described from a dual perspective: first, as a shift of institutional administrative responsibilities from top to bottom until they rest with the individual educational units, which thereby acquire the autonomy to innovate and to adapt themselves to their environments; and second, as a shift from centralized bureaucratic control of institutions to evaluation methods based on results, which will, in turn, give the educational units an incentive to take responsibility for their own institutional agenda and for effective management of their human, support and financial resources.

In sum, the proposed decentralization is not merely an administrative matter, nor does it aim at private ownership of institutions. Its goal, on the contrary, is to give institutions the autonomy to create, to innovate and to improve their quality.

As noted in the interviews, this autonomy is the basis on which schools can take up their own cultural mission, helping to define, each from its own perspective, the cultural identity of societies whose composition and orientations have become increasingly complex and diverse.

At another level, educational decentralization should be implemented in such a way as to strengthen each society's capacity to elaborate and agree on a joint strategy for developing its educational system.

Under homogeneous conditions, which are not found even in developed countries, the coordination of a diversified and decentralized system is based on each institution's capacity for self-regulation. It is the individual institutions which, in defining projects, taking initiatives and interacting with the external environment and other institutions, progressively shape the structure of the educational system and determine its evolution.

Even so, the coordination of the educational system must also include minimal but effective public regulations that are non-bureaucratic and, to the

extent possible, enforced through local and regional authorities.

The practice in Latin America and the Caribbean has been to apply a uniform educational content in diverse contexts, though this situation varies by country and level of teaching. Obviously, primary education institutions are, from the standpoint of the social situation of their students and the teaching conditions they offer, more diverse than universities. However, beyond these differences, which must be defined before specific policies can be elaborated, it is clear that a strategy to achieve more uniform results

from educational activities by strengthening each institution's capacity to define its procedures entails a radical change in the role of central State authorities.

In this regard, public authorities should lead the development strategy for the overall system of human resources training with a long-term perspective; define minimum requirements for compulsory education and ensure distribution of the necessary teaching materials free of charge; promote equitable access to ongoing training opportunities and compensate for the disadvantages of some social groups in that regard; evaluate the results obtained by the decentralized units; and oversee the regulation of the system to help it achieve its social equity objectives.

Coordination of the system should allow for progressive compensation for disparities between institutions, thus strengthening the integrating role of education at the national level. Social integration based on the modern conception of citizenship recognizes difference and diversity while generating conditions of equality for the exercise of individual rights and effective social participation.

Leading the overall development strategy for the human resources training system must be considered a task which concerns not only Governments but also organized society and its principal agents, legislatures, incumbent and opposition political parties, entrepreneurs, churches, mass media, trade unions and professional schools, among others.

Ideally, the principles underlying the overall education strategy should be shared by all of these agents. Only then can sufficient stability, continuity and strength be mustered to set the necessary changes in motion.

### 5. Policy design

If the proposed strategy is to be carried out successfully, the policies designed must, at a minimum, respond to national characteristics and priorities and be

supported by consensus or agreements among the principal social agents.

#### a) *Characteristics and priorities*

In the countries of Latin America and the Caribbean, there is a marked variety of conditions to which the strategy elaborated will be applied. Therefore, the policies derived therefrom must also be adapted to the heterogeneous reality of the region.

Priorities and focal points will vary according to the characteristics of each country. Consequently, the pairs of strategic objectives (citizenship and competitiveness), institutional reform objectives (integration and decentralization) and policy criteria (social equity and performance) will have to be adjusted to fit them.

One possible point of departure for designing national strategies would be the consideration of two criteria: the educational profile of the population, and the requirements of the production system in the area of training and knowledge (see table V-1).

In the countries of the region, whose economic and social development has been both unequal and heterogeneous, the developmental levels and modalities of educational opportunities are very diverse: some countries still have high

Table V-1

#### REQUIREMENTS OF THE PRODUCTION SECTOR VERSUS EDUCATIONAL OPPORTUNITIES

		REQUIREMENTS OF THE PRODUCTION SECTOR	
		-	+
OPPORTUNITIES EDUCATIONAL	-	1	2
	+	3	4

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean.

illiteracy rates, while others have long-standing educational systems which do not transmit knowledge that is appropriate to modern culture. Moreover, both incomplete primary education coverage and institutions of recognized excellence in specific scientific disciplines may be found within a single country. Latin American and Caribbean economies also differ with respect to the impact of technology-intensive sectors on output or exports, the overall dynamism of the production sector and the modalities of their integration into the world economy. Furthermore, a single production system may include both innovative sectors and traditional, low-productivity sectors. Nevertheless, none of the countries of the region has managed to combine a well-educated labour force with a corresponding development of production.

The proposed strategy is intended to clear the way for the countries of Latin America and the Caribbean to advance towards that goal. The inequality and diversity of their situations at the outset should be borne in mind while judging the relevance of policy proposals to various national realities, as described in the following chapter.

The central assumption of that chapter is that the policy guidelines defined therein are valid for all countries, while the means and the sequence of their application can vary substantially.

#### *b) National consensus on policies*

The policies devised to implement the education strategy needed to change production patterns with social equity must emerge from a wide-ranging debate and be actively supported by the principal social agents.

In fact, if an education strategy is to help raise levels of international competitiveness and modern citizenship, it must mobilize the whole society.

One of the greatest obstacles to this educational overhaul is the absence of basic consensus. Unless consensus is built up and expressed at the intellectual,

political and social levels, it will not be possible to introduce radical changes into the orientation and operation of educational systems.

The features of successful consensus are determined by the various political systems, cultural traditions and historical circumstances. Consensus implies neither unanimity nor agreement on the details of the measures to be taken, but rather a convergence of views on the principles and basic orientations of a strategy and of its basic policies. Above all, the concept of consensus requires the creation of a political and intellectual climate conducive to the expression of these views in decision-making and in practice. It is therefore opposed to any idea of replacing decision-making with interminable debate on the alternatives that are inevitably presented.

Democratic systems, including those of the countries of the region, provide for mechanisms to translate deliberations into decisions and action.

To facilitate the democratic prerequisites for the great changes needed in educational systems, Governments must launch initiatives that lead to concurrence and participation by the principal social agents.

The necessary strategic consensus must be *precise* in terms of its objectives, *broad* in terms of its support and *durable* for the time required to introduce the needed changes.

The desired changes cannot be effected solely on the basis of tactical agreements in government circles or policies that garner the sporadic support of social agents; instead, agreements must be reached in each of the areas to be changed on strategic objectives, institutional reforms and criteria for guiding policies and their application.

These agreements must be stable and sustained throughout the period needed to introduce the proposed changes. A complete overhaul of the system's strategic orientation, scope and educational practices will probably take at least a decade to produce results.

The new strategy must therefore embrace society as a whole, i.e., it should be adopted by the principal social agents, including the Government, political parties, entrepreneurs, trade unions, churches, the armed forces, community groups, non-governmental organizations, the mass media and, ultimately, the teachers and students who are involved in the actual processes of teaching and learning.

*c) Features of proposed policies*

The policies designed in accordance with national characteristics and based on social consensus are as different from past policies in the region as they are from those now recommended under what may be called a "radical market perspective".

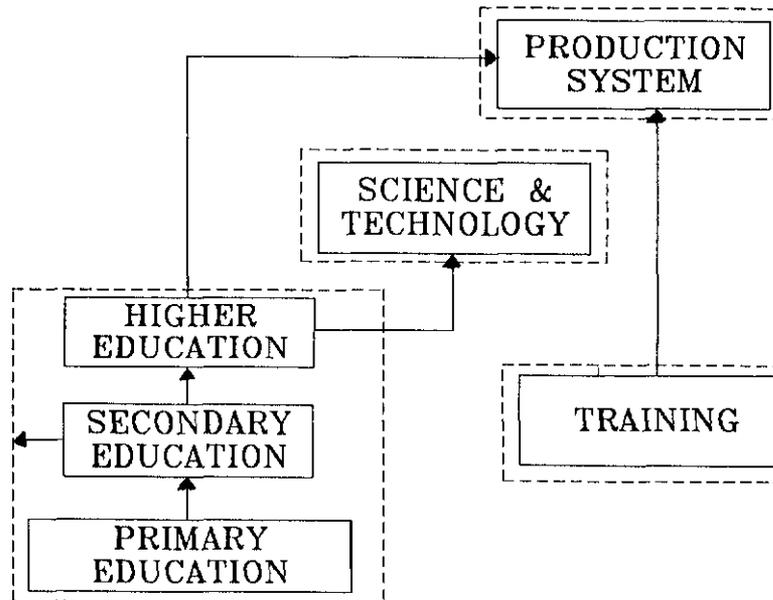
The policies to be applied in each educational subsystem primary, secondary, university, training-based, and scientific and technological have the common task of orienting the changes within each of them towards linkage with the others and with the production sector.

Thus, the proposed policies must be designed to meet, in particular, three requirements: promoting institutional reforms according to the strategic objectives concerning citizenship and competitiveness through the adoption of social equity and performance criteria; fostering the interconnection of educational subsystems, including the training-based and science and technology levels; and developing linkages between all of these subsystems and the production sector.

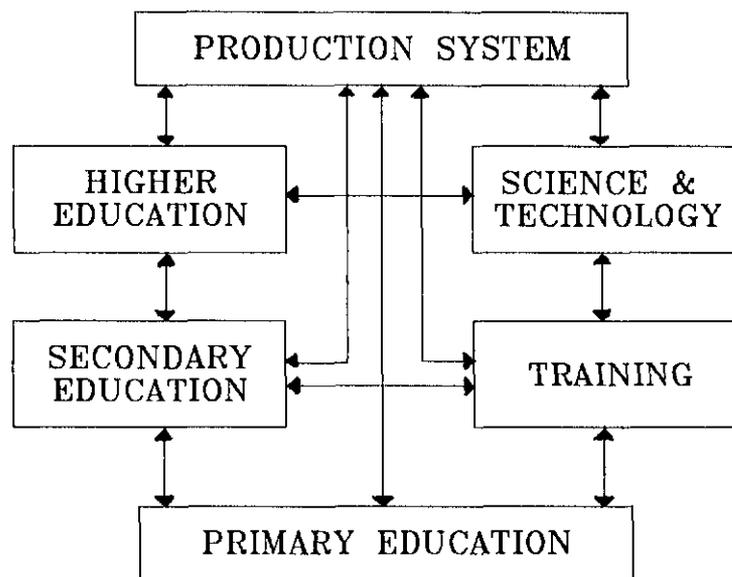
The institutional contribution to the proposed measures should include the necessary financing to carry out the desired changes in each educational subsystem, and the development of closer links among the latter. In the past, development banks played a crucial role in this area and, to some extent, became the symbol of a phase in which priority was given to expanding production capacity and building up new sectors, primarily by establishing large enterprises, both public and private. In the 1980s, development banks faltered in terms of resources and identity, but in the 1990s, under the proposed strategy, they will be given new life as they assume tasks directly related to the theory that education and the generation of knowledge are a key factor in changing production patterns with social equity. Specifically, they could promote the establishment of institutional mechanisms, in cooperation with the private financial sector, to support investment in human resources, scientific and technological development and the expansion of small- and medium-scale enterprises, as well as the creation of links between the various subsystems involved.

Thus, the isolation of each educational subsystem from the others and of all of them from the production sector, and the consequently intermittent, unidimensional or sporadic relations among them, can be progressively replaced by multiple linkages among subsystems and between them and the production sector (see figure V-1), through the strategy broadly outlined in this document.

Figure V-1  
CURRENT CONFIGURATION



PROPOSED CONFIGURATION



**Part four**

**POLICIES TO IMPLEMENT THE STRATEGY**

## Chapter VI

### ACTIONS AND MEASURES

Based on the background information and guidelines or approaches which have been set forth, in this chapter policy suggestions for implementing the proposed strategy will be presented.

The recommended policies will be grouped into various categories according to their objectives, which are as follows:

1. To create an institutional structure for education and other knowledge-based endeavours which is responsive to the needs of the society in question;
2. To ensure universal access to the cultural codes of modern society;
3. To foster creativity as regards access to scientific and technological advances, the dissemination of such advances, and scientific and technological innovation;
4. To promote responsible institutional management;
5. To contribute to the professionalization of educators and to promote a more active role for these professionals;
6. To foster a financial commitment to education on the part of society; and
7. To further regional and international cooperation.

The first of these policy objectives is of a strategic nature in that it identifies the elimination of the present educational system's isolation from the needs of society as the most promising source of dynamism and change. The second and third objectives refer to the results which this effort to create a more open system is intended to produce, while the remaining

four play an instrumental role in the achievement of those results.

Policies for implementing the strategy must be analysed within a systemic framework, since no one policy alone will produce results in the medium or long term. Thus, this chapter addresses only some of the key questions to which policy makers need answers, since other, equally crucial questions—Where should we start? When is the best time to take these steps? Are gradual approaches better in all cases or are there some instances in which some sort of shock treatment is called for? Exactly what role should be played by each actor at any given point in time?—can only be answered within the context created by each country's specific features and conditions.

#### **1. To create an institutional structure for education and other knowledge-based endeavours which is responsive to the needs of the society in question**

---

Changing the institutional framework for action in the field of education, training, and science and technology is part of the broader process of State reform. As has already been noted, reshaping the State is an important aspect of the courses of action to be followed by Latin America in the future as it strives to change its production patterns with social equity. Viewed from this vantage point, the most essential aspect of State action is the support it provides to the entrepreneurial base to help it discharge its responsibilities

in the sphere of production and to permit the public sector to concentrate, in so far as its direct responsibilities are concerned, on seeking to establish greater social equity and on building up the capabilities which the countries need to have in order to become internationally competitive.

Education, training, and science and technology are priority areas for State action in pursuit of these goals. Thus, the purpose of changing the institutional structure in this field is not to relieve the State of responsibility in this regard but rather to endow it with the dynamism and efficiency it needs in order to fulfil its responsibilities satisfactorily.

The institutional modalities of the past have isolated educational, training and scientific/technological activities from the performance-related demands of citizenship and production. The proposed strategy thus seeks to put an end to the marked isolation of present-day education and to make it more responsive to performance-related demands in the social, political, economic and cultural realms.

From an overall political point of view, responsiveness to societal needs would be manifested in the formation of the national educational consensus which are a basic feature of the proposed strategy. The participation of all social sectors and actors in educational debates and agreements would ensure that the systems attains an initial and highly important type of openness. Although it does not suffice in and of itself, such participation is necessary in order to forge a link between the instruction provided in the schools and society's needs.

The foregoing brings out the need for thorough-going institutional reforms in keeping with two basic guidelines: the integration of educational units –at all levels of the system of human resources development– with their real-world environment or surroundings; and the coordination of these units in such a way as to increase their points of interconnection and of entry and exit and, in general, to enhance their ability to relate

both horizontally and vertically with the system and with society.

In order to move forward in this direction, the first steps is to give the schools greater autonomy; then, flexible regulatory mechanisms needs to be developed; once this has been done, the next step is to create a variety of different forums or mechanisms for coordination and consensus-building.

#### *a) Autonomy for educational units*

i) *General principles.* In order to enable educational institutions to interact dynamically with their environment, they must be given greater autonomy. Rather than using painstakingly detailed, uniform controls (which have been proven to be inefficient), there is a great deal of evidence that substantiates the innovative potential of schemes based on an autonomous form of school administration at the local level in combination with effective centralized rules or regulations geared to overall national objectives and minimum requirements.

Greater autonomy for individual schools gives the faculty and director of each school the authority to define, within the framework of national policies and priorities, its own educational agenda and to assume responsibility for managing the academic, administrative and financial aspects of that agenda.

One possibility would be for this management team to report to an administrative council on which the local authorities and other members of the community would be represented (parents, students, businessmen, local community organizations, etc.). The evaluation of the team's performance at the local level would ensure that the school's educational agenda is geared to the needs of the community while, for its part, the school would be able to draw upon the community's educational and economic resources, since it would thus have the community's support as well as its commitment to the school's educational agenda.

Autonomy for the schools would also allow them to demonstrate their potential for democratic action by encouraging the citizenry to participate and take responsibility for dealing with educational matters. The risk of atomization and dispersion inherent in this type of institutional scheme can be counteracted by regulatory mechanisms at the national level, which would focus on evaluating the schools' achievement of the system's overall objectives and minimum requirements. Such mechanisms would set the general policy regarding the system's development, would establish the necessary regulations, would define the programmes' objectives and minimum content requirements, would allocate government resources and seek to encourage the commitment of private-sector resources, would offset imbalances in the system and should establish means of measuring the schools' levels of educational performance.

The greater flexibility afforded by this type of institutional scheme as regards the definition of educational plans and programmes would make it possible to diversify and, hence, to enrich the instruction which the schools provide by opening them up to the stimuli and challenges presented by the surrounding community.

ii) *General guidelines.* Greater autonomy for the schools is not an end in itself, but rather a catalyst for opening up and changing the educational system. It is therefore important to bear in mind the specific features of the various processes whereby such institutional changes can be introduced.

The experiments with decentralization that have been undertaken in the region have not been coupled with increased autonomy for the schools. Instead, past schemes of educational decentralization have focused primarily on its political and administrative aspects and only collaterally on any innovations that might be made in curricular content and teaching practices (see box VI-1). Even so, administrative decentralization initiatives have frequently run up against

three types of problems which decision-makers should take into consideration in order to design more effective policies.

First, union elements within the educational system whose power might be jeopardized by decentralization can be expected to put up strong resistance. It would therefore be advisable to provide against this eventuality by setting up training programmes and involving representative bodies in the design of the new policy from the very outset.

Another obstacle has been the inconsistency of legal provisions, the inflexibility of existing regulations (which are often regarded as "vested rights" and therefore outside the purview of the new scheme) and the undeniably limiting effects of many of them, especially those which might seem to be of less importance (e.g., regulations concerning staff transfers, budgetary procedures, remunerations, etc.). The existing institutional structure and possible modifications should therefore be studied carefully before proceeding to design a new organizational scheme.

Finally, the limited and unequal distribution of management capabilities might very likely be manifested in serious shortcomings in some schools which would make them less able to absorb the changes to be made. In such cases, increased autonomy could lead to a greater de-integration and segmentation of the system, a magnification of existing differences in terms of the quality of instruction, and an even more marked fragmentation in terms of income levels. To avoid such an outcome, the central authorities must effectively perform their role as a source of technical and financial support. Thus, in order for a policy involving autonomy for the schools to be successfully applied in a context of unequal educational opportunities, the central authority must be strong and yet, at the same time, capable of limiting its sphere of action so as to avoid hampering the work of the local communities.

Another important factor that needs to be taken into account in this connection is

## Box VI-1

### DECENTRALIZATION IN A COUNTRY IN TRANSITION: THE CASE OF COLOMBIA

A series of legal instruments were promulgated in Colombia from 1968 onwards, especially between 1983 and 1989, designed to restructure and revise the functioning of the educational system, in order to make it more modern, efficient and democratic. These norms also helped focus educational policy, by strengthening the Ministry of National Education as the agency responsible for setting national policy and by transferring responsibilities for administration and the provision of educational services to territorial units. Thus, education in Colombia is run by sharing responsibilities between the State, represented by the Ministry of Education, the territorial department, represented by the governor's office, and the municipality, represented by the mayor's office. Administration has been gradually decentralized as part of the process of decentralizing services in general.

Decentralization takes place basically at the municipal level. The municipality becomes the basic cell in the State structure for administering, financing and monitoring a range of community services, including education. Thus, governors, intendants, local officials and the Mayor of Bogotá are in charge of teachers at the different

educational levels. Primary school teachers are administered by small territorial boards and secondary school teachers by somewhat larger ones. Likewise, the President of the country can delegate to governors and the Mayor of Bogotá, through the Ministry of Education, the functions of inspecting and supervising educational establishments, be they public or private.

In this regard, Act 29 of 1989 is one more step towards effective municipal control over primary and secondary education, transferring to municipalities responsibility for administering education. This law joins previous ones which gave them the functions of constructing, maintaining and equipping educational establishments.

A decisive step in this process of gradually transferring responsibilities will be made in 1993. At that time, a higher percentage of the value added tax (VAT) is expected to be allocated for education, and more basically, municipalities will be granted more financial autonomy. Thus, more resources will be available for education in 1993, and even though the State will have to collect these funds, they will be returned to municipalities to be administered.

the sequencing and timing of the transition from such a centralized educational system as that typically found in Latin America to one in which schools enjoy a large measure of autonomy. There are a variety of options, ranging from voluntary participation in experimental projects to a radical reform carried out in one fell swoop, as well as all sorts of possibilities in between, such as a gradual reform, etc. The only possible conclusion is that there is no set formula in this area. The pace of the reform will most likely be determined by political rather than technical considerations which have to do with the society's degree of organization, the relationships among the various societal forces existing at that point in time, etc. (see box VI-2).

In view of both the range of obstacles that could arise and the acknowledged primacy of political factors, in most cases the best choice would probably be realistic

and not overly ambitious programmes which recognize existing limitations and define modest, achievable objectives.

Within this framework, the practical methods employed by the schools to pursue their educational agendas will vary considerably, since they will depend upon the particular conditions existing in each community and country, as well as the level of instruction involved.

Certain specific aspects of the way in which this broad-based form of autonomy is used at the different levels of instruction merit special attention.

iii) *Primary and secondary education.* When a strategy such as that proposed here is implemented, the most noticeable changes will probably be seen at the primary and secondary levels as, in a striking departure from the existing situation, steps are taken to promote a greater and more explicit degree of diversification. This increased

## Box VI-2

**DECENTRALIZATION IN A COUNTRY WITH A FEDERAL SYSTEM:  
THE CASE OF ARGENTINA**

Within the framework of its federal system, responsibility for education in Argentina is shared between the national Government, provincial governments and the Municipality of Buenos Aires. Around 1955, at a time when the National Council for Technical Education exercised rigid centralized control, the country had a dual educational system, composed of schools administered by the national system and schools administered by provincial systems.

Decentralization began that year, taking place in three different stages:

*1955-1978: Transfer of national primary schools to provincial governments.* Emphasis during this period was placed on overcoming excessive concentration and bureaucracy in the administration of the system, by transferring financial responsibility from the national Government to provincial governments. Consequently, the measures adopted were financial and administrative, while policy-making remained in the hands of the central Government.

*1979-1988: Administrative decentralization and regionalization of curricula.* The emphasis during this period was on decentralizing educational planning. Planning units were set up in almost all the provinces, with the technical capacity to administer the primary level. However, the administrative model used in the provinces copied the centralized model, with the support of provincial educational councils.

*1989-1991: Constitution of a federal educational system.* The effort during these years was to change the system profoundly by transferring secondary and tertiary establishments, changing institutional frameworks and programmes of study, and improving and intensifying processes of decentralization and streamlining bureaucracy, even at the school level itself. The programme to decentralize and integrate the educational system emphasized the responsibility that schools had for the results of their educational process. A proposal was made to give schools more autonomy at the pedagogical, administrative and budgetary level.

differentiation of the schools is necessary in order for them to become truly responsive to their environment by making the instruction they provide more relevant to the "real world" and offering their students a more flexible and diversified range of developmental opportunities.

Some experiments conducted outside the region have shown that schools which manage to strike an appropriate balance between autonomy and the fulfilment of the educational system's overall objectives and which receive sufficient technical support for the definition and subsequent management of their institutional agenda provide a better quality education.

iv) *Higher education.* At the university level, educational centres should be free to undertake initiatives in keeping with their individual institutional agendas and should enjoy full autonomy and independence in the management of their academic, administrative and financial affairs.

The heightened autonomy of such establishments should help to strengthen the links between universities and the production sector as well as, at a more general level, relations between organizations that generate knowledge and those that seek to put that knowledge to a productive use. The various forms of cooperation which are already being pursued in the region serve to illustrate this point (see box VI-3).

Another foreseeable effect of increased autonomy for the universities is the expansion and diversification of the teaching services they provide so that they could reach new groups of students and cover a wider range of educational needs. Even now, a notable increase is to be observed in adult education courses, continuing education programmes, educational activities for managers and administrators, refresher courses, retraining programmes, etc. By ceasing to be the exclusive educational turf of young people newly graduated from secondary schools, the universities could become a

## Box VI-3

## LINKS BETWEEN UNIVERSITIES AND THE PRODUCTION SECTOR

Training programmes are a prime potential link between universities and the production sector. Noteworthy in this regard is the programme funded by the Ford Foundation and carried out by the Monterrey Institute of Technology (ITESM), which has trained some 30,000 people in statistical techniques for process control, and provided advisory services on the installation of these techniques to those enterprises that requested them.

Centres of advanced production technology are another important link between ITESM and the production sector. The purpose of these centres is to develop, transfer and apply new manufacturing technologies. They also provide advisory services to enterprises on design and manufacturing systems, aided by computers, informatics, robotics and quality control. ITESM has invested US\$20 million in the Centre for Advanced Production Technology, which functions on the Monterrey campus. Moreover, the Centre for International Competitiveness, located on that same campus, offers electronic access to international centres for obtaining trade information. Thus, teleconferences can be held by satellite and information can be requested on market trends and the best trade opportunities.

Another case worth mentioning is the trust fund established by the Mexican bank SOMEX S.N.C. and the National Autonomous University of Mexico (UNAM), to provide financial support to new technological research projects. Both provided equal amounts to establish the fund, with SOMEX acting as trustee. The objective was to link UNAM's research capacity to the needs of national industry, especially those of the companies in the FISOMEX Group. After four years of unsatisfactory functioning, the trust fund was restructured. The enterprises remained, on one side, and on the other a unit was created from the original technical committee to promote projects, namely UNAM's

centre for technological innovation. From that time onwards, the scheme began to function efficiently, providing support to a variety of projects in different areas.

Brazil has also had a series of similar experiences which led to the creation of high technology firms, with the participation of well-known researchers. These enterprises incorporate value added and invest constantly in research and development to provide technological innovations for their line of products.

An especially noteworthy case took place in the São Paulo area, where professors and ex-researchers from some of the main academic centres in the region, particularly the University of São Paulo (USP) and the Institute for Technological Research of the State of São Paulo, created their own enterprises.

The professors and researchers took the initiative on their own, with no support from the institutions where they had previously worked. In fact, USP placed formal restrictions on their participation, but they were not enforced. The decisive factors which gave rise to the initiative were market demand and the Government's industrial policy. The researchers came to dominate the technology while carrying out research and development commissioned by public agencies and enterprises in the institutions where they were working. Later, after setting up the first firm, the more enterprising partners left their institutions. The first to do so was the head of the new firm. A lack of capital and business experience did not prevent them from creating new enterprises, which continued to invest in research and development in order to stay up to date and become technologically independent. Overall, it was a spontaneous process; there was no correlation of geographical proximity between the new enterprises and the institutions where their founders worked.

conduit for continuing education in response to the specific demands of different groups in society, as is already occurring in the developed countries.

A recognition of academic institutions' autonomy, in conjunction with the differentiation of educational centres and functions that is currently taking place, could help to generate new institutional modalities of scientific research as well,

especially if links with production activities are strengthened.

From the standpoint of competitiveness and what is needed to attain it, the universities must provide a quality education that is in keeping with the demands associated with scientific, technical and professional development as well as with economic and political affairs so that their graduates will be able

to help their countries establish a satisfactory position within the international arena and resolve their problems in relation to integration and social equity.

Under such circumstances, quality cannot be measured simply in terms of each country's level of development. At least some core group of local institutions has to be capable of providing instruction and undertaking research at a level commensurate with what is demanded of any actor seeking to establish an international position. This is what is meant by "centres of excellence".

Thus, each country—or, in the case of small countries, each subregion—needs a certain number of university-level institutions of this stature (i.e., centres of excellence) whose work will have an influence on those sectors which are at the forefront of the country's drive to establish an international position and will endow the country with the ability to become competitive through a combination of research and specialized human resources development activities, especially at the postgraduate level.

v) *Mid-level vocational training.* The close links that could be established, within a setting of greater institutional autonomy, between vocational schools and the business community would make it possible to focus the debate concerning the future of this form of instruction on strictly practical considerations, i.e., on the social and labour-related demands which vocational instruction would need to satisfy in order to meet its objectives.

It may therefore be hoped that vocational schooling can serve as a suitable means of providing training in specialized areas for which there is a great demand in the labour market. In other cases it may be preferable to use vocational schools as a gateway to production activities for young people who have already received a more general education. In both instances, the content of such training should be tailored to the development needs of the local production sector, and the business community should participate directly in,

and share the responsibility for, its definition on an ongoing basis.

vi) *Technical training institutions.* Decentralization is also essential to the success of any technical training policy, since the institutions that provide such training need to be able to respond quickly to changes in the demand and needs of the business community.

The administrative autonomy of public-sector training institutions might be coupled with a policy aimed at fostering the emergence of many different types of providers and seekers (i.e., supply and demand) of technical/professional training in order to meet the growing variety of demands made by today's production units. To do so, the role of public-sector training centres will have to be redefined on the basis of the needs of the surrounding communities. For example:

- When a dynamic supply of private training is available, public training institutions should probably focus on teacher training in order to ensure the quality of instruction and on regulating training activities by, for example, providing certification services that will furnish fuller information on the skills and qualifications acquired.
- When, on the other hand, the private-sector supply of training services is limited, then public training institutions might supplement that supply; in such cases public institutions could direct their efforts towards fulfilling those training needs brought to light by studies on the labour market and projected employment trends which fall within the framework of the priorities set by the country's economic policy. They might also sell their services to production units or entrepreneurial associations and encourage the business community to take part in training activities (see box VI-4).
- When a determined effort is being made to retrofit or modernize industry, then public training

## Box VI-4

### DUAL-TRACK TRAINING AND STIMULUS FOR EMPLOYER ORGANIZATION IN THE DOMINICAN REPUBLIC

The dual-track training programme, a project for technical cooperation between the National Technical and Professional Training Institute (INFOTEP) of the Dominican Republic, the Chamber of Artisans of Lower Bavaria and the Upper Palatinate and the German Agency for Technical Cooperation (GTZ), has been successful in three ways:

- The number of trainees increased from 60 in 1988 to more than 400 in 1991.

- It demonstrated that training activities can be carried out with close links to the employer sector and, moreover, that this contact is crucial to the success of vocational training programmes.

- It has stimulated employer organization.

A committee of specialists and employers from a given sector was formed to carry out the programme; it elaborated criteria that should be used to design a training programme. So far, three specializations are offered: industrial mechanics, automotive mechanics and cabinet-making.

In this programme, the apprentice begins with eight weeks of training in the training centre CEN-INFOTEP, during which time he is paid 40% of the minimum wage by the company in which he will serve his apprenticeship. He then alternates four days of practical apprenticeship in a company with one day of classroom instruction at CEN-INFOTEP. The percentage of the minimum wage he receives gradually increases up to 100%.

The apprenticeship in a company is supervised by an INFOTEP-trained monitor. Upon completing two years of such training, the graduate is certified by an entrepreneurial board. About 90% of the graduates remain with the company where they trained. One of the next activities planned is to follow up on the graduates. An advanced programme has been designed for the graduates of the dual-track training programme, open also to skilled workers with only practical training.

Maintaining close links with employers has been a constant concern at each stage of the programme. Therefore, the programme has an excellent reputation among employers. They feel that the graduates of the dual-track training programme achieve higher levels of productivity than those who graduate from secondary technical/vocational education.

The dual-track training programme has stimulated employer organization. The association of automotive service workshops was founded in April 1988, after consultants from GTZ called together employers from that sector to ask for more support for the programme. This association at present has 22 members who employ around 3,000 people. Moreover, the commitment of this employer organization to dual training has been the key to the success of the programme, which has shown the potential of a training system that responds to demands from the private sector and which develops in close contact with enterprises.

institutions should take part, in conjunction with the business community and the unions, in the design of comprehensive support programmes that include training and any other elements considered necessary; examples of such elements might include mechanisms for contributing to the absorption of technical progress by production sectors which are seeking to boost their competitiveness but in which employers are not in a position to carry forward the necessary programmes. Deadlines for the completion of such programmes should be set in order to ensure that the private sector will assume an

increasing measure of responsibility in this area.

- Public training institutions could also serve as intermediaries for training designed specifically for disadvantaged groups or for the retraining of workers in sectors that are on the decline (see box VI-5).

In all the above cases, increased autonomy for public training institutions would enable them to establish direct, flexible relations with the business community and to continue covering some of the areas in which they have traditionally been active while also meeting the new and varied needs of today's production units (particularly small and medium-scale enterprises), not

## Box VI-5

RETRAINING FOR WORKERS DISPLACED BY THE RETROFITTING OF  
INDUSTRY IN MEXICO

Since 1984, the Ministry of Labour and Social Welfare of Mexico has developed a retraining programme for workers whose employment status has been affected by the retrofitting of the country's industrial facilities. Each year, intensive courses ranging from one to six months in length are given to an average of 40 000 workers; these courses provide instruction in specialized fields for which demand is expected to grow, such as accounting, automotive mechanics, carpentry, and the installation and maintenance of electrical systems.

This programme has been designed to serve as a temporary supplement for regular adult training programmes; one of its distinctive features is that it focuses on one specific target group: low-income unemployed workers, preferably heads of household, having an educational level which makes it feasible to train them as skilled or semi-skilled workers. At first, trainees were offered an income equivalent to one-half of the general minimum wage during the time they were attending the courses. Given

the critical economic needs of the participants, however, this sum proved to be too low to forestall a high attrition rate. When the sum was raised to the level of the minimum wage, however, the drop-out rate fell to less than 10%.

Generally speaking, the programme has been a success. Between 80% and 90% of those completing the programme have found work, mostly in the formal sector. These workers proved to be welcome additions to the firms that hired them, and this, in combination with the growing shortage of semi-skilled technicians, paved the way for a cooperative effort by the public sector and employers which has led to the organization of jointly-run courses involving a period of formal training followed by in-house training in a participating firm. Under this joint scheme, businesses take part in designing the curriculum, setting entrance requirements and choosing candidates; they also pay a portion of the training costs and commit themselves to hire a given percentage (usually 80%) of the graduates.

only in terms of personnel training but also with regard to technological and organizational matters. In fact, some of these institutions are already doing so.<sup>1</sup>

vii) *Scientific and technological institutions.* The greater autonomy which scientific and technological centres would enjoy as a result of institutional reforms might well foster closer relations between such bodies and the entrepreneurial base. Another possible result might be the appearance of new agents to provide a liaison between the supply and demand for technology which would help stimulate innovation in both spheres.

In order for this to take place, however, a supportive environment for innovation is needed, particularly in respect of legal matters. It will therefore be necessary to review and perhaps modify legal provisions regarding the importation and transfer of technology in order to adapt them to a trade

environment marked predominantly by an absence of restrictions on merchandise imports and a progressive reduction of tariff barriers; to eliminate restrictions on the marketing of technology, whether they take the form of registration requirements, excessive administrative formalities or special taxes on payments for technological services; and to update trademark and patent legislation in order to streamline registration procedures and help create an awareness of the importance of intellectual property.

*b) Government regulatory mechanisms*

The greater degree of autonomy for educational institutions which is being proposed here would provide a tool for improving the quality of education at all levels. It would also, however, be necessary\* for the governments to have effective means of evaluating the schools'

1 CINTERFOR/ILO, *Vocational Training on ...*, op. cit.; María Angélica Ducci, *Formación profesional y ajuste estructural*, CINTERFOR/ILO, Montevideo, July 1990.

achievement of their objectives as well as of upholding the system's overall principles and its social equity.

First of all, the Government itself would need to upgrade its regulatory capabilities and its ability to guide the system as a whole so as to provide a stable set of policies and rules regarding the activities of the schools.

The institutional capabilities of the relevant government agencies in the areas of policy-making, planning, research and analysis need to be reinforced. To that end, a broad-based effort is called for in order to train the staff members of these organizations who are responsible for evaluation and supervision. It is also important to bear in mind the fact that an insufficient supply of information is often the main obstacle to an informed selection of policy options, particularly in the field of human resources. As a number of the countries in the region are already aware, the only way to help overcome this difficulty is to set up a public information system which has the necessary computer support to permit the processing of information and the decentralization of access to that information.

As regards content, it is the State's duty to ensure at least a minimum level of core-subject instruction, especially in primary and secondary schools, in order to equip students to learn and use the cultural codes of modern society, which constitute the cognitive assumptions or "givens" of modern citizenship and the basic ingredient of effective job performance.

It is also the State's duty to regulate and coordinate, at least to some extent, the market for training services and post-secondary education so as to ensure that the sought-after diversity does not degenerate into an anarchic situation in which no links exist among the various systems and there is no guarantee of the quality of instruction.

It is equally important to strengthen the public-sector agencies which provide guidance to the technological complex so that they can perform their support and coordination functions satisfactorily. Mechanisms also need to be developed for

evaluating government-supported programmes so that the relative merits of continuing those programmes can be objectively assessed.

The regulation of the general compulsory educational system entails the formulation of a certain number of rules or standards by the central authorities. Some of these rules will have to do with the content of instruction, i.e., with the overall objectives and minimum requirements corresponding to each level of education. It would be best to assign the formulation of such rules to independent committees which are representative of the community and which therefore extend beyond the internal bounds of the educational system (see box VI-6). The final decision as to whether to adopt these objectives and requirements should be made by a higher-ranking government agency or by the ministry of education. The rules regarding content which are adopted by that body should constitute a generally applicable, relatively simple model which confines itself to setting out the overall objectives and minimum requirements for each level while still giving the schools sufficient latitude as regards the implementation of that model and its supplementation.

Other general standards or rules will refer to educational practices and will seek to ensure equitable access to the system and to guarantee a certain minimum level of efficiency. Guarantees in respect of access to the system are particularly important in order to prevent discrimination against given ethnic groups, the poor, or women (see box VI-7).

The setting of the length of the school year (somewhere in the vicinity, in so far as possible, of the international standard of 880 hours annually) is an example of a rule or standard designed to ensure efficiency, although it also illustrates the need for flexibility in the application of such standards so that the schools can adapt to the specific conditions existing in each community.

The regulation of training and non-university post-secondary educational institutions can be more flexible,

## Box VI-6

## CURRICULUM REFORM IN MEXICO

The basic objectives of the 1989-1994 programme to modernize education, carried out by Mexico's Ministry of Public Education, are to improve the quality of education and promote innovative teaching. Curriculum changes at the primary level have been key to these efforts. The method used for curriculum reform is to involve all social actors in the process of defining the performance profiles of primary school graduates. These profiles provide the parameters for determining the contents of each subject and the sequence in which they should be taught, learning techniques and methods of evaluation. The idea is to revise the design of curricula in which either the corporative logic of those working within the educational system itself or the logic of the disciplines themselves currently predominate. This new curricular design aims to equip individuals with the educational

background they need to meet the requirements they will face in different areas of social life.

Among those who participated in the process of determining performance profiles and their implications for curricula and learning goals were representatives of a number of technical departments of the Ministry of Public Education and other ministries, the Mexican Worker's Confederation (CJM), parents associations, indigenous organizations, educational research institutes, universities and teacher training centres, private schools, Mexican Employers Confederation, the teachers' union, communications media and international cooperation agencies.

Research on new plans and programmes will provide the basis for defining strategies for teacher training and for producing new textbooks.

since this sphere is one in which demands and requirements change exceedingly rapidly. In this case, the two main regulatory tools are usually highly exacting school accreditation procedures and the certification of the degrees awarded by such institutions.

The founding of new public or private educational institutions would be subject to the satisfaction of certain minimum conditions so as to ensure the viability of the new institution, the quality of its teaching activities and the validity of the degrees and diplomas it intends to award. In the case of the public sector, the creation of any new educational institutions should be compellingly justified in terms of regional or national development needs.

In the case of technical diplomas, independent certification agencies should be established in which educational authorities and the business community are represented. The involvement of such agents in the certification process is the best possible guarantee that the degrees in question will enjoy recognition in the labour market.

Finally, in the case of higher (university and professional) education, the type of regulatory measures to be used

should be such as to encourage the institutions to evaluate their own activities, should make adequate provision for external evaluations and should foster the greatest possible transparency in this subsystem so that students, other users and public authorities may all base their actions and decisions on the most complete information possible.

In fact, at this level it is to be hoped that educational institutions will regulate themselves based on their interactions with other such institutions and with their external environment, while government authorities devote their energies—ideally, through an independent technical agency—to their accreditation and to encouraging (by means of regulations concerning information and evaluation) a continuing improvement in the quality, effectiveness and efficiency of such institutions.

Two specific regulatory issues are of particular importance, however: the adoption of sufficiently stringent standards or mechanisms for the creation and authorization of new private universities and for the accreditation of postgraduate programmes. Some countries' experiences in the 1980s

## Box VI-7

**RECOMMENDATIONS FOR ELIMINATING GENDER-BASED STEREOTYPES IN TEXTBOOKS AND TEACHING**

In addition to marginalizing 50% of the population from production processes crucial to improving the whole population's quality of life, discriminatory sexual stereotypes transmitted at school make it more difficult for people to see reality clearly. Also, by reinforcing the division between the sexes, values such as cooperation and solidarity within the family, and the respect which should be developed between members of families and communities, regardless of age or gender, tend to be ignored. For all these reasons, it is important that measures be adopted to eliminate discriminatory messages from teaching, including especially the following:

- \* Revision of teaching programmes, making the necessary changes to eliminate sexual stereotypes from textbooks and other classroom teaching aids. Among other things, this could mean providing technical and financial support

to publishing houses so they produce educational material free of sexual stereotypes and provide textbook authors with precise recommendations in this regard. The recommendations should not be only for primary school textbooks, but also, in materials at the secondary school level, aim to present as objectively as possible the reality of women of all ages.

- \* Promotion of workshops for educators to heighten their awareness of the problem and encourage teaching methods which avoid sexual stereotypes in classroom activities.

- \* Production and dissemination among the community of a series of messages and images which counteract current stereotypes on male and female roles, presenting women and men working together and choosing occupations with no prior categorization.

demonstrate that when such standards are too lax, an enormous number of private universities may suddenly burst upon the scene whose viability and quality are by no means assured. Similarly, if postgraduate programmes can be established without sufficient guarantees in terms of accreditation, the increase in such programmes will not contribute to the development of top-level human resources, especially in the case of new researchers and scholars (see box VI-8).

*c) Mechanisms for coordination and consensus-building*

Increased autonomy for educational institutions must be coupled with the establishment of a variety of effective mechanisms or forums for coordination and consensus-building in order to prevent the system as a whole from becoming disjointed or disorganized. The region's past experience indicates that pre-existing regulatory mechanisms are generally not enough to ensure such a system's effective coordination.

i) *Coordination.* Coordination among units at the same level of education ought to augment local decision-making power

and diminish costs. One example of the types of experimentation with different ways of coordinating primary schools which are now being done is the school consolidation or clustering programmes which have been implemented with differing degrees of success in a number of countries in the region. These schemes involve grouping schools around a central institution which is specifically equipped to serve as a resource centre and as a source of support and guidance for those schools. The ways in which this resource centre is linked to the other schools vary and may or may not provide an opportunity for the participation of the rest of the community.

The coordination of the various components of human resource development systems has not been an easy task. In the case of the early stages of formal education, the failure to coordinate the transition from one level to the next (preschool-to-primary and, later, primary-to-secondary), even in centralized systems, is the source of—or, at the least, exacerbates—learning problems; it is no mere coincidence that many such problems are concentrated in the grades where students pass from one level to

## Box VI-8

## EVALUATION OF POST-GRADUATE PROGRAMMES IN BRAZIL

Right from the very beginning, Brazil's modern postgraduate programmes (master's and doctoral level) were systematically accredited, at first by the policy-setting body of the Ministry of Education and Culture, the Federal Council for Education.

But from the 1980s onwards, accrediting these programmes became the exclusive function of the Committee for Educational Improvement, an agency of the Ministry of Education and Culture responsible for policy at the postgraduate level and for scholarships and support needed for training high-level human resources.

The Committee's accompaniment and evaluation system is basically a process of external evaluation by committees comprised of professors and researchers from master's and doctoral programmes nationwide. The system also makes use of information gathered periodically by the Committee through detailed questionnaires given to the respective programmes and on-site visits made by consultants from the same institutions as the members of the evaluating committees.

These evaluations shape policies, support strategies, financing and accreditation at the postgraduate level, and are shared with the programmes themselves to promote their own efforts to improve quality and efficiency.

Evaluations are carried out every two years, based on criteria of academic rating, coherence and efficiency. Academic rating refers to the faculty and their output. The criterion of coherence makes it possible to evaluate how well suited the faculty is to the programmes' needs and curriculum. The criterion of efficiency allows for analysing indicators of the process, among them, professor-student relations, the work schedule of the faculty, average time it takes students to complete the programme, etc.

Programmes are evaluated at two levels: alone and in comparison with several other programmes. The first level shows how a programme is evolving, its specific development and its present situation with respect to its previous evaluation. The other level gives the relative position of each programme within its area or subarea of knowledge. At both levels, the different aspects evaluated are graded from "A" to "E"; an overall grade is also given. New programmes are not graded, in order to nurture them through the first stage of their development.

Programme directors receive the results of the evaluations of their programmes, and the communications media and other interested parties are also informed.

another. In the case of training and technical education systems, a number of countries have sought to reorganize this segment, often by setting up a council to coordinate existing institutions, prevent the duplication of work, etc. Attempts to set up a central coordinating unit that will respect the system's need for flexibility has been fraught with difficulties, however, and continues to be an important goal that has yet to be achieved by the majority of the countries in the region.

The complementarity of educational and training policies, along with the "bridges" which this builds between the working world and the educational system, is another crucial factor, as is the complementarity of the various levels of the educational system (e.g., a complementary relationship between secondary technical instruction, on the

one hand, and post-secondary and university education, on the other) in achieving the ultimate goal of creating an integral human resources development system.

In the case of secondary education and the universities, on the other hand, just the opposite – i.e., a "de-linking" – is called for. It makes no sense for secondary education to operate as if it were no more than a path to a university education when only a fraction of its graduates go on to university. If such a de-linking process is pursued, secondary schools will then be in a position to seek out new ways of relating to their social environment on the basis of their individual educational agendas (see box VI-9).

ii) *Consensus-building.* One of the corollaries of the de-linking of secondary and higher education is a closer coordination between secondary

## Box VI-9

**CREATING A QUALITY SECONDARY-LEVEL TECHNICAL TRAINING PROGRAMME:  
THE CONALEP SYSTEM IN MEXICO**

In Mexico, like several other countries of the region, secondary-level technical schools have little social prestige. They fail, therefore, to attract students with a good educational background, who prefer general secondary education. At the same time, many Mexican companies lack mid-level technicians. To deal with this problem, the Mexican Government created the National Association for Technical and Vocational Education (CONALEP) in 1978, a semi-autonomous, decentralized public agency, responsible for establishing new and independent training centres for mid-level technicians.

CONALEP presently has more than 100 centres training more than 110,000 people a year. Most of the students enter the programmes without having finished their secondary education and are able to complete a three-year programme. The centres are run by local committees composed of representatives of teachers, firms and students, as well as by a central administration. Employers participate in defining the curricula and provide most of the

instructors, who are normally experienced industrial workers teaching only part time, and therefore earn far more than traditional technical school teachers. Although the central Government provides most of the financing, enterprises normally supply equipment, materials and other donations in kind. CONALEP centres also offer training opportunities to workers with lower levels of formal education.

CONALEP centres have been relatively successful, compared with other technical schools. This is due to regular radio and television campaigns, aimed at both enterprises and potential students, emphasizing the crucial role of vocational training in the industry of the future. Likewise, the administration of these centres has been flexible enough to incorporate, for example, remedial courses for disadvantaged students on prerequisite subjects, which has helped lower the drop-out rate. That rate, however, is still high (above 50%), partly because many students are hired by enterprises before finishing their training.

education and the labour market, which can only be achieved if educational authorities and representatives of the production sector engage in an active process of consensus-building.

A first-tier mechanism for such consensus-building should be established for each school and should actively involve social organizations in the design of educational agendas, curricula, etc. The design of manuals and textbooks, for example, might even be arranged for in cooperation with regional or national publishing houses.

Such consensus-building may take a wide variety of institutional forms, as is demonstrated by a comparison of experiences in different parts of the world. The object is to create mechanisms which combine a leading role for educators with inputs from representatives of the rest of the community (parents, students, businessmen, local community organizations, etc.) and the Government's regulatory and monitoring activities.

At the general basic-education level, an example of one aspect of an actual consensus-building process might be the incorporation into the curriculum of an introduction to production activities, which might include field trips to different companies or short sessions of practical instruction at specific firms. The purpose of such a course would be to develop the students' ability to function within a work environment, rather than to develop any specific skill. The organization of such a course could provide an opportunity for direct collaboration between the production sector and educational institutions which might well pave the way for a subsequent increase in consensus-building and cooperation.

The experiences of public training institutions make it clear that legal mechanisms are not enough to ensure genuine consensus-building. The traditional form of tripartite representation which has customarily been employed by the governing bodies of these institutions has failed to involve

unions and employers in a meaningful way in relevant decision-making processes relating to technical training. Over time, the tripartite model has tended to become so ritualized or overly bureaucratic that business and labour have gradually become isolated from the decision-making processes inherent in their day-to-day operations.<sup>2</sup> Consensus-building is a process which therefore needs to be pursued on a more specific, efficient and concrete basis.

Inter-firm consensus-building in the field of training also needs to be furthered. Although they generally lack a tradition of involvement in this field, some Latin American firms have already grasped the increasing importance of training their workers in a modern-day world marked by rapid technological change in which it is quite difficult to predict accurately what skills will be needed in the more distant future. Thus, some companies in the region have managed to find ways of cooperating with one another that enable them to compete as a single unit for international market niches and to conduct joint training efforts (see box VI-10). It is also possible that the change in the technological paradigm which is now taking place may be prompting the emergence of new behaviour patterns in the business world which, although they are slow to take form, are already becoming noticeable in certain industries and countries. Some public training institutions could play a pioneering role in this field by offering training programmes for corporate management staff which highlight the benefits of an active policy of investment in human resources.

Finally, the broadest possible type of consensus-building mechanism could be created in the countries as a foundation for the generation of consensus-based policies regarding the design, implementation, financing and evaluation

of a national human resources development strategy. Such a mechanism need not be rigid or formal, and should be adaptable to the circumstances prevailing in each country (see box VI-11).

## 2. Universal access to the codes of modern society

The entire population should be trained to handle the basic cultural codes of modern society or, in other words, should possess the knowledge and skills required in order to participate in public life and play a productive role in modern society.<sup>3</sup> These skills provide the necessary foundation for future learning, whether in school or elsewhere.

When reference is made to modern society, the fact should be borne in mind that the term alludes not only to the incorporation of an instrumental rationality and the absorption of technical progress, but also to an organized group of citizens who are capable of thinking about themselves, determining their needs and wants, forming an integrated whole, reacting to a changing environment and engaging in complex problem-solving.

It follows from the above definition that the skills required to form part of society cannot be acquired without making a reassessment of one's own cultural identity; this provides a point of departure from which to assimilate, on a selective basis, those aspects of general scientific and technological progress that prove useful and to utilize the answers to be gleaned from the society's accumulated store of cultural assets. It is through this reassessment that the assimilation of universal codes becomes meaningful and comes to constitute a factor of progress.

In more concrete terms, in Latin America and the Caribbean this reassessment entails accepting the

2 Maria Angélica Ducci, *op. cit.*

3 These capabilities are usually defined as those required to do basic arithmetic; to read and understand a written text; to engage in written communication; to observe, describe and analyse one's environment; to receive and interpret the messages of modern communications media; and to engage in teamwork.

## Box VI-10

**TRAINING OFFERED THROUGH JOINT EFFORTS BY EMPLOYER ASSOCIATIONS**

Several enterprises in the region have collaborated in developing activities that would have been difficult for them to carry out separately. Indeed, on the basis of their shared training system, they have achieved a sustained export growth.

Businessmen and community leaders in Novo Hamburgo, in the Brazilian State of Rio Grande do Sul, have for decades been promoting technical training in the footwear sector, in order to support the development of this type of enterprise in the region. The leather and footwear industry in that area employs close to 200,000 workers. Employer associations in the sector have been outstanding for their dynamism, long-range vision and solid capacity for consensus-building, developing a whole system of technical schools for leather-working. The first such technical school was created in 1947 by the National Industrial Apprenticeship Service (SENAI), a technical and vocational training institution supported by associations of Brazilian industrialists. In 1965, a technical school for tanning was added, and the following year, another technical school dealing with related areas, such as chemistry, mechanics and electronics. Finally, in 1972, some employer associations created the Technological Centre for Leather, Footwear and Related Areas (CTCCA), providing technical support to local industry, with financing from enterprises. The close link between the schools and the companies in the area—company executives sit on the schools' boards of directors—keeps curricula up to date and allows graduates to find work easily in the industries of the region. This interaction with the training institutions has also been one of the reasons for the success of the sector.

The Chilean company Ivo Creaciones has developed activities along the same lines, both with its main customer, a Brazilian trading company, and with the other enterprises of the sector. With 200 employees, Ivo Creaciones manufactures 800 pairs of shoes a day and exports almost three-fourths of its output, mostly to the United States and Canada. Faced with ever stricter quality demands in international markets and constant changes in

production processes, a lack of skilled labour could become a serious problem. The trading company has played an important role in solving that problem, suggesting modifications and sending technicians to help organize production and train the company's personnel and some of its suppliers. For its part, Ivo Creaciones entered into an association with other enterprises of the sector in the footwear committee of the Association of Exporters of Manufactures (ASEXMA) of Chile, encouraging it to sign an agreement with ECATEMA, a training institution for the textile and footwear sectors. In this agreement, ECATEMA provides theoretical and practical training courses. The enterprises, in turn, commit themselves to providing practical training for the graduates.

In a sector with even more demanding technological requirements, the Paraguayan company Consorcio de Ingeniería Electromecánica, S.A. (CIE) has become an exporter of electrical machine components thanks to a sustained effort at training, initially supported by Brazilian enterprises. CIE was formed after the signing of the Itaipú treaty between Brazil and Paraguay, with the commitment to participate in the manufacture and installation of components for turbines and generators, in conjunction with Brazilian firms. This activity, governed by strict quality specifications, required the installation of modern machinery whose operation was clearly beyond the capacity of local manpower and the graduates of the country's technical schools. To face this challenge, CIE took advantage of the technical assistance provided by associated enterprises by sending its personnel for practical experience in their plants in Brazil, or by receiving Brazilian technicians in its own plant to train and supervise its personnel. The company later developed its own annual training plan, creating a welding school in its industrial plant where it could provide different kinds of training, so that the personnel trained, besides acquiring basic theory about different welding processes, would also be capable of performing a variety of tasks.

region's true cultural identity, which is the product of its diverse roots and its particular history.

The affirmation of a well-defined Latin American and Caribbean identity which, despite its heterogeneity,

undeniably reflects certain historical and cultural bonds is not an obstacle to becoming part of the modern world nor is it an isolating factor; on the contrary, it can help the region to establish a new position for itself which will enable it to play a more

## Box VI-11

**SEARCH FOR A CONSENSUAL AND PARTICIPATIVE EDUCATIONAL REFORM  
IN THE DOMINICAN REPUBLIC**

Education in the Dominican Republic underwent a serious crisis, with increasing deterioration of the physical infrastructure of school buildings and the working conditions and economic situation of teachers, and a continuous decline in the quantity, quality and coverage of education, all this together with a growing gap between education and the home and community. This process reached its peak in 1991 with widespread teacher strikes. However, the seriousness of the crisis helped Dominican society as a whole to become aware of the fact that the solving of the problem called for more than a superficial reform, but rather profound change, which would be part of a whole consensual, pluralistic and highly participative movement to renew the national way of life. This gave rise to an initiative from civil society itself to search for a consensus which provided the basis for the birth of the Ten-Year Plan for Education. Innumerable public and private institutions participated in this process, including the relevant ministries, educational research institutes, religious groups, organizations of teachers and other social sectors (including several employer associations) and international cooperation agencies.

The plan was elaborated around five major themes: quality, democratization, innovation, modernization of the administration of education and the social and cultural environment of the teachers, students and parents. Each of these themes was studied, from its diagnostic appraisal up to its programming, in light of direct consultations with broad social sectors throughout the country and with personalities and institutions publicly recognized for their knowledge of the area.

In order to bring together the work of these preliminary consensuses, the President of the country named a commission to elaborate a draft project for the new education law, which incorporated these valuable contributions in both its letter and spirit. After holding numerous seminars, specialized working groups and open consultations, in July 1991 the commission presented the President with a group of solutions organized into four main areas: recovery of educational quality, increased prestige for the teaching profession, improvement of students' living conditions and modernization of school administration. The commission also recommended that a series of steps be immediately taken to resolve as quickly as possible the sector's most serious problems.

important and more genuine role at the world level.

Obviously, as the modernization process proceeds this identity will be continually redefined. Some of its aspects will inevitably become outdated, but others will no doubt provide an excellent environment for the generation of societies whose modernity will take on the stamp of their own individuality.

For many of the region's young people, basic education will be their terminal course of study. Nonetheless, because of the increasingly important role played by information in modern society and the changing nature of society's pool of knowledge, every individual must be equipped to continue his or her learning process by taking advantage of the wide variety of channels of communication—and, hence, of education—that are available in this society.

It is generally agreed that in order to achieve this objective, policy action must be taken in two different spheres simultaneously. On the one hand, the coverage of primary education must be made universal and changes must be made in order to ensure that access to primary schools truly provides access to an opportunity to learn the basic skills needed to take part in society. On the other hand, specifically focused education and training campaigns should be undertaken to ensure that the whole of the adult population has attained at least a specified minimum skills level.

*a) Universal coverage and the quality of basic education*

In some countries, the coverage of basic education falls far short of being universal, particularly in poor, isolated

rural areas. In these cases, expanding the subsystem's capacity by investing in infrastructure and in the hiring of teachers is an imperative priority.

i) *Expansion of preschool programmes.* A majority of the studies on the subject indicate that preschool and early stimulation programmes make an important contribution to children's subsequent educational development. Such a programme is particularly beneficial for children from poor homes who receive little intellectual stimulation because it facilitates their subsequent entry into formal education. Steps to expand preschool services can be taken in two different but complementary spheres:

a. Universal school coverage from 5 years of age onward can be ensured either by making school attendance compulsory for children from age five on, as a number of English-speaking Caribbean countries have done, or by launching a broad-ranging awareness and publicity campaign to convince parents to enrol their children earlier. Both options call for a substantial increase in the free (public or subsidized) preschool education system, especially in rural areas where present coverage is quite limited; and

b. Selective coverage of children from 2 to 4 years of age from low-income homes can be provided by means of public or subsidized programmes offering both school readiness activities and nutritional and health services. Better coordination of government action with the activities carried out by non-governmental and local organizations could increase the effectiveness of such programmes, but such action cannot serve as a substitute for government subsidies.

ii) *Reinforcement of basic skills development in the schools.* Since with each passing day the possession of basic skills is becoming increasingly crucial for those wishing to participate in society as citizens and as agents of production, and given the fact that primary school continues to be the terminal level of instruction for most children in the region, an effort should be made to reinforce skills development starting at the earliest possible age.

In order to ensure that all children completing primary school have acquired these skills and can continue to add to them during their working life or during the following stage of secondary education, teaching methods, curricula and teaching aids will all need to be redesigned.

As regards teaching methods, it is generally acknowledged that one of the main obstacles to learning is the passive and repetitive nature of traditional forms of instruction. There is no one "correct" teaching method, and it would not make sense to promote the use of similar methodologies in such widely differing cultural contexts as are to be found in the region, but an in-depth review of instructional systems based on rote learning, which so often fail to produce the desired results, should be undertaken with a view to improving the quality of education. Special attention should be paid to the methods used to teach reading, writing and arithmetic in schools attended by children whose cultural background differs from the cultural assumptions made by the system (see box VI-12).

In this connection, particular importance should be placed on bilingual education. In a number of countries in the region, large segments of the population speak languages other than the official language, and these groups are often found in the poorest sectors of society. A number of experiments have shown that the use of a student's mother tongue for purposes of instruction, at least during the early years of schooling, coupled with the gradual introduction of a second language, facilitates learning. In order to be successful, bilingual programmes need to be very carefully designed and implemented, and should include teacher training activities and the design of suitable teaching materials (see box VI-13).

With regard to the reorganization of school curricula, a variety of studies and experiments indicate that it is better to plan courses of study on the basis of learning cycles or stages; this involves abandoning the traditional method of

## Box VI-12

**THE ESCUELA NUEVA: A NATIONAL-LEVEL EXPERIMENT IN  
PERSONALIZED EDUCATION**

A Colombian experiment has shown that it is feasible to substantially raise the quality of primary education for relatively modest increases in the unit cost per student. The Colombian *Escuela Nueva* is now functioning in 20,000 rural schools with one or more teachers, and the evaluations made show that the students of these schools turn in higher levels of academic performance than those of traditional schools. Greater self-esteem and motivation to work have also been achieved.

This model has succeeded in changing the role of the teacher. In these schools, the teacher no longer has to spend almost all his time in transmitting instructions or knowledge, often written down in a text, but instead must ensure that every student is taking an active part in a learning experience. For this purpose, the students are given self-training texts containing detailed instructions on each of the steps that must be followed in order to achieve a learning experience of real value. These instructions do not constitute the source of knowledge in themselves, but are rather the "map" of the road that the student must follow in order to arrive at the treasure of personal knowledge. These instructions are imparted directly to each student, who then studies them together with a group of three or four schoolmates, and they only turn to the teacher when there is some difficulty in understanding part of them. This greatly reduces the time now used by the teacher to "transmit" instructions either verbally or by writing them on the blackboard. This is particularly valuable in a region where the annual number of hours of teaching are only one third or less compared with schools in developed countries and where there are teachers without formal teacher training (the texts make it possible to ensure certain minimum levels for the learning experiences).

One of the main contributions made by the Colombian experiment has been the design of a new type of modular self-training text. Each text has detailed instructions which make the student examine a local reality or a text and analyse it (first of all alone, and then in a group) from the points of view suggested by the instructions, those that occur to the students themselves, or those suggested by the teacher. The students have to write down the result of

each analysis for examination in the group and subsequent comparison with what it says in the text, in order to identify the other aspects which were not taken into account at this time. Once all these stages suggested in the text have been completed, the teacher must evaluate the final result of the group work in order to decide if it is necessary to carry out other activities or if they can go on to the next module. Eventually, the students become proficient in a non-memory-based method of learning, and the teachers become true guides for the students' research. Students who have gone through this kind of training are not afraid to face new situations, because they have exercised and developed their capacity to identify problems, seek and process information, and write down the results of their process of enquiry. Moreover, as the students ask their parents for items of information for their work (local songs, tales and sayings, ways of preparing food, illnesses, methods of work, forms of transport, dances, and the raising of animals or plants), the parents themselves usually become interested in the work of the school and cooperate more willingly when the teacher asks them to.

The process of putting the *Escuela Nueva* into practice has been systematized, and it is now applied in 20,000 schools. This systematization would naturally facilitate its application in other countries. Although the texts used must be adapted to each country, the method of giving instructions, which is designed to take account of the local environment, facilitates their adaptation. The materials required are provided by the community or collected by the students, except in the case of the work tables or desks, which must have a flat top and must be movable in order to facilitate the group work. The teachers are trained at three seminars, each lasting one week, which are carried out when they fulfil some very specific requirements on community participation or work with the students. The programme is kept up through periodic visits to the demonstration schools and monthly meetings of the teachers at "microcentres" where they discuss the problems of putting the programme into practice and study further advances in the technology used.

## Box VI-13

## ECUADOR'S MACAC EDUCATIONAL MODEL

The MACAC Educational Corporation of Ecuador is carrying out an educational project specifically aimed at the Quechua-speaking indigenous population.

This programme is an innovative alternative to traditional programmes in this country. It was begun on an experimental basis in 1978 among indigenous communities in the Ecuadorian sierra. Once its effectiveness was proven, it was adopted by the national Government as a subprogramme of existing Quechua literacy programmes and formed part of the National Development Plan, which made it possible to extend to the rest of the country.

From the institutional viewpoint, a reference framework was defined which brings the State into association with representatives of indigenous organizations, with the State providing financial and administrative assistance through the Ministry of Education and Culture, and the indigenous representatives assuming responsibility for achieving the educational goals formulated. The research centre for indigenous education at the Catholic University of Ecuador is the technical agency for the agreement; research is done, educational materials are produced and methodologies are designed for teaching and teacher training. Concerted efforts like these make it possible to strengthen activities and share responsibilities for solving whatever problems might arise.

The programme has two tracks: one for those who have not finished primary education and who read and write poorly, and the other for those who have completed primary school.

Courses are taught in Quechua, the indigenous language, while Spanish is taught as

a second language according to the need for intercultural contact. Content is designed to recapture the cultural and social value of the population, allowing individuals to recover and affirm their identity and knowledge. This content covers different fields, namely, ecology, agriculture, stock-breeding, health care, history, arts, law, literature, mathematics and Spanish. The methodology seeks to teach subjects in an integrated fashion, as interrelated rather than unrelated.

In quantitative terms, the Quechua literacy programme has accomplished the following:

Bilingual education centres: 769

Trained human resources: 1,100

Approximate enrolment: 20,000

Family members affected by the programme: 100,000 (estimated)

Education materials produced in Quechua: 43

The experience provides background for literacy training in Quechua, which then moves on to a second stage of learning spoken Spanish, then gradually written Spanish. Also, important progress has been made in researching indigenous mathematics, which the community has an oral command of, and which is introduced in written form during the course of literacy training. In this regard, it has become clear that cultures like the Quechua have different forms of reasoning and symbolism, as well as different ways of accumulating knowledge.

As can be seen, the MACAC Project is a valuable experience, in so far as it links literacy training to university research, the participation of indigenous actors and the promotion of their cultural identity.

planning on the basis of an annual sequence and introducing modular, step-by-step curricula which give the instructor or teaching team the necessary leeway to adapt the pace of learning to each child.

In respect of teaching aids, the availability of textbooks is clearly one of the most influential factors in enhancing academic achievement at the primary level of education; some portion of present school failure rates can therefore be attributed to the fact that, in a number of countries in the region, textbooks are frequently lacking.

Generally speaking, the countries should try to see to it that each student has textbooks for the main subjects included in that student's educational programme. To this end, during an initial stage it might be advisable for the government to distribute textbooks free of charge to public and subsidized schools. Another option would be to provide a subsidy to the schools or to students' families to help pay for textbooks. The size of this subsidy could differ according to the zone and household income levels. This alternative has the advantage of channeling fiscal expenditure more efficiently, as well as

providing for some measure of diversity by allowing different schools to use different textbooks; its disadvantage is that it would demand a greater administrative capacity on the part of the public sector. In any event, the cost of such a policy would represent only a small part of current expenditure on education, as has been seen in those instances where measures of this type have been adopted.<sup>4</sup>

In addition to the transmission of facts and other data, the schools should teach students how to obtain and analyse information. In modern society, there are many different sources of knowledge (libraries, data banks, manuals, newspapers and magazines, the mass media, experts, etc.) and an individual can gain access to that knowledge only if he or she has learned how to make use of those sources. Education should plot out "access routes" to knowledge by incorporating all these sources as different types of reference materials. This can be done, especially at the middle-school level, in various ways: bringing non-teacher educational agents into the school who are knowledgeable in a certain area and are capable of sharing that knowledge; having the students go out into the community in order to gain access to the knowledge to be found in practices, institutions and experiences; making regular use of libraries, newspapers and the other media; increasing the interaction among the students themselves in connection with research projects and other forms of teamwork, etc.

The use of modern communications media such as radio, television and, increasingly, computers is especially important; indeed, the use of such media in the region has spread so rapidly –and continues to do so– that their inclusion in any future educational strategy is clearly called for. Interaction between modern education and communications must necessarily encompass two elements: first, the use of such media for direct educational purposes so as to create more

or less formal channels for distance learning by children and adults; and secondly –and more importantly, in the medium term– the utilization of the content and techniques of modern communications media for educational purposes by means of their integration into learning processes and their use as a means of opening up the schools to the community. The schools must teach their students to receive and interpret the messages sent out over the mass media, to think about the content of those messages and to use their critical judgement to weigh the information thus obtained; all these capabilities are required both by informed citizens and by producers seeking to play an effective role in the economy (see box VI-14).

iii) *Improving the teaching of science.* Policies designed to guarantee universal access to the codes of modern society should devote special attention to improving the teaching of science at the basic and lower secondary levels. The incorporation of subjects essential to an understanding of the world and of contemporary society (the environment, population matters, the prevention of such diseases as AIDS and of drug use, etc.) is a fundamental element in preparing a person to take part in society. The integration of these subjects into the curriculum gives students a better grasp of the sciences and thereby not only helps prepare them to play their role as citizens but also provides a greater stimulus for the selection of some area of science as a profession.

iv) *Incentives for school attendance.* In addition to the problems relating to access to education and its quality which must be dealt with in order to arrive at a point where the whole of the population can gain a working knowledge of the cultural codes of modern society, the actual demand for education is sometimes weak, either because of the economic limitations affecting potential students' households or because the individual sees education as not being worthwhile. All this is

<sup>4</sup> George Psacharopoulos and Maureen Woodhall, *Education for Development. An Analysis of Investment Choices*, World Bank, New York, Oxford University Press, 1985.

## Box VI-14

## EDUCATION AND TELEVISION

The programme *Telesecundaria* was created in Mexico towards the end of the 1960s, as an instrument for offering educational services in isolated and scarcely-populated zones, where the cost of establishing and maintaining a traditional secondary school are prohibitive. *Telesecundaria* transmits classes on eight subjects corresponding to the seventh through ninth school years, at the secondary level. Televised classes, each approximately 17 minutes long, are transmitted alternately according to the school year, so that each group of students can see any class designed for their grade every 50 minutes. Between classes, the teachers (called "facilitators") go over the lessons and supervise the work through textbooks and exercises provided to the students by the Ministry of Public Education. Classes in *Telesecundaria* schools have between 15 and 50 students, and one television set. During the 1989-1990 school year, almost half a million youth participated in *Telesecundaria*, which is significant inasmuch as enrolment was barely 70,000 10 years earlier. A *Telesecundaria* school is created when a locality has no formal secondary school nearby and when there is demand from at least 20 young people who have finished primary school. The main attraction of the programme is its low operating cost, which is 43% less than that of a general secondary school and 60% less than those of a technical secondary school. Teachers' salaries, books and administrative costs are the main expenditures, because fixed costs are low (barely 10% of total costs).

Evaluations of televised educational programmes show that an enormous amount of

"non-formal education" is also provided, simultaneously and with no explicit educational objective, by commercial television programmes that are apparently intended purely for entertainment. A number of different kinds of shows and situation comedies seem to be highly educational.

The development of this concept has been facilitated by successful experiences in using regular television genres. Over the last 10 years in Chile, at least three promising experiences have been carried out to meet cultural needs through the use of different kinds of television programmes. The first was the series *Sentencia*, in which a dramatic format was used to present everyday legal problems affecting low-income urban populations. The second was *TELEDUC*, which began with a format modeled on formal education, but later switched to motivating learning through comedy. The third was the use of television to promote an educational campaign on breast-feeding, under the auspices of the National Council for Food and Nutrition (CONAPAN). The radio and television spots for this campaign were produced only after careful research and pilot programmes were carried out. A study of the attitudes, culture and communication codes of the target population was decisive for defining the kinds and structure of the spots, as well in taking decisions concerning what language should be used, which personalities should appear as authorized and therefore credible sources, and what scenarios and settings would be appropriate.

reflected in low attendance rates and high drop-out rates among children and adolescents. Possible measures for overcoming this situation include:

a. Adapting the school calendar to the needs of the local economy, especially in rural areas (reworking the calendar so that, for example, students do not have school on market days or during the harvest period).<sup>5</sup>

b. Establishing a relationship between government funding for schools and the actual number of students/day; this measure could raise problems, however, in areas where climatic, cultural and labour-related organizational factors militate against regular school attendance, in which case it would work to the detriment of rural schools in particular.

5 In rural areas of Uruguay, classes begin at 10:00 a.m. (rather than at 7:00 a.m., as they do in urban areas) so that the children can help with farm chores. Vacations coincide with the sugar cane harvest in Cuba and with the coffee bean harvest in some areas of Guatemala and Costa Rica. In a quite original experiment in Bolivia, teachers accompany seasonal farm workers as they move from place to place.

c. Providing direct incentives for school attendance; in low-income school districts, for example, the creation of school lunch programmes and the provision of health care have generally been successful in raising attendance, as well as improving the students' nutritional status and, hence, their learning ability.

d. Conducting campaigns to increase the public's awareness of the benefits of education as a means of complementing other measures designed to promote enrolment in preschool programmes.

***b) Adult education and training programmes***

The shortcomings of the existing educational system are in large part what determines the training needs of the labour force in Latin America and the Caribbean, and they will continue to do so for many years to come. Since nearly 50% of all workers are totally or functionally illiterate (i.e., they have had little or no formal schooling and therefore cannot read, write and count with ease), training programmes for this segment of the labour force should include remedial basic skills courses; as for workers who have completed primary school, although they are theoretically already in a position to benefit from traditional training programmes, the design of such programmes should take into account the poor quality of the basic education provided in the majority of Latin American schools, which may have diminished their graduates' capacity for assimilating new information. Because education and training are mutually reinforcing, adult education programmes (especially those targeting disadvantaged groups) need to be both broadened in terms of coverage and improved in terms of quality in order to permit members of this segment of the population to upgrade their basic skills and their ability to play a role in production and in society.

***i) Remedial basic skills courses for adults.***

In a number of countries in the region, a large portion of the population is either entirely or functionally illiterate<sup>6</sup> and is consequently either completely or partially excluded from societal integration and economic modernization processes. To prevent this situation from growing even worse in the future, a renewed effort will have to be made to achieve literacy and reinforce basic adult education; this effort should avoid the kinds of mistakes made in the past, such as isolating educational activities from the students' social and economic environment. To that end, these programmes should be very carefully designed and should have short time horizons, and mechanisms for their evaluation should be provided for.

In countries where complete or functional illiteracy is widespread, mass literacy and basic education campaigns should be undertaken for the express purpose of bringing all members of the population up to a specified minimum skills level. In order for this type of initiative to be successful, it must have the backing of a broad-based political consensus and of the mass media, and a great deal of international assistance will be needed in designing the campaign, carrying out teacher training and paying for teaching materials (see box VI-15).

In the other countries of the region, such programmes should concentrate on clearly-defined target groups, and steps should be taken to ensure that the knowledge they impart can be put to practical use, within a reasonable time period, by the participants. In other words, these courses should be associated with the generation of additional income. In point of fact, initiatives which have failed to do this and which have tried to make use of the physical facilities and faculty of the formal education system in order to add to the population's basic skills have not been very successful. Programmes designed for the working

<sup>6</sup> For lack of a more accurate type of measurement, people who have had less than three years of formal schooling are generally considered to be functionally illiterate.

## Box VI-15

**PEBA, AN INTEGRAL EDUCATIONAL CONCEPT: THE RADIO SCHOOL  
OF THE ARCHDIOCESE OF SAN SALVADOR**

The Adult Education Programme (PEBA) was created in 1987 as part of the effort of the Archdiocese of San Salvador to help solve the country's illiteracy problem through its radio station (YSAX).

In the beginning, PEBA was fundamentally dedicated to basic adult literacy training in rural areas. Later, the demands of the people themselves created the need to generate broader educational opportunities for children, youth and adults. To accomplish that, PEBA, which had begun as a programme to teach reading and writing with the help of the radio, became a programme mainly at the service of low-income sectors. PEBA therefore coordinates education with general health care, maternal and child care, among others, which are components of the national plan for social development. The PEBA strategy is designed to provide basic education to children, youth and adults over a three-year period.

In 1989, PEBA received support from UNDP and UNESCO and participated in an initiative for inter-agency coordination with the Ministry of Education, the Ministry of Culture and Communication and the Salvadorian Institute for Agrarian Change, which allowed it to consolidate its work, extend its coverage and obtain its own recording studio.

PEBA is organized at the institutional and communal level, and all its members receive wages. The institutional expression of PEBA, formed by a group of psychologists, teachers, communications specialists, community workers and secretaries, takes care of the orientation, preparation and evaluation of radio and printed material, research on topics, training, planning, and overall evaluation, as well as the internal and external coordination of the programme.

PEBA at the communal level is composed of 10 zonal educational councils, 156 local educational councils and as many educational nuclei as deemed necessary. Zonal educational councils are formed by local community workers who work on a voluntary basis in each of the communities. They are responsible for motivating, planning, coordinating and

evaluating education in the zone. They meet monthly to share experiences, analyse accomplishments and obstacles and search for possible solutions. The local educational councils are composed of group leaders and the local community worker of each community, who meet weekly or biweekly to register students, prepare teaching activities and carry out different related tasks. The educational nuclei are composed of the group leader or volunteer teacher and the group of students from a given community. They hold classes or meetings, during which time the roll is called and the learning progress of the students is monitored.

PEBA brings together three pedagogical elements in its literacy programme: radio, educational material and the group leader. Lessons are transmitted by radio every day at three different times, and are complemented by the educational material which the students receive. During the weekend, the group leader meets with his students to clarify any questions, review their work and continue to discuss the topic presented previously by radio. There is a special programme for 7- to 12- year-olds from communities with no schools or where existing schools cannot absorb demand, or where children drop out of school because of the poverty in which they live.

Once a week an educational programme is broadcast exclusively for the leaders. Radio training is very important, given the volunteers' low level of schooling and their lack of initial preparation. A special programme is broadcast every Sunday for the direct participation of the members of the different communities that PEBA works with. They express themselves through interviews and testimonial statements, as well as their songs and poems. This Sunday programme also deals with a monthly theme, such as women's issues, the family, literacy training or volunteers. To date, PEBA has provided literacy training to 25,000 people, between children, youth and adults. Most of them (95%) are from rural areas and some 70% are women.

population should instead be conducted within the working environment in collaboration with employers and with the public sector's financial support. Some projects in the region have demonstrated that it is entirely possible to secure the

participation of employers and members of the corresponding target groups in such programmes so long as they have clearly-defined, practical, short-term objectives. Concern about the practical relevance of such programmes should not,

however, be allowed to obscure their overall educational purpose. Indeed, the two aims can be combined and can reinforce one another; for example, accounting courses or preferential lending programmes for micro-enterprises can be fashioned into tools for reinforcing basic reading, writing and arithmetic skills, as well as organizational abilities. In any event, it is important for suitable teaching materials to be developed and for the course content of such programmes to be diversified so that they can be adapted to the particular characteristics of the target population (see box VI-16).

ii) *Training programmes for disadvantaged or vulnerable sectors.* Even if an open, flexible institutional structure is established, some sectors will continue to participate very little in such programmes due to their limited ability to organize themselves and to express their demands

or needs. These are probably just the people, however, who would benefit the most from educational and training programmes designed in a way which takes their needs into account. Moreover, because these groups are poor, their absence from such schemes would represent a serious limitation in terms of the social equity of the system. It is therefore necessary to develop ways of identifying these groups' needs and of encouraging them to participate actively in such programmes so that, eventually, they will be able to organize themselves in a way that will allow them to play a genuine role in the community (see box VI-17).

There are three specific groups which are likely to have the greatest difficulty in communicating their training needs: people who are employed in small and medium-sized firms, those who work in

#### Box VI-16

##### TWO COMPANIES' IN-HOUSE ACADEMIC TRAINING PROGRAMMES

Of the almost 1,200 employees of the Companhia Renascença Industrial, a textile enterprise in Belo Horizonte, Brazil, 60% have not completed primary school, a fact which is likely to present a serious problem in terms of their ability to use new production technologies. This situation has led Renascença to launch a programme offering those workers who wish to do so the possibility of finishing their primary education. Classes are held on a flexible schedule within the company by teachers from the Niteroi Educational Centre (CEN), an institution specialized in developing these kinds of courses. The enterprise finances 70% of the costs involved (close to US\$15 per student) and the student pays the rest. Since the programme began in February 1991, 60 employees have enrolled and attended classes. Most are below 30 years of age and work as unskilled labour in production.

The Cuban Fishing Fleet began an educational programme for its workers in 1963, in coordination with Cuba's Ministry of Education. The main achievement of this programme has been to link study with work, taking into account the characteristics of the fishing sector and the working conditions of fishermen who normally have to remain at sea for long periods of time.

In the first stage, priority was given to illiterates and those in literacy follow-up courses

and in worker advancement programmes (post-literacy training). This was a difficult task, owing to a lack of study habits and the rigorous nature of the work. One of the first problems to be solved was to choose and prepare some of the workers with more schooling to teach their workmates. Manuals were drawn up to guide the teaching of different subjects. Special attention was given to reading, spelling and mathematics. Also, teaching aids were provided for classes held at sea, since the system of studies was adapted to the work schedule.

History and geography were taught in units, in order to broaden the cultural horizons of the workers and deepen their knowledge about the countries they had to visit in their work. Technical reading material was also prepared, as a way to increase work efficiency.

Between 1975 and 1980, the training department of the Cuban Fishing Fleet incorporated workers into its programme who had not finished the sixth year of primary education, in the framework of the national educational campaign being carried out in Cuba at that time. Between 1980 and 1985, it participated in the national programme to complete the ninth year, with practically all of the 2,500 workers of the enterprise reaching this level in 1985.

## Box VI-17

## PLAN FOR SOCIOCULTURAL PARTICIPATION IN VENEZUELA

The Venezuelan plan for sociocultural participation is an intervention strategy dealing with the cultural dimension of development in the broad sense of the term; it involves education and training in socially coherent values. The basic idea is to counteract the exclusion of people from major social institutions (the educational system, socially relevant information and local participation). Such exclusion has segmented and marginalized broad strata of Venezuelan society. Four of these programmes have already been launched in the same community, each of them dealing with a different problem.

a) *Empowerment programme.* This programme stimulates local organization and community participation, with a view to ensuring the lasting impact of social programmes and various community activities on raising the quality of life. To achieve this goal, community members are trained to participate effectively in dealing with community problems through a local committee that constantly monitors local management of these programmes and activities, which, among others, include the other programmes in the overall plan.

b) *Leisure-time educational programme.* Although this programme targets children and youth, it also allows for training significant adults from the same community (normally mothers and youth) chosen by the local committee to aid in educating children (in school or out) and in enriching the cultural panorama of both children and young people through recreation, an unconventional learning

mode. The programme is carried out through units and centres for extracurricular attention, clubs for student tutors, recreation groups, etc., located in community facilities.

c) *Family support programmes.* These carry out educational activities on the family, sex, health care and nutrition, training community members to direct workshops in these areas, which increases the cultural capital of the family.

d) *Programme for the mass distribution of information.* The purposes of this programme are, first, to disseminate socially relevant information, which allows for a suitable formulation of community demands and the social services available to meet them, and second, to establish information exchanges with communities, with a view to increase community participation. Community bulletin boards and periodicals have been created, along with centres for training youth and youth leaders.

The plan for sociocultural participation made it possible to train 26,000 adults in 1991 and give intensive attention to 100,000 children and youth, and occasional attention –through weekend activities, holiday programmes and youth information centres– to 400,000 children and youth.

At present, the plan is in the process of expanding its activities by delegating them to non-governmental organizations and providing them with technical and financial support. In this way, the lasting impact of the plan is ensured and civil society is provided with a stimulus to organize.

the urban and rural informal sectors, and the unemployed.

*Small firms.* Such firms' reluctance to provide training stems from their perception of a series of deterrents, which include the adverse impact of labour laws and regulations, the fact that they expect to benefit very little from tax exemptions, and their inability to take advantage of economies of scale in training their staff. In addition, all this is compounded by their traditional misgivings regarding human resources development and new technologies. Despite changes in the production structure and in human resources policy, these problems will probably persist over the medium term. In

order to counter this tendency, the public sector should therefore take steps to familiarize the managers or owners of such firms with the benefits to be derived from training. In cases where the insufficient attention devoted to training by small and medium-sized firms appears to be the result of a limited management capacity, it may be helpful to make such training a part of a package that would also include activities to promote the absorption of technical progress, quality control, marketing techniques, etc. It should be stressed that training would have to be made an explicit component of such a package, however.

In so far as the conduct of small-firm training programmes is concerned, a number of options are available. The first, and most flexible, is the organization of seminars, the dissemination of technical information, the publication of periodic reports on the training market, etc. Another and more complex option is to conduct pilot programmes in selected sectors or areas; in this case, care must be taken to ensure the active participation of the members of the target group and to make sure that the programme is gradually weaned from public-sector funding, which will be indispensable at the outset. In any event, the management of training units should be decentralized and should eventually be handed over to the firms in question (see box VI-18).

*The informal sector.* The assistance provided for training programmes for the informal sector and micro-enterprises will probably need to be much longer lasting and more active. In order to be well received, the programmes for these groups will have to be geared to the cultural and educational traits of the potential users and their actual needs; these needs are very different from those of enterprises in the formal sector, which are the usual target group for training programmes. The operational model used for such programmes should be such as to promote an open and flexible educational

process outside the formal school structure which is tailored to the interests, potentials, schedules and resources of these target groups. Programmes for segments of the rural population should be carried out by mobile units that are equipped to provide training in the use of new agricultural technologies and in non-agricultural services such as maintenance, repair, construction, etc. In the case of both urban and rural zones, three aspects of the design of such programmes will be of crucial importance: firstly, the type of training provided must be in line with the actual job opportunities of these groups, which in most cases are confined to self-employment; secondly, means should be provided of allowing trainees to earn income during the training period through, in particular, the sale of the products they make in the course of the programme; and, thirdly, provision should be made for the fact that it will frequently be necessary to provide scholarships or short-term credit for the purchase of materials, since these groups' incomes are too low to permit them to cover these expenses by themselves (see box VI-19).

*The unemployed.* Finally, the authorities need to take action to provide the unemployed (whether they be young people with no work experience or displaced workers whose training

#### Box VI-18

### PROJECT TO SUPPORT TRAINING IN SMALL AND MEDIUM-SIZED ENTERPRISES IN MEXICO

As in the other countries of the region, Mexico's 380,000 small and medium-sized enterprises have no tradition of staff training. Although demand for training services increased during the 1980s when the economy embarked on a sweeping reform of industrial and trade policy, the personnel in these enterprises remained poorly equipped to take advantage of present technological opportunities to increase productivity and income.

An experimental programme was drawn up to support training in priority regions and sectors, for the purpose of encouraging a more active attitude on the part of these enterprises towards human resources training. This programme makes it possible, through an

agreement with the Ministry of Labour and Social Welfare and the respective employers' association, to establish a technical support group to help small and medium-sized enterprises train their employees. The group will provide technical assistance to enterprises so they can elaborate a plan for staff training or retraining. In a first stage, 20 such groups would be formed in sectors and regions chosen for their potential, which would train 75,000 employees, and then help enterprises organize their own training programmes. These groups will also disseminate information on training opportunities, new technologies and other related topics.

## Box VI-19

## PUBLIC TRAINING AND PRODUCTION WORKSHOPS IN COSTA RICA

The National Apprenticeship Institute (INA) of Costa Rica has developed a method for training low-income workers, called public training and production workshops. These workshops provide basic and complementary training, providing students with a work space and tools and equipment, along with experienced supervisors. Those interested (be they small producers, young people or the unemployed), can bring their own materials to the workshop, whenever they want and for as long as they want, use the equipment and receive technical help when they need it, by paying a small fee. When they finish, they can bring home what they make and sell it if they so wish.

The programme is primarily characterized by its flexibility, which is seen in the fact that it will accept participants with any level of knowledge. In fact, there are no entry requirements, and the instructor and the student together define a study programme in line with the latter's interests and real possibilities. Another proof of its flexibility is the open schedule. Thus, the participant can decide for himself the field, intensity and schedule of his training programme.

Second, since this initiative clearly targets the informal sector, the users' urgent need to generate income immediately is taken into account. The possibility of selling a product made in the workshop and of earning some income from the outset of the training process is an incentive for remaining in the programme. For this reason, the programme constantly seeks to increase the number of opportunities for generating income. Therefore, it encourages the beneficiaries to acquire their own basic tools, which allows them to work independently once their training in the workshop is completed, and to create small enterprises.

A third characteristic concerns the inter-agency coordination which is the

backbone of the programme. Although INA is in charge of the vocational training, other institutions actively participate in complementary aspects, such as technical assistance, providing credit and establishing and managing enterprises. Also, the participation of the Coeducational Institute for Social Aid (IMAS) is crucial, since it provides the user with basic materials needed to begin his project, or financial aid for bus fare, food, etc.

Finally, the workshops explicitly demand community participation, generally by having the community provide land and often buildings, which INA then equips and administers before placing teachers there. These workshops, begun in 1982, have been very successful. At present, there are 15 workshops (two in rural areas) with training and production capacity in tailoring, carpentry, artisanal metalworking and welding, cosmetic treatments and barbering, conservation and preparation of food, to mention only the main specializations. The number of users has grown to an average of 5,000 a year, almost 10% of the total number of students at INA. Around 75% of the users are low-income female heads of household, attracted by a training programme adapted to their family and work obligations.

The workshops have made a positive contribution to the development of community organizations, leading frequently to the creation of "communal committees" or "users' associations". These latter have at times set up petty cash funds with money from users and a percentage of the sale of products. These funds are used for wholesale purchase of the materials that the students need in courses and to maintain installations in good condition. Also, two women's associations have been established, one of which is planning to open a small clothing factory.

prepares them only for employment in sectors that are on the decline) with a type of training that will enable them to rejoin the workforce as swiftly as possible. Such a solution needs to be found quickly because in many cases the greatest problem that a dislocated worker faces in finding employment is the length of time

for which he or she has been out of work. It is particularly helpful for training programmes for unemployed persons to include in-house training modules, since this provides a possible route to a longer lasting position in the labour market (see box VI-20).

## Box VI-20

**A TRAINING PROGRAMME FOR YOUNG PEOPLE IN CHILE**

In Chile, the Ministry of Labour and Social Welfare has developed a vocational training programme for low-income young people who lack job experience. The programme will provide them with training and an opportunity to gain practical experience that will improve their employment prospects.

The aim of the programme is to address the problems posed by persistently high unemployment levels among young people and by the large percentage of young people who enter the labour market each year with no vocational training whatsoever. The training provided under this programme will primarily be intended to provide young people in marginal sectors who neither study nor work with their first opportunity to work in a company. Accordingly, the chief modality to be used by the programme is that of internships, whether as part of a work-study scheme or in the form of vocational instruction followed by a period of hands-on training. The programme also provides for two additional options designed for extremely disadvantaged young people and for those who are preparing themselves for self-employment.

The programme started in 1991 with the help of IDB funding; its goal is to train 100,000 young people within four years. Participants receive a subsistence allowance for a maximum period of four months.

This programme also has a series of quite original features as regards financing and allocative mechanisms. First of all, the courses—which cover a very broad spectrum and are wholly adaptable to local conditions—are taught by SENCE-accredited public or private training institutions which submit bids for that purpose. The corporations which are awarded this responsibility have the opportunity to modernize their equipment by means of leasing arrangements and are eligible for special teacher- and instructor-training courses. Furthermore, the payment they receive is linked to indicators of the courses' successfulness. Upon a course's completion, the training corporation receives 50% of the agreed value of the course and the remainder is disbursed in accordance with student attendance and attrition rates and the subsequent job placement rate of the graduates.

### **3. To foster creativity as regards access to scientific and technological advances, the dissemination of such advances, and scientific and technological innovation**

Experience at the international level has demonstrated that growth and competitiveness—in terms of both countries and firms—is positively correlated with the implementation of specific policies regarding access to science and technology, the dissemination of scientific and technological advances and innovation in this field.

Education, training, and research and development, together with the organizations and institutions which carry out these processes, are the systemic determinants of a country's social capacity for technological absorption and influence the pace and scope of the incorporation and dissemination of new technologies as well as the potential for future innovation.

Scientific and technological policy and the pattern of comparative advantages possessed by a given country's industry should support one another. Such policies must, above all, be in keeping with the industrial structure of the country in question, the extent to which it has developed its competitive potential and the capabilities of its firms and research centres.

Experiences the world over suggest that there are four key areas of technological policy and technological support infrastructure:

- Acquisition of the most appropriate foreign technology for narrowing the gap between the best local practices and those prevailing at the international level;
- Rational use and dissemination of technology, especially for the purpose of lessening intra- and cross-sectoral differences in firms' economic efficiency;

- Improvement and development of technologies in order to keep pace with the latest advances; and
- Development of human resources capable of efficiently performing these tasks.

In the light of the examples which have been reviewed and of the current developmental status of the systems of innovation existing in the Latin American and Caribbean countries, in the following section the discussion will turn to ways of building up a country's stock or "supply" of technologies, the demand generated by the production system, the kinds of agents that can perform the vital function of liaison between the supply and demand for technology and, finally, the policies needed to link the scientific and technological system to the production apparatus.

#### a) *Building up the supply*

Some of the countries in the region have designed programmes for building up their supply of technology (see box VI-21). An examination of these initiatives indicates that most of them include a similar series of measures, which may be classified as follows:

i) Increasing incentives to encourage institutions of higher learning and technological centres to augment their technological supply in terms of both quantity and quality by setting wages at suitable levels, updating existing regulations and policies so as to facilitate the sale or transfer of technology, drawing up budgets for the income generated by the sale of technologies and specific or general capital contributions;

ii) Improving the leadership or guidance provided by public-sector technological centres. To this end, consideration might be given to having businessmen sit on the governing councils of such institutions, developing suitable management indicators and updating the managerial skills of their directors and mid-level staff;

iii) Promoting national enterprises' supply of marketable or transferrable technologies via special liaison agents;

iv) Streamlining the transfer of technology from foreign sources to national firms via special liaison agents; and

v) Establishing channels through which a country's supply of technology

#### Box VI-21

##### CONACYT (MEXICO) PROGRAMMES IN SUPPORT OF TECHNOLOGICAL DEVELOPMENT

In May 1991, the National Council of Science and Technology of Mexico (CONACYT) announced a package of projects in support of scientific and technological development calling for expenditure of close to US\$100 million a year to be added to the approximately US\$1 billion a year which Mexico spends on science and technology (about 0.4% of GDP).

The programmes in question include:

1. A fund for repatriating Mexican research workers and keeping them in the country.
2. A fund for strengthening the science and technology infrastructure and in particular for partially financing purchase of scientific equipment and materials.
3. A fund for creating teaching posts for distinguished scholars in institutions of higher education and research centres and institutions.
4. Funds for financing research projects in the exact, natural, earth, social, human and behavioural, applied and health sciences.
5. Establishment of a register of notable postgraduate institutions in scientific disciplines. Students whose name appears on the honour role of these institutions will be awarded scholarships covering their enrolment and course fees, a monthly allocation for living expenses and medical insurance.
6. Research and development fund for technological modernization which will finance projects whose final output will be used by private enterprises.
7. Fund for strengthening strategic scientific and technological capacities which will enable the Federal Government to join enterprises in a particular branch of the economy, Chamber of Industry or sector in participating financially in the establishment of research and technological development centres.

can be supplemented with the help (part-time) of scientists and researchers from that country who are residing in developed countries (see box VI-22).

There are also many types of direct action, at either a general or sectoral level, that can be taken to help build up a country's supply of technology. In the educational sphere, for example, a system of post-secondary training could be set up for those graduating from technical middle schools which would allow them to specialize in a given industrial area or in a linked set of sectors. It would also be possible to expand or create postgraduate courses of study and laboratory courses in such disciplines as industrial design, production management, the management of technological operations and industrial materials engineering.

#### *b) Building up the demand*

Measures which could help build up the demand for technology include the following:

i) Creation of technological management centres that can help promote an increase in the demand for technology on the part of entrepreneurial organizations and companies;

ii) Promotion, via government-generated demand, of the establishment of subcontracting mechanisms involving the transfer of technology from the issuer of a subcontract to the firm performing that subcontract (see box VI-23); and

iii) Development of educational programmes to sensitize firms' senior and middle management to the opportunities opened up by the types of technologies that are becoming available and to encourage them to upgrade their technical capabilities.

#### Box VI-22

##### URUGUAY'S SCIENTIFIC COMMUNITY AND ITS INTERACTION WITH EXPATRIATE SCIENTISTS

Uruguay has had interesting experience with the interaction between emigrant communities and the domestic development, especially but not exclusively, of advanced science and technology. It is true that the small size of the country and the large impact of its emigration, along with certain events in the country's recent history, have made these activities possible, which is not always the case in other countries.

In 1985, a national committee for repatriation was set up, which brought together private and governmental efforts and external financing in the framework of reintegrating "returnees" (those who were returning to the country after the restoration of democracy) and creating a series of employment, educational and scientific programmes. Shortly before, a programme had been launched to develop the basic sciences, the fruit of a joint initiative between resident and expatriate academics. Created with the express purpose of stimulating the return of scientists, this programme gave the initial impetus to rebuilding science in Uruguay and has been presented in different studies as an example of the influence that an expatriate scientific community can exert on programming and the execution of actions inside the country.

At present, associations of expatriate Uruguayan scientists exist that maintain communication networks with one another and with the country. Their activities include issuing statements about scientific and technological policy—which have a real and continuous influence in discussions and domestic institutional decision-making—planning for and reception of scholarship students, and the establishment of training programmes outside Uruguay, in which they act as the link with scientific and technological activity in the advanced countries in which they live, and regular conferences and work in common.

Although it is generally agreed that this expatriate community has made a real impact over the last five years, it is probably still too early to say if that can continue to be the case for longer periods of time. If the answer is yes, the experience should undoubtedly be considered an example of expanding frontiers, particularly for transmitting messages about modernization in a constant and organized manner, and would mitigate, at least to some extent, the problem of the emigration of highly skilled experts.

## Box VI-23

**INDUSTRIAL SUBCONTRACTING**

Industrial subcontracting is a way of organizing production in which one enterprise, called a contractor, orders from other enterprises, called subcontractors, the manufacture of parts and components of the products it manufactures, or technical services used in manufacturing processes.

With a view to extending the benefits of subcontracting and making the system more efficient, the developed countries have established subcontracting exchanges. These exchanges are private institutions that gather specific data on the available capacity of subcontracting industries, which are provided to the contracting industries that solicit it.

Some countries in Latin America began to set up exchanges for subcontracts more than 10 years ago, with technical assistance from the United Nations Industrial Development Organization (UNIDO). Two of these initiatives were successful: in Peru, with exchanges in Lima, Arequipa and Trujillo; and in Colombia, with exchanges in Bogotá, Medellín and Cali. The regular functioning of these exchanges led to ever more frequent participation in international subcontracting fairs, and periodically, regional fairs, which increased exports of goods and services. UNIDO's "Regional Project to Develop Subcontracting in Latin America", whose first stage began a year ago, aims to establish exchanges in Argentina,

Chile, Ecuador, Mexico, Uruguay and Venezuela. A second stage will incorporate Bolivia, Brazil, Cuba and Paraguay. The formation and coordinated functioning of this network will facilitate subcontracting at the regional level, thereby broadening perspectives at the national level.

Structuring subcontracting around a system of exchanges presents several advantages to the contractor and subcontractor and contributes to the overall development process.

One advantage for contractors is that they have immediate access to precise and detailed information about suppliers of components and services, which helps enterprises stay up to date with technological changes.

An advantage for subcontractors is that they have direct contact with users, which facilitates access and adaptation to new technologies transferred by contractors. Moreover, they are provided with opportunities to develop new products or services in conjunction with contractors.

Structuring the system this way also brings benefits to developed and developing economies by strengthening and expanding production chains, systemically producing technological innovations and increasing the specialization of small and medium-sized industries.

At the company level, the opening of lines of credit to help firms modernize their technology could be facilitated by taking steps to eliminate or diminish the segmentation of financial markets; this measure would be particularly important for small and medium-scale enterprises.<sup>7</sup> Another option is the formation of technology-management working groups to facilitate the management of technology and technological change within firms or within industrial branches (see box VI-24).

c) *Liaison*

The vital function of providing a liaison between the supply and demand for technology can be performed by a variety of agents, including the following:

i) Centres designed to provide support for increased international competitiveness in such areas as foreign trade, the management of technology, problem identification and problem solving, business services, cost analysis, quality improvement, etc.;

ii) Business management centres for small and medium-scale industry whose objectives would include the promotion of the following: an improved utilization of installed capacity; problem identification and problem solving; an experience-based collective learning process; inter-firm cooperation in the areas of purchasing, marketing, standardization and quality control; arrangements for obtaining government support and international technical cooperation; the implementation

<sup>7</sup> *Social Equity and Changing Production Patterns...*, op. cit., chapter VII.

## Box VI-24

**WORKING GROUPS FOR TECHNOLOGICAL MANAGEMENT  
IN THE DOMINICAN REPUBLIC**

A study on investment in technological modernization for industrial restructuring in the Dominican Republic, part of project RLA/88/039, sponsored by UNDP and ECLAC, recommended the creation of working groups for technological management. Their role would be to provide in-house support for the technological management and competitiveness of firms, in coordination with similar efforts at the level of branches of activities and the industrial sector as a whole.

Besides activities related to technological management, the groups would take other initiatives in the areas of financing technological modernization projects and training human resources, for example, general training, in-service training, courses, etc. These programmes would be carried out by

employees of the enterprises themselves or technical teams hired specifically for this purpose.

The proposal also includes the acquisition of computer equipment, quality control of reactive substances and materials, and subscriptions to technological journals. The basic goal is that enterprises should acquire the capacity for innovation and technological management, so that they can manage technologies well enough to maintain a high level of competitiveness.

It is estimated that in the first stage some 115 working groups for technological management will be organized in enterprises, at a cost of US\$1.3 million over four years. Financing will be shared by the enterprises and the technological management institutions.

of automation programmes and the installment of computer systems;

iii) Distance education centres or programmes for small businessmen, chambers of commerce, subcontracting firms and others which, in addition to permitting the use of modern communications media (e.g., television, video, systems of interactive education via satellite link), would facilitate the development of student manuals;

iv) Training centres or programmes for executives aimed at raising the level of technological competitiveness;

v) Programmes for enterprising university students which would be designed to serve as "incubators" for technology-based companies and technological consulting firms;

vi) Technical training centres for workers designed to help them develop skills in the areas of manufacturing, maintenance, testing and quality control, design, standardization and access to technical information;

vii) Liaison offices at universities to facilitate the transfer of technology to business enterprises; such offices might also provide information and library services, arrange for research internships, furnish advisory services in the areas of management and engineering, promote

continuing education and technological research and development on a contractual basis, etc.;

viii) Technology fairs and exhibits at the level of branches of industry, zones or countries;

ix) Technical assistance centres tailored to the needs of each zone which would provide services in such areas as technical testing, inspection and calibration of measuring and manufacturing equipment, technical training, manufacture of prototypes, etc.;

x) Companies or institutions engaged in raising venture capital for investment in technologically promising enterprises;

xi) Bodies to promote industrial development and the use of patents through the licensing of inventors', companies', research centres' and universities' patent rights;

xii) Centres designed to promote standardization and quality certification; these centres would be specialized by branch of industry and would primarily be made up of entrepreneurs;

xiii) Design centres to serve the needs of small and medium-scale enterprise; and

xiv) Officials serving as technological and scientific attachés in the corresponding country's embassies, who could also be responsible for providing

information on international meetings, exhibits and fairs, for locating partners in technological ventures and for seeking out international technical assistance.

A need for such liaison agents in order to boost the capacity for technological innovation is to be observed in various production sectors in the region (see box VI-25). The implementation of the following policies could help to spur its development:

i) Supplementing private funding with public financing on a temporary basis in order to equip agents to perform liaison functions at the regional and/or sectoral level;

ii) Disseminating information among businesses and research institutions

concerning liaison agents already in existence or in the process of being created; and

iii) Creating modern technological information systems (centres, networks, etc.) to meet the needs of various branches of activity; such systems would initially be financed by the public sector, but a deadline should be set after which they should be self-supporting.

d) *Measures for linking the scientific and technological system with the production apparatus*

A number of different types of measures –some of which have already been mentioned– can provide an effective

#### Box VI-25

#### PROMOTING TECHNOLOGICAL AND COMMERCIAL STUDIES AND HUMAN RESOURCES TRAINING AT THE SECTORAL LEVEL

One of the objectives and spheres of action of the ECLAC/UNDP project RLA/88/039, "Design of Policies to Strengthen the Capacity for Technological Innovation and Enhance International Competitiveness in the Latin American Entrepreneurial Environment", was to identify at the subsectoral level technological obstacles to greater competitiveness. Public and private sector representatives met at the national level to analyse steps which could be taken to solve these problems.

Some cases examined by the project are given here to illustrate how obstacles are specific to a given sector and call for sectoral-level solutions.

One of the project's studies, on the petrochemical industry in Colombia, analysed the management and transfer of technology in enterprises of the sector. The study was part of a larger effort to design programmes to modernize the plastic and rubber industries, as well as areas of activity and the technological content of teaching materials to be prepared by the Institute for Training and Research in Plastics and Rubber. The purpose of the institute, founded by the Colombian Association of Plastics Industries (ACOPLASTICOS), entrepreneurs and a private university, is to examine in depth and interpret trends in production processes and raw materials; train human resources at the expert, technician and engineer level through formal and non-formal educational programmes, and provide technical assistance to enterprises.

Another of the project's studies, on the jewelry industry's potential for working with precious metals in Bolivia, showed that the deficient training of jewelers was one of the causes of the virtual absence of modern designs, the failure to adhere to international norms and underutilization of raw material potential. One of the study's main suggestions was that two schools or training centres should be established, one for jewelers and the other for precious-stone cutters. It is estimated that such a move would rapidly and significantly increase the income-generating capacity of thousands of jewelers in the country.

Finally, a study in the State of Morelos, Mexico, analysed the stimulus given to create technology-based enterprises through "incubators" and technological parks. The study shows the importance of technology-based enterprises as a means of providing impetus to the technological modernization of production and encouraging linkage between universities and business research institutes. It also points out that developing these enterprises demands a minimal technological and entrepreneurial infrastructure, indispensable for establishing "incubators" and technological parks. Only through integral strategies, in which leadership is shared between government, enterprises and agents of technological innovation, can efficient programmes be developed to give impetus to technology-based enterprises and obtain the benefits they offer.

means of promoting a close link between a country's scientific/technological system and its entrepreneurial base (see box VI-26). Some of the major ones are as follows:

i) Promoting the execution of research and development by businesses, particularly through temporary, non-discriminatory credit- and tax-based backstopping measures;

ii) Promoting the "upgrading" of scientific processes used in a laboratory setting to experimental applications in pilot plants;

iii) Setting up scientific industrial complexes or centres which are linked to suitably equipped universities;

iv) Ensuring that inventors share in the economic benefits derived from their innovations and revising patent laws;

v) Encouraging the establishment of firms which provide scientific/technological consulting and other services; and

vi) Strengthening scientific/ technological outreach organizations and offices (see box VI-26).

#### 4. Responsible institutional management

One element which plays a highly important role in ensuring that a decentralized educational system will function at an optimum level (in both internal and external terms) is the existence of an effective mechanism for gathering information on and evaluating educational achievement and teaching performance. The information furnished by such a mechanism would provide users with a basis upon which to demand a better-quality education from the schools as well as enabling the schools to improve their performance. It would also furnish the authorities with the data they need in order to be able to focus their efforts on the schools which have the lowest achievement levels and which consequently bring down the overall educational system's level of social equity.

Thus, evaluation not only serves as a tool for measuring performance, stimulating efforts to improve

#### Box VI-26

##### HUMAN RESOURCES TRAINING AND RESEARCH AND DEVELOPMENT IN A KOREAN STEELWORKS

The Pohang Iron & Steel Co., Ltd. of Korea, better known as POSCO, has taken a prominent place among the world's major steel producers in its two-decade history. The company has a plant in Pohang with a capacity of 9,100,000 tons per year, and another in Kwangyang with a capacity of 8,100,000 tons.

Basically, two of the firm's distinctive features are of interest here: research and development activities and human resources training.

In January 1977, POSCO founded the Technical Research Laboratories, which in 1986 became the Research Institute of Industrial Science & Technology (RIST). The institute has research and development departments in the areas of iron and steel, science and engineering (electronics, mechanical and chemical engineering), advanced materials, and business management and economics. Its research activities range from short-term projects for industry to medium- and long-term projects to develop strategic

technologies. The institute carries out its research independently, and develops projects for various enterprises and universities and for the public sector; however, POSCO guarantees its financial stability by supporting specific research and development activities.

In 1986, POSCO established the Pohang Institute of Science & Technology (POSTECH) as a higher education centre for scientific and technological research. In 1990, POSTECH had 1,000 undergraduate students, 10 departments, over 400 postgraduate students and 170 faculty members; its curriculum includes doctoral programmes. Investment in laboratory equipment reached US\$55 million in 1990. The institute aspires to be one of the best-equipped institutions of higher technical education in the world.

One of the keys to the competitive success of POSCO has been the close linkage it has established between enterprises, RIST and POSTECH.

performance and ensuring the allocation and efficient use of the resources invested in education; it is also a powerful means of furthering policy efforts to achieve greater social equity and to improve the quality of education and training.

*a) Information-gathering systems for basic and mid-level education*

One of the most important steps in achieving responsible institutional management is to design and implement routine procedures for monitoring and evaluating primary and middle schools so that society will have an adequate supply of up-to-date information at its command concerning the main features of these schools' activities and performance. This will provide users and the authorities with a sounder foundation for decision-making.

i) *Measurement.* Systems need to be set up for regularly evaluating how well primary and middle schools are achieving the main objectives of their curricula and how efficiently they operate. The availability of such measurements will make it more feasible for society to ask the directors of such schools to be publicly accountable for their management, as well as making it possible to spot potential problems and shortcomings and to seek solutions to those problems at the local administrative level. Thus, they constitute the best available means of promoting effective management of the schools (see box VI-27). Care must be taken, however, to ensure that such measurements do not become the ultimate objective of the schools' efforts, since this would distort both the content and the orientation of the educational process.

ii) *Guidelines for targeted educational support programmes.* Systems for measuring and evaluating the schools' performance will also enable central and local authorities to identify which schools are doing the worst and to determine what the main sources of inequality within the system are. They will then be prepared to define the types of action needed to remedy these situations.

Improving the management capabilities of schools that are doing poorly is an important aspect of this effort. Governments should provide these schools with technical support and should backstop them as they work to formulate and pursue their own educational agendas. The object is to help each school –and especially those which are starting from a disadvantaged situation or which have fewer resources to draw upon– to develop the ability to carry out projects on their own, based on their own experiences and needs, that will improve the quality of the education they provide.

These schools –which are usually located in the most seriously disadvantaged areas of a country– cannot be expected to generate the resources needed to improve their performance entirely on their own or to obtain them directly from the surrounding community. It is therefore essential that the central and local educational authorities should make support programmes available to these schools. Such programmes are particularly important in order to eliminate initial disadvantages, and may thus focus on improving the students' nutritional status, providing assistance in the form of additional teaching services, furnishing a more complete supply of teaching materials, etc.

*b) Institutional evaluation of higher education*

Ever since the early 1980s, various groups in the region have been calling for the creation of mechanisms for evaluating the academic performance of higher education with a view to improving the system's quality and efficiency. This movement marks the region's incorporation into a process which, although some of its characteristics may differ from country to country, has been taking place all over the world for several decades now. Its hallmarks have been, on the one hand, the assumption by the State of an evaluative role and, on the other, the emergence of a competitive ethic as the

## Box VI-27

SYSTEMS FOR MEASURING THE QUALITY OF BASIC EDUCATION:  
SOME REGIONAL EXPERIENCES

The System for Measuring the Quality of Education (SIMCE) in Chile and the Information System on the Quality of Mexican Education (SICEM) are two periodic and systematic information systems which make it possible to identify and detect on a regular basis the problems affecting the quality of education.

SICEM was applied for the first time, on an experimental basis, in 1987 and subsequently, more extensively, in 1988, at the fourth and sixth grades of primary education. It seeks to measure four types of specific variables: formative aspects, the process of education and learning, operational support for the educational system, and the response of education to economic and social development. SICEM uses a methodology designed to evaluate the presence of a particular educational objective in the teachers' minds, as a function of their own personal evaluation. In order to corroborate certain variables and to go more deeply into the more subjective aspects, a sample survey is carried out, and in 1988 this was applied to 5,500 students and 420 teachers.

The special features of SIMCE are its massive application and the broad dissemination of its results, in keeping with its function as an instrument to promote autonomous action tending to favour the improvement of the quality of education. Instead of defining a single reference of educational quality, SIMCE gives different indicators which each agent can weigh in accordance with his own criterion in judging actual conditions. In 1988, the measurements carried out covered five quality indicators: achievement of academic objectives, personal development, recognition given to educational work, scholastic efficiency, and coverage.

However, it is the first of these indicators which receives most attention, since it measures the quality of education as a function of the achievement by the student of the objectives proposed by the educational system for him in different subjects. It is measured through tests of performance in mathematics, Spanish and composition, social sciences and natural sciences, applied to students of the fourth and eighth grades of basic education. The contents included all those considered to be of fundamental importance in the curriculum.

The UNESCO Latin American and Caribbean Regional Office for Education (OREALC), for its part, has prepared a draft system of measurement of the quality of basic education in the region which, as well as measuring the performance of the students in scholastic matters, also makes it possible to determine how the various dimensions of the educational system affect scholastic performance and, thereby, provide guidance for corrective action. In addition, instruments have been designed with the aim of establishing a common set which could be adapted to the different cultural, social, economic and educational conditions in Latin America and the Caribbean, in order to collect information on educational quality in the region and generate soundly-based knowledge on the subject. For the measurement of learning achievements in the first, second and fourth grades of basic education, the areas of language and mathematics were selected. This measurement of the knowledge gained is supplemented with a test of social skills, designed to measure the acquisition of skills which will be useful to the students in their daily life.

chief driving force behind the development of institutions of higher education.<sup>8</sup> This evaluative role of the State can be seen as an alternative to meticulous bureaucratic regulations which gives educational institutions greater freedom in defining, organizing and carry out their activities. Past experience shows that to make this new type of relationship between the State and the system of higher education a reality,

each country needs to design and implement its own system of institutional evaluation; the nature of this system will vary depending on its objectives, the means to be used and the organizational form that is selected in keeping with the traits of each national culture.

In a time of rising costs and diminishing resources, when the countries are faced with the necessity of maintaining a series of exacting economic

8 Guy Neave, "On the cultivation of quality, efficiency and enterprise: An overview of recent trends in higher education in Western Europe, 1986-1988", *European Journal of Education*, vol. 23, No. 1/2, 1988.

balances and when a multitude of competing demands are being made by other sectors of society, the need to increase the productivity of teaching and research activities is greater than ever.

The effectiveness and efficiency of institutions of higher learning cannot be measured solely in terms of the usual concept of profitability, since the aim of education is not to generate profits but rather to perform a series of tasks which have been assigned to it by society; the performance of these tasks produces effects (not just profits) which are difficult to appraise or evaluate properly. Consequently, the criteria of effectiveness and efficiency to be applied to academic institutions should be geared to the complexity and autonomy typical of such organizations, and their fulfilment should be measured on the basis of parameters of quality and performance that are suited to the nature of intellectual endeavours (see box VI-28).

In highly diversified systems of higher education such as those found in the region, the evaluation of effectiveness and efficiency should be undertaken with great care and should take into consideration the objectives, duties and goals which each institution has set for itself (see box VI-29). They need not be exclusively – nor even primarily – quantitative in nature, as is the case when performance indicators are employed. Peer appraisals, or a combination of the two methodologies, may also be used in order to ensure that the outcome is an objective evaluation that can serve as a basis for policy-based self-correcting institutional mechanisms.

Academic evaluation systems should also encourage educational institutions to engage in a process of self-assessment (see box VI-30).

Efficiency is not incompatible with academic pursuits even though it is not their greatest merit nor a sufficient measure of their successfulness. It is

#### Box VI-28

#### INSTITUTIONAL EVALUATION TOOLS

In the area of institutional evaluation, two kinds of tools are normally used in combination: performance indicators and reviews by panels of anonymous experts or peers.

A 1985 survey revealed that European institutions of higher education used performance indicators mainly for internal decision-making and to satisfy external requirements, such as those of public financing entities. The most important decisions in which the indicators were taken into account concerned allocation of resources, planning and academic administration. The institutions themselves felt that the most important indicators were, in decreasing order, the number of students, the teacher/student ratio, unit costs, physical environment, laboratory activities and research grants.

In general, the institutions surveyed tended to be skeptical about the use of these indicators. Those which found them useful pointed out that access to financing depended on the indicators and that they were a means of comparing different institutions. Others felt that they were of little use and were generally inadequate, and even claimed to be unaware of how or to what ends they were used by outside organizations.

The classic example of a review process by a panel of anonymous experts or peers is the arbitration system used for scientific reports. An inevitable and integral part of this evaluation tool is the degree of subjectivity present in any judgement rendered by a small group recognized as having sufficient experience to take decisions according to the implicit canons prevailing in a given discipline or specialty.

Currently, this system is widely used in evaluating research projects as a prerequisite for financing by public or private entities. There are many examples of this in Latin America. In such cases, the judgements of panels of anonymous experts may be supported by background material gathered from information systems, databases and performance indicators, which are assumed to be less subjective.

Despite this inevitable subjectivity, review processes of this type have certain advantages, including flexibility (since they can be adapted to the traditions of various disciplines or various paradigms or schools) and the capacity to evaluate a wide range of units, from institutions to projects or products.

## Box VI-29

## PRINCIPLES AND PRECONDITIONS FOR EVALUATING HIGHER EDUCATION

Following is a summary of criteria for use by developing countries in adopting national guidelines for evaluating higher education:

1. *Consideration of the diversity of existing conditions.* These include each country's degree of economic development, differences in the quality of higher education systems, the type of political regime, sources of financing for higher education, regular mechanisms for academic evaluation in each institution, regional disparities, training modalities and faculty salary scales.

2. *Consideration of the evaluation modalities developed in each country.* Before defining the methods and content of evaluation processes, existing traditions in countries and systems must be analysed as background for future evaluation schemes. Some factors to be taken into consideration are previous evaluation experiences, the climate of existing relations among financial support entities, Governments and institutional agents, the degree to which the judgements of panels of anonymous experts or peers are accepted as objective, the extent and reliability of written reports submitted by institutions and the types of sanctions envisaged in post-evaluation decision-making.

3. *Adapting the evaluation system to the financial capacity of each country.* Where resources are scarce and costly procedures impracticable, evaluations based on the consideration of written reports and institutional visits by groups of peers or external experts who render their assessments on the basis of their own experience and the practical dictates of common sense in their discipline or office would probably be most appropriate. However, due

account must be taken of the system's underlying power structure, which can affect this type of evaluation.

4. *Determining the scope of the evaluation.* The greatest difficulty will be balancing the need to limit the cost and effort involved in evaluations with the need to carry out wide-ranging assessments. Evaluations must be broad, since some of the roots of institutional failure are found outside the institutions themselves; however, from the standpoint of available resources, limited evaluations focusing on specific issues might be more suitable.

5. *Adherence to a strict code of ethics.* This criterion applies to the handling of information submitted and the sanctions indicated in evaluations. Care in these areas will build the mutual trust necessary for the successful completion of the process.

6. *Rationalizing efforts and resources.* A balance must be struck between the efforts and resources devoted to direct evaluation practices and those allocated to the compilation of information used indirectly in the evaluation process. Unless the former are complemented by the latter, the process will be too costly and the information needed for producing indicators and making comparisons will not be available.

7. *Training evaluators and supporting the elaboration of suitable evaluation instruments.* Such tasks can be carried out with the help of international cooperation, as in such initiatives as the Columbus project, which is supported by the Standing Conference of Rectors, Presidents and Vice-Chancellors of the European Universities.

nonetheless important that steps be taken to make educational institutions more publicly accountable for their results as well as to ensure greater informational transparency and the establishment of more appropriate controls over the use of fiscal resources.

c) *Systems for evaluating education's external efficiency*

Finally, it will also be necessary to set up mechanisms for measuring the external efficiency of educational institutions or, in other words, their ability to provide an education that serves the

needs of its users and of the business community. Such evaluative systems will be particularly useful for technical, vocational and professional schools, whether they are at the secondary level, the post-secondary level or outside the framework of the formal educational system.

The clearest indicators of external efficiency are how easily graduates are placed within the job market and how highly regarded their diplomas are. Although this may seem to be a somewhat simplistic yardstick, such information could be regularly compiled and made available by public authorities as a means

## Box VI-30

### INSTITUTIONAL EVALUATION PROPOSAL: QUALITY CONTROL OF HIGHER EDUCATION IN CHILE

The Commission to Study Higher Education, established by the Government of Chile in early 1990, proposed that the country should adopt a system of continuous institutional accreditation for higher education, the main features of which are as follows:

- Its main objective is to provide incentives for improving the quality of higher education through self-evaluation by institutions.

- It is voluntary and institution-based; i.e., fully autonomous institutions can take part in it.

- It comprises two steps: internal self-evaluation by the institutions themselves, and external evaluation by commissions of peers and panels of experts appointed by an autonomous public entity. The institution being evaluated must affirm its acceptance of the members of the commission.

- Self-evaluation is the system's key element.

- Measurements of quality must be mutually agreed upon, based on optimal standards of university practice, and must be established in relation to the institutional objectives of each university.

- The system is ongoing and cyclical. Institutions that decide to adhere to the system will be evaluated externally every five years.

- The evaluation process has both internal and external repercussions. On the one hand, the results may lead to improvements or modifications on the part of institutions; on the other, only institutions subject to the procedure may admit students subsidized with public funds, and all such institutions may submit

competitive applications for project financing from an institutional development fund.

- The specific results of studies and visits by evaluators are confidential, since they are the property of the institution being rated.

- The authorities will publicly endorse the process by providing information on which institutions participate and by publishing a report on evaluations carried out during the year.

According to the Commission's report, "The (proposed) procedure operates on a voluntary basis, assumes that participating institutions will practice continual self-evaluation, makes use of the judgements of peers and experts and will produce two types of effects. First, it will help the participating institutions themselves to improve levels of quality, effectiveness and efficiency in their autonomous activities. In technical terms, the procedure is therefore an evaluation of goal attainment, intended to enhance institutional effectiveness. Second, it can help public authorities to allocate fiscal resources for both institutional development programmes and measures to ensure equity in the system's operation. Technically, therefore, the procedure (...) is, from this viewpoint, an incentive system. The adoption of this procedure, which combines internal self-evaluation with external accreditation standards, will result in a balanced, non-bureaucratic and effective mechanism capable of contributing significantly towards consolidating the system and furthering its goals."

of augmenting the transparency of the market for post-secondary instruction, which in many countries has grown very swiftly on a largely unsupervised basis.

One of the elements that is needed in order to evaluate the external efficiency of academic schooling and training is a knowledge of the labour market. The decline of traditional forms of formal employment during the 1980s has prompted a number of countries in the region to set up national employment systems. These mechanisms gather information on the types of jobs available, wages differentials, the qualifications required, etc. In addition to providing a very good means of evaluating the

efficiency of existing training activities, these systems permit ongoing modifications to be made in the objectives of training and educational policy so as to keep pace with changes in the labour market.

Another less formal method of evaluation could be based on the organization of meetings for educational institutions, business firms, vocational guidance and information centres and job placement services. Such meetings would facilitate contact among training institutions and potential employers and thereby promote jointly agreed-upon changes that would increase the system's external efficiency (see box VI-31).

## Box VI-31

## EVALUATION AND FINANCING MODALITIES OF THE MONTERREY INSTITUTE OF ADVANCED TECHNOLOGICAL STUDIES

The Monterrey Institute of Advanced Technological Studies (ITES) was established in 1943 as a non-profit private institution and has operated ever since according to the same types of profitability and efficiency criteria as used in business. One important result of this is that the institution considers research only as an element of postgraduate programmes and as a means of supporting them. Therefore, all ITES research projects focus on solving the practical problems of enterprises. In contrast to the policies of public research institutions, every one of the Institute's projects must be externally financed in advance, since there is no item for this category in the operational budget.

Since 1985, ITES has adopted total quality control as an explicit institutional objective, and has modified its organizational structure, cutting out administrative levels so that its director is in immediate contact with the teachers. Quantitative goals of excellence are set so as to be attainable within three years. To evaluate goal attainment, academic and administrative indicators are generated and published each semester.

ITES carries out annual opinion surveys in the business community to evaluate the performance of its graduates and to uncover

new technical areas that correspond to the expected development of enterprises and industries in the next 10 years. The surveys provide the basis for the elaboration of new courses of study. Also surveyed are graduates, students, professors, parents and others, so as to evaluate the performance of the entire ITES system, and the rectors of each zone meet regularly with graduates of their campuses.

The subsequent careers of graduates clearly evidence the close linkage of ITES with industry and the production sector, in that 90% of them are in industry and the remaining 10% in the service sector and in government.

The production sector provides financing to develop the endowment of ITES (campuses and real estate) through fund-raising campaigns. Faculty salaries and administrative and operational expenses are covered by tuition payments. The financing mechanisms of ITES constitute a direct and effective means of linkage with the industrial sector *per se*. ITES maintains contacts with many facets of industry, and each of its campuses is supported by the industries of the region. Since these enterprises also belong to the civic associations that sponsor and supervise campus life, they feel a special obligation to provide financial support.

### 5. The professionalization and promotion of a more active role for educators

The two principal demands which an efficient system of human resources development places on educators –i.e., a commitment to providing a quality education and the ability to administer the schools and resources assigned to them in an autonomous, responsible manner– bring to light the urgent need for the professionalization of this field. This does not mean, however, that the teaching profession should be made more rigid; on the contrary, in order to achieve the objectives of decentralizing the schools and integrating them more fully into the community, educators will also need to be receptive to external signals and demands and to be willing to work as a team with people from other professional milieus.

#### a) Recruitment, education and training

i) *Basic and mid-level education.* Since the public sector will probably remain the chief supplier of educational services at the primary and secondary levels, it is important for the ways in which teachers are recruited, educated and trained to be reformed as swiftly as possible.

It can be reasonably assumed that the completion of secondary school is a minimum requirement for primary-school teachers and that a post-secondary education is a minimum requirement for secondary-school teachers. Nevertheless, some of the region's practising teachers do not have these qualifications. Replacing them –even if the necessary time and resources to do so were available– would not be the best solution, since it would mean losing the benefit of their hands-on experience and direct teaching practice,

which are key elements in effective teaching.

The most efficient and effective means of upgrading the professional qualifications of practising teachers is to conduct special, readily-accessible teacher training programmes which are backed up by a system of incentives. A good example would be a distance learning programme coupled with professional advising as part of a course of study leading to the award of a professional certificate (see box VI-32).

Teacher training institutions should also learn from such experiences. Rather than concentrating on a long period of classroom instruction, their curricula should provide for a shorter period of formal instruction in combination, from the very start, with practice teaching sessions in which the student teacher would gradually assume more and more responsibility. In addition, opportunities should exist for flexible, stimulating forms of ongoing in-service training throughout a teacher's working life. For example, visits to other schools in order to see different kinds of teaching methods in practice should be a routine activity. The organization of regular workshops or round tables, along the lines of those provided for in the Colombian *Escuela*

*Nueva* (new school) system, in which teachers from a given area meet once a month to talk about their experiences and exchange suggestions, might be an option provided that meeting facilities and support personnel are available. At the secondary level, where course content changes extremely rapidly, refresher courses for teachers should be a standard feature. This means that, in contrast to the prevailing practice today, ongoing training throughout teachers' working lives would be the preponderant factor, rather than their initial training.

Some aspects of the teacher training process merit special attention. First, the general course of study for teachers should include instruction in educational project management techniques. For primary-school teachers, a systematic form of training in multi-class teaching techniques might also be provided, since this type of instruction predominates in the rural areas of the region. Teachers who speak indigenous languages, for their part, should receive special training in bilingual education. Finally, training teachers in the use of the manuals and other teaching aids which have been chosen at the local level should be a standard practice, since it has been found that otherwise teachers simply do not use

#### Box VI-32

#### THE LOGOS II PROGRAMME FOR TRAINING TEACHERS

Various Latin American and Caribbean countries have used some forms of distance training in order to train teachers, particularly in rural areas. The main advantage of teaching through radio, television, or correspondence is that it makes it possible to reach schools located in the most distant areas, which are often precisely those that have the teachers with the least teaching and academic training. Distance training gives these teachers the possibility of completing training courses, after which they can sit for examinations to obtain a professional certificate and may thereby improve their income and receive professional recognition, a prospect which is generally attractive to them. Furthermore, distance training programmes for teachers make it possible to combine training with professional practice and substantially

reduce the cost of training a dispersed population.

In Brazil, the Logos II programme offers correspondence courses to teachers who do not yet have professional certificates. These courses are supplemented with activities in local training centres. The programme combines the strengthening of curriculum material with training courses on teaching. The curriculum is divided up into modules or short courses on specific subjects. Each module is backed up with written material. The participants study the written material at home and come to the centre to carry out exercises and take tests. The centre also offers other activities, such as study and discussion groups, classes on special subjects, etc. The whole programme lasts from 30 to 50 weeks, after which the participants can sit for examinations to gain a professional certificate.

such teaching aids, even when they are readily available.

ii) *Vocational and post-secondary education.* In the realm of technical, vocational and higher education, on the other hand, a greater degree of freedom is needed as regards the recruitment of teachers. Especially in the case of vocational and technical training, it is important for the faculty to include experts who come to the students directly from the production sector in question. The accreditation and certification systems discussed earlier would ensure the quality of the instruction provided by such professionals.

#### b) *Remunerations and incentives*

The question of teachers' salaries is a highly controversial issue in a number of the countries in the region, especially those in which their salaries have decreased sharply in real terms over the past decade. It is impossible, however, to define suitable pay levels for each category of teacher in the abstract. Part of the relative decline in their salaries is a result of today's broader educational coverage, since this means that the relative supply of persons with a secondary or post-secondary education is larger. This type of decline, which has been occurring all over the world in most of the professions, is what sociologists call a "perverse effect" of the expansion of education, and it is reflected in the fact that, as a rule, teachers earn relatively less in the countries that are the most highly developed in educational terms.

However, teachers' salary levels should be such as to ensure the fulfilment of certain requirements: a specified educational level, a full-time commitment to the profession and a reasonable degree of faculty stability. Insufficient wage levels jeopardize the efficiency of the educational system by encouraging moonlighting and a high turnover rate.

Thus, the level of pay which will attract and hold an effective teaching staff will depend on the educational profile of

the labour force and on the alternative job opportunities in each country.

The inclusion of teachers' salaries in the general civil service wage scale would, in most cases, make it difficult to maintain the necessary flexibility and would interfere with the establishment of truly competitive salary levels. In order to overcome this obstacle, a system of incentives and bonus payments could be used to supplement the base salary. At present, however, most bonus payments are based on seniority, and it is very rare for bonuses to be awarded on the basis of actual performance or the difficulty of the work assignment. The result is a paradoxical situation in which the teachers assigned the most difficult classes are often young teachers with little experience who receive lower-than-average salaries. It is therefore of particular importance that a scheme of incentives should be designed which will reward teachers who take part in special programmes or who teach in underprivileged areas (e.g., bilingual education, programmes which devote priority attention to schools that have fallen behind in meeting national goals, etc.) and which will thereby attract experienced, highly motivated educators to these activities.

Another option is to establish a "production" bonus. Although teaching performance or academic achievement can certainly not be measured as precisely as physical output can be, it is nonetheless possible to design simple evaluation criteria. The use of this type of incentive is a fairly common practice in universities in many parts of the world; in those cases where this system has been used in primary and secondary schools, the incentive payments are generally made to all the members of the teaching team so as to avoid fostering a negative form of competition among its members.

Finally, educational institutions could be allowed to determine their faculty's pay levels entirely on their own or could be given a say in that decision based on their particular educational agenda. Care would have to be taken, however, to

ensure that such a system would not spark an excessive degree of job mobility among teachers. Indeed, it is quite important to promote a certain degree of staff stability so that the faculty will identify with the school, work together as a team, and assume some responsibility for the management of the school's educational agenda (see box VI-33).

*c) The new duties of school directors*

The new institutional schemes involving greater autonomy for the schools which are now being developed will entail a radical change in the duties of school directors. In this new type of

system, school directors will be called upon to assume their post not merely as one more step along their career path but rather as a moral, intellectual and functional position which provides its incumbent with the opportunity to lead the school and to head it in a given direction. Thus, rather than simply being administrators, the people who fill these posts will have to have leadership qualities and, at the same time, be efficient organizers.

Currently, most school directors do not have the type of training or experience that would enable them to assume a leadership role or motivate a school's

**Box VI-33**

**NEW POLICIES FOR PROFESSIONALIZATION OF TEACHING**

New proposals are emerging in various countries of the region on training and professionalization policies for teachers and professors. To illustrate these trends, the cases of the Dominican Republic and the Brazilian state of Ceará have been selected as examples.

In the Dominican Republic, the report submitted to the President of the Republic by the Commission for the Study of Dominican Education, includes an important chapter on "enhancing the status of the nation's teachers". This document reveals the marked deterioration of real teacher salaries and stresses the need for an equitable and lasting solution. In this context, the document states:

"... It is therefore necessary to design a new system of salary incentives for educators which links increases with:

- Professional qualifications (higher salaries for educators with higher educational levels, participation in refresher courses, accumulated experience, etc.).

- Exclusive dedication to teaching (granting a significant differential to educators of demonstrated excellence who are willing to sign a contract of exclusive dedication to teaching).

- Work carried out under especially difficult conditions (in urban or rural poor areas, with oversized classes, etc.).

- Changes in the price index (to prevent future deterioration of salaries, in accordance with a plan consistent with macroeconomic stability).

"Current financial difficulties necessitate the definition of a timetable for the gradual improvement of teacher salaries, based on a

binding agreement between the State and the Dominican Teachers' Association."

In the Brazilian state of Ceará, a process of educational change was launched with the aim of significantly upgrading the quality of public schools. The state government's plan devotes an entire chapter to measures to "restore dignity to the teaching profession", including the following:

- Establishment of a permanent, regionalized training system, in coordination with universities, model schools and other training organizations, to offer, *inter alia*, long-term academic degree programmes.

- Conduct of a teacher census to gather professional and training information, to improve the system of updating knowledge and training.

- Support for municipal efforts to formulate and carry out training programmes for teachers who lack professional degrees.

- Progressive recovery of teacher salaries through the elaboration of a new system of posts and promotions, in which increases are differentiated according to certain factors, such as degrees or qualifications, evaluation of results, location and conditions of work, and other criteria to be defined by law.

- Establishment of public competition as the only means of selecting teachers, technicians and support staff for appointment to posts in the teaching profession.

- Reformulation of the Teacher Statute and implementation of the posts-and-promotions system.

faculty members, as well as lacking the necessary organizational skills.

This problem is the most serious in large urban schools, which are highly complex organizations that are quite difficult to manage, and in marginal-urban and rural schools, in which the difficulties associated with the teaching process as such make effective leadership all the more necessary.

Eligibility for the post of school director should not only be determined on the basis of seniority but should also be the result of a career decision that has been taken once the potential candidate has gone through a training and certification process. Under certain circumstances, consideration might be given to the possibility of separating the career of school director from that of teaching; such a system might involve additional prerequisites and a maximum age of entry for school directors as well as parallel, rather than sequential, career development paths for the two professions.

Meanwhile, extensive training programmes are needed for today's school directors in order to familiarize them with modern techniques of school management, of systems organization and management and of public relations.

#### 6. Society's financial commitment to education

In keeping with the approaches outlined in this document, fund-raising and resource-allocation policies should conform to three main guidelines:

- To ensure, in so far as possible, a large, stable and diversified supply of funding for education to which both public and private sources contribute;
- To allocate a specified portion of public educational funding in a manner which would encourage schools to improve in terms of both quality and efficiency and which will foster a carefully planned use of available resources; and
- To allocate another portion of public educational funding on a selective

basis in order to support certain sectors or activities and to increase social equity by offsetting existing inequalities and disadvantages.

#### a) *Ample, diversified funding*

i) *The stability and consistency of public funding.* Although an effort should indeed be made to increase the efficiency of the system of human resources development, this does not change the fact that in most of the countries in the region a need also exists for a higher level of public funding in order to ensure a quality education. Such financing must be relatively stable in order to avoid the types of fluctuations in revenues that were experienced by schools in some countries during the 1980s, since they destroy the continuity of national and local educational initiatives.

By the same token, the management and evaluative capacity of ministries of education need to be reinforced in order to make sure that they have the capability to prepare feasibility studies and cost-benefit analyses efficiently. In the past, a number of educational initiatives have ended in failure because they were executed in areas where the infrastructure was insufficient or because they did not have enough regular financing.

Consideration should also be given to the conclusion of explicit agreements aimed at protecting those budget items which are most vulnerable to unexpected fluctuations in fiscal revenues. An example would be expenditures on teaching materials, which were subject to deep cuts in a number of the countries in the region during the 1980s despite their crucial influence on the quality of instruction. Other countries have chosen to shelter a certain sphere of education, such as primary education or vocational secondary education.

ii) *Diversification of funding sources.* One way of increasing both the level and stability of educational funding is to diversify its sources. In the Latin American and Caribbean region, fiscal revenues have supplied the bulk of the funding made available for education and

vocational and technical training. The potential therefore exists for an increase in the private sector's (whether households' or the business community's) contribution to education.

Even in the case of compulsory education (which should be provided by the State free of charge), but especially at the other levels of education and training, public educational funding should be supplemented by the private sector. The private sector's contribution could take a variety of forms: partly corporate-financed programmes, especially at the local level, to backstop selected schools; contributions to training; the payment of tuition or other fees for poor students at the higher educational levels in those institutions which are the most selective and which serve primarily middle- and upper-income groups; the use of tax exemptions and incentives to encourage private individuals to make donations for educational, research and cultural activities; private scholarships for exceptional low-income students; fellowships provided by industry for applied research at the postgraduate level; contributions to special funds set up for the purpose of improving the quality of education; etc.

Access to diversified financing is not of the same significance at all levels of education, since almost all funding for basic and mid-level education will continue to be furnished by the public sector. In various countries, however, it may also be possible to tap local public funds, which might eventually serve as the source of a considerable level of financing. In addition, some companies in the production sector may be interested in making specifically earmarked contributions (e.g., to buy equipment and materials, to finance preschool programmes for the children of their employees, etc.) (see box VI-34).

Universities and vocational and technical schools are the educational institutions which have the greatest chance of obtaining private-sector contributions, however. Legal provisions and government policy should promote the establishment of closer contact between institutions of higher learning and business enterprises so that the business community will play a more active role in the country's scientific and technological development and in the development and training of human resources.

#### Box VI-34

#### PRIVATE FINANCING FOR PUBLIC SCHOOLS: DRAFT LEGISLATION IN URUGUAY

In recent draft legislation on accountability, adopted by the Senate of the Parliament of the Eastern Republic of Uruguay, an article was introduced to encourage enterprises to sponsor public schools in poor areas, through donations that can be deducted from certain taxes. Under the proposed law, enterprises that pay tax on income from trade and manufacture (IRIC), agriculture activities tax (INAGRO), agricultural income tax (IKA) or property tax may take part in this system, whose main procedures are as follows:

i) Authorization to sponsor schools serving low-income populations may be requested from the National Public Education Administration (ANEP).

ii) The request shall be considered approved in the absence of a negative reply from the Central Administrative Council (CODICEN) within thirty days of receipt.

iii) The sponsor shall undertake to purchase goods and services for meals, supplies, clothing, equipment and other necessities as requested by the school administration, up to a maximum of seven annually-adjustable units per pupil.

iv) The school administration shall see that the quality and cost of the subsidized goods and services are at least equal to the standard rate in the location concerned, and shall provide receipts for them.

v) Of the total cost of these subsidies, 75% shall be considered as payment towards the aforementioned taxes. The remaining 25% may be considered for tax purposes as business expenses.

CODICEN will publish a list of schools eligible to benefit under this system, and will authorize sponsorships up to a maximum amount per year.

The existence of a variety of funding sources will help to heighten the autonomy of educational institutions; these institutions can then exercise that freedom and use their initiative to define their aims and their identity more clearly as they strive to improve both the quality of instruction and their productivity (which, in turn, will put them in a better position to seek and obtain funding). For their part, the public authorities will be able to respond more flexibly to the many demands associated with educational development and will therefore be better able to distribute fiscal resources on the basis of objective criteria which are suited to the goals of education.

In order to raise funds from a wide range of sources, a series of steps will have to be taken. These include the following:

- Drawing up framework agreements to be entered into by the public schools and the private sector and devising incentives for their implementation; one possibility is to provide matching funds for any resources generated by the schools as a result of such framework agreements.
- Creating or expanding tax exemptions for private financing of educational and training activities (see box VI-35).
- Overhauling the universities' administrative practices and their use of the resources provided by the public sector in order to correct the distortions that have built up over the years, partly as a consequence of the financial security such institutions have enjoyed under the system of undifferentiated fiscal contributions (under this system, the universities have not been subject to strict requirements as regards accounting for their use of public funds, nor have they had to make any substantial effort in order to secure the continuation or increase of such inputs).
- The establishment of mechanisms for appraising the market value of services provided by the universities. Such mechanisms are needed because in future, under a system of greater

autonomy, the universities will have to be in a position to obtain an appreciable percentage of their funding through market-based activities, whether it be by selling their services, performing research contracts, charging fees or operating as a production unit. Indeed, as a consequence of the universities' closer relations with the production sector, the latter might well become a major source of financing for the universities, so long as suitable precautions are taken in setting the value of the services they provide. Care should also be taken to ensure that the academic prerogatives which are an essential element of the universities' activities will be safeguarded under these types of arrangements.

*b) Incentives for an efficient allocation of public funding*

Regulating the allocation of fiscal resources on the basis of the development objectives and priorities of the country, of the particular zone and of the educational and training system itself can be accomplished by means of two types of mechanisms: those relating to the efficiency of educational institutions and those relating to the relative priority of the objective being pursued.

A portion of fiscal allocations should be routed through mechanisms which will prompt the recipient institutions to upgrade the quality and increase the efficiency and relevancy of the activities they undertake. Competition based on academic values which takes place within the framework of educational projects or agendas is a positive principle on which to base the development of educational institutions. The exact percentage of public funding to be channeled through such mechanisms will depend on the country's evaluative capabilities.

A number of different mechanisms (and combinations thereof) are available for implementing this principle of efficient allocation of public funding:

## Box VI-35

## CHILE: TAX EXEMPTIONS FOR TRAINING, TECHNICAL EXECUTION AGENCIES (OTE) AND INTERMEDIARY TECHNICAL BODIES (OTIR)

In the 1970s, the Government of Chile changed the country's regulations on training so as to place business enterprises in charge of determining the main features of this activity. Tax exemptions under which enterprises could deduct training expenditures from profits taxes were instituted as an incentive for employers to train their workers.

Under this system, the maximum deduction is equivalent to 1% of payroll; there is also a maximum deductible amount per hour of instruction for each participant. If a participant's remuneration is equal to or greater than 10 times the minimum monthly income, this figure is reduced by half.

Training activities must be carried out by the enterprises themselves or by technical execution agencies (OTE). These are private or public for-profit training organizations recognized by the National Training and Employment Service (SENCE) of the Ministry of Labour and Social Security.

At the same time, intermediary technical bodies (OTIR) were established to provide technical support services for the organization, design and supervision of training activities in enterprises which decide to affiliate themselves with these institutions. The main objective of these entities, which are organized by sector or region, is to serve as intermediaries between OTEs and small- and medium-scale enterprises so as to mitigate any problems which the latter may encounter in undertaking initiatives in this field. An OTIR is a non-profit organization that arranges for the reimbursement of funds used under the tax exemption provisions and uses a portion of these funds to finance its operations.

During 1990 the training activities carried out under these provisions were valued at 6,799 billion pesos and almost 5% of the country's labour force received training. Of the 270,000 enterprises eligible for the tax exemption, 3.2% took advantage of it. About 25% of the training courses are carried out by the enterprises themselves, and the remaining 75% by OTEs.

The tax exemption is a training incentive that strengthens the links between training entities and the private sector. It has stimulated the proliferation of enterprises offering training services. However, it benefits only the workers

of those enterprises that pay profits taxes, which means that it excludes the unemployed, the self-employed and public employees, as well as agricultural and informal-sector workers; moreover, the incentive has been used mainly by the largest enterprises, i.e., those with more than 200 workers. Medium- and small-scale enterprises, which make up most of the job market, are often unable to take advantage of the exemption, since the amount they can deduct is very low, even though the floor amount is equivalent to three times the minimum monthly income. Of the total amount deducted under the exemption in 1990, only 3.7% correspond to small-scale enterprises (1-50 workers) and 11.3% to medium-scale enterprises (50-200 workers). The remainder was deducted by enterprises with over 200 workers.

Although the OTIRs established in the construction, trade, manufacturing, industrial, engineering and transportation sectors have done valuable work, most small- and medium-scale enterprises do not carry out any type of training activity whatsoever. The delay in reimbursement, fear of a tax audit and the lack of a tradition in the area of training are some of the reasons for the underuse of the exemption.

The newly emerging training enterprises have confined themselves mainly to courses on administrative, rather than technical, matters, since the former do not require costly investments in equipment. The failure to regulate these enterprises and the lack of information on the quality of the courses have hindered the continuity of the training process and diminished the transparency of the market. Attempts to upgrade the skills of workers are thus discouraged. Currently under consideration is the possibility of changing some features of the tax exemption to spur training efforts in small- and medium-scale enterprises. One alternative might be to create a worker training fund for small enterprises which would expedite the reimbursement of funds used under the provisions of the tax exemption; another would be to increase the minimum level required for the exemption.

i) One option is to delegate the task of evaluating educational quality and efficiency to the users. In this case, then, the amount of funding received by a school would depend on the number of

students who are enrolled (this assumes that the student have the right to choose what school they attend, provided that it meets certain general requirements);

ii) Another possibility is to allocate funding on the basis of objective *ex post* yardsticks, such as an improvement in students' scholastic or academic achievement; this has been the most frequently suggested method of allocating funding for basic and mid-level educational institutions;

iii) Yet another method—which is used more often at the higher and university levels—is the performance of an *ex ante* appraisal of educational agendas by the relevant authorities based on explicit standards as regards their objectives and expected results.

One mechanism for promoting an efficient allocation of the private funding made available to public training institutions is to authorize the use of all or part of a business enterprise's compulsory contributions to finance training activities conducted within the firm itself. This arrangement, which would have to be negotiated and would have to include pre-established starting and ending dates, could also help encourage public training institutions to initiate reforms, since it would involve the discontinuation of a portion of their captive financing and would force them to compete, at least in some areas, with private firms. It might also help to do away with some of the bureaucratic rigidities and practices which often weigh down these organizations and might prompt both employers and trade unions to play a more active role in vocational and technical training as well as in other activities linked to rising productivity (see box VI-36).

It is also possible to devise operational standards or guidelines for maximizing the efficiency of the financial assistance provided for scientific and technological development projects. To this end, it is helpful to distinguish among three different types of projects:<sup>9</sup>

— Immediately transferrable research projects (i.e., those whose findings can

be expected to be incorporated into the production process within a time period of no more than, say, four or five years);

- Research projects which are not immediately transferrable (i.e., those producing results whose absorption will take longer than that); and
- Scientific and technological service projects (i.e., projects which use scientific procedures and tools but which, rather than generating new knowledge, products or processes, simply backstop research and development or help to apply and disseminate its results).

Different types of credit mechanisms are needed in order to finance these various kinds of projects. Three of the many credit instruments available for the financing of scientific and technological development appear to be of particular interest and have been widely used by multilateral lending agencies:

i) *Low-cost commercial loans with easy repayment terms.* Loans provided by international financial agencies for regional scientific and technological development programmes tend to provide for repayment periods of about ten years (with a grace period of no more than one or two years) and to carry below-market (that is to say, below the local credit market, which is primarily short term) but nonetheless positive interest rates. This type of loan is usually given for readily applicable projects (e.g., applied research and experimental development, technology transfer, establishment of quality control centres, research and development centres within production enterprises) which can boast a fairly high economic rate of return (e.g., 10%-12%). The management of direct investor loans might be assigned to the development bank (directly or through special funds created for this purpose) or the commercial banking system in each country.

<sup>9</sup> The information provided in this passage is based on a number of documents issued by the Inter-American Development Bank concerning credit for initiatives in the field of science and technology in Latin America and the Caribbean.

## Box VI-36

**SOURCES OF FINANCING FOR THE NATIONAL INDUSTRIAL  
APPRENTICESHIP SERVICE (SENAI) OF BRAZIL**

The establishment of the National Industrial Apprenticeship Service (SENAI) of Brazil in 1942 inaugurated what is still the main source of financing for vocational training institutes in Latin America: the mandatory assessment on enterprises' payrolls, set at 1% in this case, with a surcharge of 0.2% for enterprises with more than 500 employees. In recent years, Brazil has also developed various innovative mechanisms to diversify the sources of financing for vocational training.

In 1976, Brazil was the first country to enact a tax incentives law which provided for an income tax deduction equivalent to twice the amount spent on vocational training projects, up to a maximum of 10% of taxable earnings. This law generated high expectations with regard to its possible effects on the expansion of human resources training, the participation of enterprises and the mobilization of new resources. In practice, however, only a few medium-scale and, especially, large enterprises have taken advantage of this law, as only 6.5% of the potential total of allowable incentives has been used. Moreover, almost 60% of these enterprises are concentrated in São Paulo and Rio de Janeiro. Because of the measure's limited and highly concentrated influence, it is unlikely that it has effectively mobilized new resources for vocational training. Moreover, the law's future is being threatened by attempts to simplify fiscal policy and eliminate social-purpose tax measures.

In contrast, cost-sharing agreements, under which enterprises can deduct part of their mandatory contributions in order to carry out training programmes directly, have come to represent an innovative and effective means of obtaining supplementary financing for vocational training. There are three types of agreements, the first two of which apply only to large enterprises (500 or more workers), while the other can be applied more flexibly: i) agreements exempting enterprises from up to 80% of the base assessment; ii) agreements allowing partial retention of the 0.2% surcharge on the payrolls of large enterprises, up to a maximum of 20%; and iii) technical and financial cooperation provisions similar to those established under the first type of agreement, but with retention percentages ranging from 10% to 30%. These agreements were designed to stimulate the transfer of training responsibilities from SENAI to business enterprises but, paradoxically, they have instead operated as co-financing agreements between such enterprises and SENAI. Although only 6.5% of the enterprises authorized to take the exemption or retention are doing so, in many cases they have invested five times the amount retained from the base assessment in programmes financed under these agreements. In fact, contributions retained from SENAI represented barely 8% of programme expenditures under these agreements in 1987, while 92% came from supplementary contributions by enterprises.

ii) *Shared risk and profit loan.* This type of loan can be used to finance research and development projects proposed by private or public companies, which can include high-risk but also potentially high-profit projects. If the project achieves the objectives of its investments, then the loan must be repaid to the international lending agency, along with the corresponding interest and a fixed percentage (e.g., 10%) of its net profits over a pre-established period (e.g., 10 years) starting from the point in time when profits first began to be made. If the project does not have the expected results, the lending agencies in question are obliged to forgive a considerable portion

of the loan (perhaps as much as 60% or 70%).

iii) *Financing to be repaid on a contingency basis.* This type of financing may be used in the case of research projects or scientific and technological services provided by public or private institutions outside the production sector. Since the results expected from this type of project, although they may be very useful, do not normally generate profits to which the research institution would have direct access, that institution will not pay back the loan but will instead be required only to publicize the results. If, however, a research or scientific/technological service project financed by this type of

credit should generate a profit, the investor will pay a fixed percentage of those profits to the lending agency for a pre-established period of time. In the event that patents, registrations, royalties or other sources of revenue should be obtained, the percentage share to be paid to the lending agencies and the corresponding time periods may also be stipulated. The research team in charge of the project may also receive a share of the profits or of the revenue derived from patents or similar instruments.

c) *Mechanisms for the selective allocation of public funding*

Much of the public funding for the generation and dissemination of knowledge should be allocated on the basis of selective criteria relating to the country's educational policy priorities.

i) *Distribution of funding according to level of education and type of expenditure.* The priorities in this area will vary depending on the situation in each country. Generally speaking, universal access to a basic education should be the first priority. This means that in countries where a considerable percentage of children do not manage to complete primary school, the bulk of the available fiscal resources should be used to rectify this situation.

In addition, the educational reforms being proposed here will, at least in the beginning, also call for a substantial amount of "supplementary" or "corrective" expenditure, and the financing of such outlays needs to be planned for in advance.

ii) *The criterion of social equity.* The State should ensure that educational opportunities are distributed suitably and equitably. This can only be done if those who are able to pay for their education do so, while poorer students are given access to State scholarships and loans that will make up the difference between the cost of an education and what the student or the student's family can afford to pay.

Scholarship and lending programmes should be made available regardless of the type of educational institution in which

the student is enrolled, provided that all the educational institutions in any given country are subject to the same accreditation and evaluation procedures.

Although basic schooling is usually provided free of charge, policy makers should not overlook all the other expenses associated with school attendance (transportation, uniforms, school supplies and, as children grow older, forgone earnings). In order to make the system truly equitable, these expenses should be covered for low-income families by means of assistance programmes (free transportation, the distribution of school supplies, etc.) or direct monetary subsidies. The main recipients of these transfers should be poor households located in rural areas. Since the drop-out rate is particularly high in such areas, the payment of subsidies for school attendance would also enable children to go to school longer and would boost the enrolment of the children of subsistence farmers in secondary schools. In fact, some experts contend that a sustained flow of direct educational subsidies for poor rural households may be the only way to put an end to the pronounced educational lag which is characteristic of rural Latin America.

iii) *Strategic criteria.* The way in which public funding for human resources development is allocated should also be in keeping with the strategy objectives of the country's overall development policy and, where applicable, with the support of specific production sectors. This can be accomplished simply by adapting some of a country's general resource-allocation mechanisms for this purpose. For example, training in strategic fields can be promoted on a priority basis by increasing the tax exemption applying to the relevant sectors. Another possibility is to concentrate university scholarships in those areas of specialization regarded as being most important for the development of the country's production activities. Care should be taken, however, to ensure that strategic criteria do not interfere with those of social equity.

### 7. The furtherance of regional and international cooperation

The region is thus being called upon to make an enormous effort in the field of education, training and scientific/technological development at a time when the supply of financing is exceedingly limited. One of the implications of the relative scarcity of funding is that an extremely precise ranking of priorities must be established for the use of financial resources, particularly public funds. This setting of priorities may even make it necessary to abandon lines of research that some countries have been pursuing for years, and regional cooperation may prove to be an efficient mechanism for reducing the adverse repercussions in such cases. In fact, the vast fields of education, science and technology offer many opportunities for taking advantage of economies of scale and scope through the consolidation of regional or international cooperation projects and programmes.

Regional and international cooperation can play an important role in the implementation of the strategy and policies being proposed in this document; in particular, such cooperation could make a very effective contribution in four main fields:<sup>10</sup>

a) Cooperation aimed at strengthening human resources development capabilities in the Latin American and Caribbean countries by finding ways to make more efficient use of the installed capacity of the region's universities and academic centres;

b) Regional cooperation relating to the interface between the educational and research system and the production or social development sector. Such cooperation should address issues relating to the effective use of knowledge and, hence, to the link between knowledge and development;

c) Regional cooperation in the field of educational research and in connection

with research concerning the generation, dissemination and utilization of knowledge; and

d) Regional cooperation in the operational and institutional aspects of implementing the strategy and policy proposals set forth in this document at the country level.

In more specific terms, attention could be focused on the following areas of cooperation:

— *Programmes to upgrade the quality of education.* During the 1990s the countries of the region will all be involved in the process of designing and implementing policies to improve the quality of basic education. One factor which is critical for the success of such policies is the organization of systems for measuring the schools' quality and educational performance; this area provides ample opportunity for horizontal technical cooperation among the countries of the region and for the transfer and adaptation of plans and technologies which have been devised in the industrialized countries.

Bilingual education programmes should also be a priority area for regional cooperation since many of the countries' educational strategies address this area of education in much the same way.

— *Innovations at the middle-school level.* To date, very little international cooperation has taken place with respect to the analysis of innovative initiatives at the middle-school level. In fact, some multilateral organizations have tended to assign a very low priority to technical assistance for mid-level education. In future, however, this sector can be expected to figure as one of the most strategic spheres of educational development in the Latin American countries and, hence, as an important focus of cooperation, especially with respect to the modernization of curricula, teacher training and the

<sup>10</sup> See Fernando Chaparro, *Cooperación regional e internacional en el campo de la educación y el conocimiento*, International Development Research Centre (IDRC), December 1991.

- adoption of practices which link education to its social environment and to the labour market.
- *Accreditation of advanced educational institutions, programmes and units.* The first regional and international cooperation programmes in this field were initiated a few years ago with the active participation of Latin American and European universities and of specialists from the United States and Canada. The design of mechanisms for the accreditation of institutions of higher learning and the development of indicators and methods of evaluation constitute learning processes which cooperation can enhance, particularly with respect to an exchange of views and the analysis of experiences, the training of technical staff and the development of relevant tools.
  - *The training of scholars and researchers.* Although this is one of the traditional spheres of international cooperation (which usually takes the form of scholarship programmes to enable Latin American students to attend prestigious universities abroad), this type of educational assistance is being placed in jeopardy by declining funding for scholarships and rising educational costs at foreign postgraduate institutions. A special effort therefore needs to be made to revitalize these programmes and to focus them on those fields which carry a high priority for each of the countries in the region. Such programmes should also be extended to include postgraduate training within the region itself, and one way of helping to make this possible would be to devise innovative means of bringing more educators from the North to the countries of the South and of encouraging them to stay for longer periods. At a more general level, inter-university exchanges and joint efforts on the part of the universities of the region can contribute to the solution of complex issues relating to health, applied research, the design of methodologies, etc. (see box VI-37).
  - *Local administrative and institutional reform.* The decentralization of educational systems and greater autonomy for the schools open up a wide range of opportunities for international cooperation. Indeed, the region will have to train a whole new generation of educational administrators at the local level; it will have to change, modernize and strengthen the central governments' administrative capabilities in the field of education; and it will have to develop new programmes aimed at increasing the social equity of education on the basis of its decentralization.
  - *Technical training.* This may be one of the areas of human resources development in which international cooperation can have the greatest positive influence at both the secondary and post-secondary levels in coming years. As is demonstrated by the strategy being proposed here, the whole concept of training needs to be reworked in all the various channels through which it is provided. International cooperation could also make an important contribution by providing support for experimental plans and pilot programmes, as well as for the updating of equipment and materials and the further training of the teachers who are working in this sphere of education.
  - *Educational research.* Another field in which regional and international cooperation can produce results fairly rapidly is research into educational and training processes, institutions and outputs. There are already some indications that educational research projects are more and more often being undertaken at the regional or subregional level, especially in the case of research projects oriented towards policy making and evaluation. Today, such projects are also facilitated by improved communication among researchers

## Box VI-37

## COOPERATION INITIATIVES IN THE FIELD OF HIGHER EDUCATION

A number of cooperation associations and initiatives in the field of higher education are to be found in the region.

1. *Central American University Council (CSUCA)*. For over four decades now, the Council has coordinated and promoted inter-institutional, teaching and research activities among Central American universities. At another level, it has played a key role in defending and promoting university autonomy and academic freedom of expression at times and in situations in which they have been threatened by political circumstances or serious conflict. It also contributes to the exchange of experiences and information with the other countries of the region and to cultural integration efforts in Latin America.

2. *Association of Amazonian Universities (UNAMAZ)*. This association includes the eight countries of the Amazon subregion: Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname and Venezuela. Currently, it comprises over 40 institutions, 19 of which are active members, while the rest are cooperating members. Its main objective is to promote cooperation between universities and research institutions in the Amazon area in launching joint cultural, academic, scientific and technological projects to further the social and economic development of the population and to promote environmental conservation.

3. *SALUDUAL*. This project, is sponsored and funded by PAHO/WHO and the Union of Latin American Universities (UDUAL), aims at enhancing the contribution of universities towards the goal of good health for all by the year 2000, through improved primary health care.

4. *Consortium of Caribbean Universities for Resource Management*. This entity pools the capacities of individual universities to provide, in a practical and simple fashion, a high-quality education in the management of the subregion's principal natural resources.

5. *Simón Bolívar Programme*. This initiative is intended to promote industrial, technological and scientific cooperation between enterprises and research institutes to increase the productivity and competitiveness of Latin American and Caribbean industries and economies in the world market by strengthening the response capacity of each country and of the region as a whole.

6. *Regional Researchers Exchange Network for Latin American and Caribbean Development (RIDALC)*. The main objective of this network,

formed by national agencies for the promotion of science and technology in Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, Uruguay and Venezuela, is to promote exchanges of young researchers within the region between academic centres of recognized excellence in different countries. For this purpose, it utilizes a database containing information on the curricula, research projects and publications of these centres.

7. *Columbus Project*. This project joins the efforts of European universities with those of Latin American and Caribbean universities under the sponsorship of the Standing Conference of Rectors, Presidents and Vice-Chancellors of the European Universities. Its main objective is to promote institutional development, particularly in terms of the structures and the administrative and medium- and long-term programming processes of the participating universities. Over 40 universities in Latin America and about 20 in Europe have participated actively. In its three-year history, the project has sponsored visits by Latin American university authorities to learn about the situation of European universities, as well as the exchange and joint analysis of experiences in such areas as academic evaluation and linkage between universities and industry.

8. *Inter-University Centre for Andean Development (CINDA)*. This private regional entity consists of a group of distinguished Latin American universities and represents a pioneering initiative in the field of inter-university cooperation which is structured around programmes to promote mutual support and cooperative learning in three of the sector's key areas: development of the scientific and technological capacities of universities and their applications in government and the private sector; policies and mechanisms for creating linkages between the work of universities and national development; and university administration and academic evaluation.

9. *UNITWIN programme, of UNESCO*. This programme attempts to use "twinning" and other mechanisms to forge links between universities in industrialized countries and those in developing countries. UNITWIN supports regional and subregional networks of institutions of higher education, as well as centres for specialized studies and advanced research. The main objective of this initiative is to strengthen postgraduate programmes and to cooperate in research projects having a direct impact on the countries' development.

and by the support to be had from regionwide academic information networks, such as the Latin American Information and Documentation Network on Education (REDUC) (see box VI-38).

- *Teacher and student exchanges.* Regional cooperation should also be extended to include more exchange opportunities for teachers, scholars, scientists and students. Not only are students, in particular, willing and able to further their education by

means of sojourns in other countries of the region, but such experiences would also help to promote Latin American integration and to foster the necessary changes in the region's educational systems. Increased student exchanges would necessarily entail a demand for greater comparability of achievement levels in the various educational systems and would make those systems more open to new stimuli and needs.

#### Box VI-38

#### REGIONAL COOPERATION IN THE FIELD OF EDUCATION RESEARCH

There are many examples of intraregional cooperation in the field of research and studies on education, training and science and technology, including the following:

a) The Network of Postgraduate Studies in Planning, Management and Social Studies of Science and Technology is a programme sponsored by UNESCO through its Regional Office for Science and Technology for Latin America and the Caribbean, based in Montevideo. Its main objective is to enhance understanding of the role of scientific and technological factors in the development process.

b) The Biological Sciences Information Network for Latin America and the Caribbean (RIBLAC) is a pilot project of the Venezuelan Institute of Scientific Research (IVIC).

c) The Latin American Information and Documentation Network on Education is both a network of institutions and a document database. Since 1972 it has collected, analysed and disseminated the results of education research through a cooperative network of 27 centres located in almost all of the Spanish- and Portuguese-speaking countries. About 2,000 new documents are processed each year. Between 1981 and 1991, 450 publications were produced, and analytic summaries have begun to be disseminated electronically.

d) The Education Commission of the Latin American Social Sciences Council (CLACSO) consists of a large panel of researchers in the region from universities and independent academic centres who discuss and disseminate studies on educational systems and their transformation. The Commission operates as a network for researchers working on the cutting edge of specialized studies in this area.

e) The Project on Comparative Studies of Higher Education Policies is carried out with the participation of the Centre for Studies on the State and Society (CEDES) of Argentina, NUPES of the University of So Paulo, Brazil, the Institute of Political Science and International Relations of the National University of Colombia, DIECINVESTAV of Mexico and the Latin American Faculty of Social Sciences (FLACSO) of Chile. With the support of the Ford Foundation, an initial two-year phase of work has been completed, with the production of a series of studies on the formulation, adoption, implementation and analysis of the effects of higher education policies both within and between countries. In the second phase (1991-1994), the project is to become a regional network of researchers specializing in the analysis of higher education policies, with close ties to similar networks already established in the United States, Canada and Europe.

f) The Latin American Research Network on Human Resources Training for Science and Technology is a project supported by the International Development Research Centre (IDRC) of Canada through its offices in Ottawa and Montevideo. In the first phase, a study was done on the latest developments in human resources training for research and development in Latin America and the Caribbean; this study was then presented and analysed in meetings with representatives of academic entities and organizations to promote science and technology in the region. In the second phase, case studies were prepared on postgraduate programmes in four countries: Brazil, Chile, Colombia and Mexico. For the third phase, a follow-up study is planned on human resources training policies in various countries both in and outside the region.

— *Strategic cooperation.* It may well be that at some point in the future the strategy being proposed in this document will become the focus of an active form of cooperation on the part of countries in the region which are seeking to implement this strategy and between them and countries in other regions which are involved in similar efforts to retrofit their human resources development systems. The

creation of some sort of permanent forum concerned with educational reforms aimed at increasing competitiveness and social equity might provide a practical means of furthering a debate that would be open to inputs from outside the region as well as fostering a comparative analysis and evaluation of such reforms.

**Part five**

**RESOURCES**

## Chapter VII

# COST AND FINANCING OF THE STRATEGY

The specific forms and modalities and the magnitude and sequence of the measures making up this strategy will vary by country, depending on the starting position and future needs, institutional organization and relative priorities of each; the cost of these measures and the selection of suitable financing instruments will likewise vary. Despite these expected differences among countries, this chapter contains an overall estimate of the cost of the strategy for the region, for purposes of illustration, and identifies possible sources of financing. It also presents a series of measures that could apply to all of the countries. These measures are not a minimalist version of the strategy proposed in this document, but rather a basis for defining the order of magnitude of the costs its execution would entail.

### 1. Patterns of education spending in the 1980s

---

Public education spending in Latin America and the Caribbean as a whole declined markedly in the first half of the 1980s, from US\$32.7 billion in 1980 to US\$28.6 billion in 1985, a decrease of 12% in nominal terms and over 30% in real terms (see table VII-1). This decline was influenced by both the pressures of the economic downturn and a trend towards reducing the State's role. The former, however, was decisive, considering that the relative weight of public education spending, measured either as a percentage of GDP or as a proportion of total fiscal

expenditure, remained almost constant in that period at around 4% and 16% respectively. It should be borne in mind, however, that these regional averages mask a wide disparity, since poorer countries generally devote a lower proportion of their GDP to education (see table VII-2).

Preliminary indicators seem to show that the proportion and amount of public resources devoted to education rose in the second half of the decade as a result of various factors, such as increased demand for qualified manpower in the wake of greater openness to international trade, more concern on the part of the authorities about human resources training and increased external financing for this sector. Public education spending approached US\$39 billion, or 4.4% of GDP, in 1988. However, in real terms, this amount was still 16% lower than it had been in 1980, while real per capita spending, which barely reached US\$100 in 1988, was 30% less than the 1980 figure and represented only one tenth of the amount of resources devoted to education in industrialized countries.

It seems that in the 1980s, as public financing for education dwindled, private educational spending increased to fill the gap. National and international non-governmental organizations considerably boosted their participation in the educational services of the region's poorest countries, generally focusing their efforts on the most disadvantaged social sectors.

Table VII-1  
PUBLIC EDUCATION SPENDING

	1975	1980	1985	1988
<b>Latin America and the Caribbean</b>				
Billions of dollars at current value	13.6	32.7	28.6	38.9
Real index (1980=100)	60	100	68	84
1990 dollars per capita	93	138	84	98
As a percentage of GDP	3.6	3.9	4.0	4.4
As a percentage of fiscal expenditure	16.3	16.3	16.4	17.2
<b>Industrialized countries</b>				
Billions of dollars at current value	244.8	424.4	536.0	712.2
Real index (1980=100)	83	100	98	119
1990 dollars per capita	763	884	838	1 006
As a percentage of GDP	5.8	5.8	5.4	5.7
As a percentage of fiscal expenditure	15.6	14.6	13.1	...

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, based on official figures.

Table VII-2  
LATIN AMERICA AND THE CARIBBEAN: PUBLIC EDUCATION SPENDING  
(Percentages)

	As a percentage of GDP				As a percentage of fiscal expenditure			
	1975	1980	1985	1988	1975	1980	1985	1988
Antigua and Barbuda	4.5	2.9	2.5 <sup>a</sup>	...	14.4	...	...	...
Argentina	2.5	3.6	2.0 <sup>b</sup>	1.9 <sup>bc</sup>	9.5	15.1	8.6 <sup>b</sup>	8.9 <sup>bc</sup>
Barbados	6.0	6.5	6.1 <sup>a</sup>	5.9	20.9	20.5	...	...
Bermuda	3.4	4.1	3.2 <sup>a</sup>	...	18.0	...	18.4 <sup>a</sup>	...
Bolivia	3.5	4.4	2.6 <sup>de</sup>	3.1	...	25.3	21.3 <sup>de</sup>	20.1
Brazil	3.0	3.5	3.7	2.7 <sup>b</sup>	...	...	19.1	...
Colombia <sup>b</sup>	2.2	1.9	2.8	2.7 <sup>c</sup>	16.4	14.3	24.8 <sup>a</sup>	22.4 <sup>c</sup>
Costa Rica	6.8 <sup>f</sup>	7.8 <sup>f</sup>	4.5	4.3	31.1	22.2	22.7	20.8
Cuba	5.7 <sup>f</sup>	7.2 <sup>f</sup>	6.3 <sup>f</sup>	6.8 <sup>cf</sup>	30.1	...	...	14.1
Chile	4.1	4.6	4.4	3.6 <sup>c</sup>	12.0	11.9	15.3	...
Ecuador	3.2 <sup>b</sup>	5.6	3.7	2.8	25.9 <sup>b</sup>	33.3	20.6	21.3
El Salvador	3.4	3.9	2.9	2.3 <sup>c</sup>	22.2	17.1	18.0	16.4 <sup>c</sup>
Guatemala	1.6	1.8 <sup>g</sup>	1.8 <sup>a</sup>	...	15.7	10.7 <sup>g</sup>	12.4 <sup>a</sup>	...
Guyana	4.9	9.7 <sup>h</sup>	10.5	9.6 <sup>c</sup>	9.8	14.0 <sup>h</sup>	10.4	8.1 <sup>c</sup>
Haiti	...	1.5	1.2	1.9 <sup>c</sup>	...	14.9	16.5	20.6 <sup>c</sup>
Honduras	3.7	3.2	4.4	4.9 <sup>ce</sup>	20.3	14.2	13.8	19.5 <sup>ce</sup>
Jamaica	5.9 <sup>b</sup>	6.9 <sup>b</sup>	5.7	7.2	16.0 <sup>b</sup>	13.1 <sup>b</sup>	12.1	11.0 <sup>c</sup>
Mexico	3.6	4.2 <sup>g</sup>	3.9	2.1 <sup>b</sup>	11.9	17.2 <sup>g</sup>	25.3	...
Nicaragua	2.4	3.2	6.2 <sup>b</sup>	6.2 <sup>bc</sup>	13.1	10.4	10.2 <sup>b</sup>	12.0 <sup>c</sup>
Panama	5.7	5.0	5.2	5.6	21.3	19.0	18.7	26.7
Paraguay	1.6	1.5	1.5	...	14.0	16.4	16.7	...
Peru	3.3	3.1	2.7	3.4 <sup>c</sup>	16.6	15.2	15.7	22.9 <sup>c</sup>
Dominican Republic	1.9 <sup>i</sup>	2.1	1.8	6.0	14.3 <sup>i</sup>	16.0	14.0	...
Saint Kitts and Nevis	4.0	5.0	6.0	3.2 <sup>e</sup>	10.5	9.4	18.5	12.5 <sup>e</sup>
Suriname	5.6	6.7	9.1	10.1	14.1	22.5	22.5 <sup>d</sup>	...
Trinidad and Tabago	3.1	4.0	6.0	5.5	14.7	11.5	...	...
Uruguay	...	2.2	2.6	3.1	...	10.0	9.3	15.1 <sup>b</sup>
Venezuela	4.5	4.4	3.9 <sup>b</sup>	3.5 <sup>b</sup>	...	14.7	15.5 <sup>b</sup>	16.6 <sup>b</sup>

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, based on figures from UNESCO, the International Monetary Fund and the World Bank.

<sup>a</sup> 1984. <sup>b</sup> Only expenditures of the Ministry of Education. <sup>c</sup> 1987. <sup>d</sup> 1983. <sup>e</sup> Not including expenditures for universities. <sup>f</sup> As a percentage of global social product. <sup>g</sup> 1981. <sup>h</sup> 1979. <sup>i</sup> 1976.

At the same time, the business sector, whose financial participation in education in the region has traditionally been low, gradually but steadily reduced its financial contributions to public training institutes. However, such outlays represent only part of the training expenditures of this sector. In fact, the growing need for skilled workers in a climate of increased international competition, and the shortcomings of existing training institutions that prevent them from teaching appropriate skills, may have helped increase direct training expenditures by the business community. One indicator of this development might be the upsurge of the private training market in various countries of the region. However, no figures are available to measure this trend accurately.

Even so, it is probable that the greatest increase in education financing was in household contributions. Partial indicators suggest that the proportion of income which urban households set aside for education rose from an average of 2.3%, observed in 11 Latin American cities in the early 1970s,<sup>1</sup> to an average of 3.4%, revealed in surveys of household expenses around 1985. This change contrasts with the relative stability of private education spending at around 1% of GDP, based on national accounts figures (see table VII-3). In the 1980s, the growth of private-school enrolments which had characterized the previous decade stagnated in most countries of the region (see table VII-4). This stagnation could reflect the reduced demand for private education as a result of deteriorating family income, which even prompted an increased demand for public education in sectors which had once been able to afford private education.<sup>2</sup> The increase in household expenditures for education seems to reflect two simultaneous phenomena: greater demand for

extracurricular or supplementary education on the one hand, as a strategy to facilitate subsequent placement in an increasingly demanding labour market, and efforts towards direct financing of the public education system on the other, to compensate for reduced fiscal expenditures.

These efforts to make up for reduced public funds seem to have originated in both high-income and low-income sectors. The former were obliged to increase their contribution to higher education funding, owing to decreased fiscal transfers to universities in most countries of the region. There are indications, however, that households also increased their participation in funding primary and secondary public education. In some countries, for example, parents help finance the basic operational expenses (gas, lights, electricity) of public schools and even, in some cases, pay supplementary amounts to teachers as partial compensation for their loss of real income. In almost all countries of the region, students have also had to pay a larger share, and sometimes the total amount, of the cost of teaching materials (books, notebooks, etc.). Increased household participation in funding public education may have exacerbated the unbalancing effect of public spending in this sector, in that it affected low- and medium-low-income households –the principal categories served by public primary and secondary schools.

Based on this background, it can be conservatively estimated that the region currently allocates about 7% of its GDP to education and human resources training, with a relative decrease in public-sector support and increased contributions by the private sector. It must be remembered, however, that this regional average does not reflect the substantial differences between countries, since public spending,

1 Philip Musgrove, "La contribución familiar al financiamiento de la educación en América Latina", *Financiamiento de la educación en América Latina*, Mario Brodersohn and María Ester Sanjurjo (eds.), Mexico City, Fondo de Cultura Económica, 1978.

2 Juan Carlos Tedesco, "Privatización y modernización educativa", Santiago, Chile, UNESCO Regional Office for Education in Latin America and the Caribbean (OREALC), 1991, unpublished.

Table VII-3  
**LATIN AMERICA AND THE CARIBBEAN: ESTIMATES OF  
 PRIVATE SPENDING ON EDUCATION**

(As a percentage of GDP)

	1975	1980	1985	1988
Corporate contributions to public training institutes	0.2	...	0.1	0.1
Education spending by urban households (as a percentage of income)	2.3	...	3.4	...
Added value of private education	...	1.3	0.8	...

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, based on official data.

Table VII-4  
**LATIN AMERICA AND THE CARIBBEAN: PRIVATE EDUCATION ENROLMENTS**

(As a percentage of total enrolment)

	Primary education			Higher education		
	1970	1980	1985	1970	1980	1985
Argentina	15.9	17.8	18.6	17.0	21.7	16.1
Bolivia	15.8	...	7.7	...	...	...
Brazil	7.5	12.8	12.1	55.0	64.3	58.7 <sup>a</sup>
Colombia	13.4	14.5	13.5	46.0	62.9	60.9 <sup>b</sup>
Costa Rica	3.5	2.6	3.5	...	...	14.3
Chile	22.8	20.2	31.8	34.0	...	32.3 <sup>b</sup>
Ecuador	17.9	15.9	...	21.0	15.6	...
El Salvador	4.8	7.2	8.1	...	...	...
Guatemala	15.5	14.2	13.7	...	...	...
Honduras	5.9	5.3	5.1	...	...	...
Mexico	7.8	4.9	5.0	15.0	...	17.4 <sup>c</sup>
Nicaragua	15.1	11.8	13.3	...	...	...
Panama	5.4	6.3	7.5	...	...	...
Paraguay	12.9	...	13.7	...	...	...
Peru	14.5	13.1	14.4	22.0	...	32.7 <sup>b</sup>
Dominican Republic	11.6	17.8	24.1	...	...	...
Uruguay	18.5	16.4	15.4	...	...	...
Venezuela	11.7	11.1	11.5	11.0	11.6	16.8 <sup>b</sup>

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, based on official data.

<sup>a</sup> 1983. <sup>b</sup> 1984. <sup>c</sup> 1982.

as seen previously, can range from barely 2% to over 10% of GDP in the region's economies.

## **2. The cost of setting up a system of educational-generating institutions responsive to societal needs**

---

The cost of the proposed institutional reforms is fundamentally related to the training of teachers and of central and local administrative personnel to enable them to meet the requirements of the new institutional structure effectively. This cost will be analysed in section 5 below, which contains an estimate of the additional funds needed to ensure responsible management of the educational system.

## **3. The cost of universal access to the cultural codes of modern living**

---

### *a) Universalization of access*

The first condition for the spread of education in the region is universal access to basic education. Although the enrolment rate rose in Latin America and the Caribbean over the past decade, 1.5 million school-age children fail to enrol each year. Absorption of these children, who are basically concentrated in four countries, would require an annual investment of US\$1 billion and a 0.5% increase in annual payroll expenses to hire 50,000 new teachers. The investment could be less in cases where existing schools can be used in double shifts; however, potential savings under this scheme are minimal, since current deficiencies in access are concentrated in isolated and hard-to-reach areas almost wholly lacking in adequate educational infrastructure.

In addition, opportunities for adults to attend basic or refresher courses on fundamental concepts should be

multiplied. Under the strategy described, the required investment would be used not so much for infrastructure –since established enterprises or enterprise support centres could organize such programmes– as for teaching personnel and materials suited to this type of education. To date, national expenditures for these programmes in general, and for this component in particular, have been both scanty and sporadic. Nevertheless, a degree of experience has already been acquired in the field, as the unit cost is relatively low (about US\$50 per participant).<sup>3</sup> This means that a "maximalist" plan to strengthen, in three years, the basic knowledge of the segment of the region's labour force that has not completed primary school (70 million people, or 45% of the total) would cost an annual amount barely equivalent to 0.1% of GDP.

Lastly, the universalization of access to education entails greater expenditures on vocational education programmes. One component consists of in-house training. The additional spending required in this area cannot be calculated accurately owing to the lack of detailed information on current expenditures and costs for such programmes. It was previously estimated that such activities by Latin American enterprises cost about 0.5% of GDP; based on this figure, the doubling of such expenses in the next ten years to reach a level of 1% of GDP is a reasonable objective.

Training programmes for specific groups requiring public support are easier to quantify. The preceding chapter identified various population subgroups that could benefit from such programmes: small businessmen, urban and rural workers in the informal sector, public employees, the unemployed, displaced workers and young people with minimal qualifications seeking to enter the job market for the first time. For the first three groups, a reasonable objective might be to

---

<sup>3</sup> In the training programme launched by the Renascença firm (see box VI-16), the cost per participant is US\$21, though this probably does not include procedural or teacher training costs, which are generally financed directly by the Government.

train about 10% of the targeted population each year, while programmes for the other three groups would have to be somewhat more ambitious, since their income needs are more urgent (see table VII-5).

The unit cost of training programmes for these population groups will vary widely, since their content ranges from basic skills for entering the job market to highly sophisticated technical training. In fact, the costs observed in the region can range from US\$100 per participant in advisory programmes for the urban informal sector to several thousand dollars in training courses for middle-level industrial technicians. Using an average cost of US\$500 per participant for estimating purposes, the total annual cost would be slightly more than US\$6 billion, or 0.7% of GDP.

#### b) Quality education

As noted in chapter II, about half of all children currently repeat the first grade of primary education. These initial problems recur in subsequent grades, so that in 1988 almost 30% of all primary-school pupils were repeating a grade. Thus, while pupils remain in the first six grades of the school system for an average of almost seven

years, they successfully complete little more than the first four grades. If the funds allocated to repeating pupils each year are taken into consideration, the cost of repetition amounted to US\$3.3 billion in 1988, or almost one fifth of regional public spending on primary education (see table VII-6).

There are a number of possible combinations of measures to meet the objective of improving the quality of education for almost all the children of the region. Some of these would pursue several goals at once; for example, a strategy of preschool learning or family education would help to prepare children for reading and writing, would facilitate their entry into school at the appropriate time and would promote parental participation in decision-making at the local level. In all of these combinations, certain components are essential and can be described as methods of "personalized" education, in which teaching time is adjusted to fit each pupil's needs, students are allowed to participate actively in their learning plans and teachers receive ongoing training, as they share the benefits of the student's learning experience by following the instructions contained in preprogrammed textbooks. This type of personalized instruction can be supported in two basic ways: by subsidizing preprogrammed textbooks and by training teachers in the appropriate use of these books and in participatory teaching methods.

The use of preprogrammed textbooks is especially important since, in 1987, 27% of the teachers in Latin America and the Caribbean did not have teaching degrees.<sup>4</sup> Even in countries where almost all teachers have degrees, there are problems with respect to their level of knowledge in certain cases. The organization of teacher training programmes, with short courses supplemented by visits to innovative or model schools, or of plans for periodic training in specific techniques, is essential for improving the quality of teaching. Some studies have shown that these

Table VII-5

#### LATIN AMERICA AND THE CARIBBEAN: POTENTIAL BENEFICIARIES OF PUBLIC TRAINING PROGRAMMES

(Thousands of people per year)

<b>Working</b>	
Small businessmen	2 370
Urban and rural informal sector	3 370
Public employees	1 580
<b>Total</b>	<b>7 320</b>
<b>Not working</b>	
Unemployed	2 500
Newcomers to the labour market	2 500
<b>Total</b>	<b>5 000</b>

Source: Joint ECLAC/UNIDO Industry and Technology Division, based on PREALC and CELADE figures.

4 UNESCO Regional Office for Education in Latin America and the Caribbean, op. cit.

Table VII-6  
LATIN AMERICA AND THE CARIBBEAN: COST OF GRADE REPETITION

	1985	1988
Pupils repeating the first grade (%)	47.6	46.0
Pupils repeating the sixth grade (%)	19.5	18.3
Repeating pupils in grades 1-6 (%)	29.5	28.9
Years enrolled in primary school	6.9	6.8
Grades passed in primary school	4.2	4.2
Percentage of such pupils who complete the sixth grade	61.0	60.0
<b>Cost of repetition (millions of dollars)</b>		
Expenditures on repeating pupils	2 913	3 330

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, based on figures from the SIRI (Regional Information System) database.

flexible methods are apparently more efficient than traditional advanced training courses.<sup>5</sup>

It is estimated that both measures would entail an increase of between 5% and 15% over current per-pupil expenditures (see table VII-7). As textbooks usually cost about US\$1 per copy in editions of 100,000 or more copies, a subsidy for three books per pupil would increase the unit cost by US\$3. Textbooks for bilingual programmes, which are more difficult to design and are issued in fewer numbers, are more expensive (around US\$3 per book), entailing an additional expenditure of US\$6 per child in these programmes; however, since they are needed for only about 2 to 2.5 million children, the cost of such programmes would raise the unit cost of the textbooks subsidized throughout the region by only 20 cents. It should be remembered, however, that this cost will be concentrated in certain countries. The increase in unit cost represented by the inclusion of bilingual textbooks can be expected to vary from 2% in countries with relatively reduced indigenous populations and existing educational materials to 12% in countries with sizeable

indigenous populations and fairly low per-pupil expenditures.

Remuneration for one week of teacher training can be estimated at US\$100, plus a similar amount for subsistence and travel expenses, thus bringing the total cost of teacher training to slightly more than US\$7 per pupil.

A simulation has been carried out to show how this means of universalizing access to education and improving quality would affect enrolment rates and total costs.<sup>6</sup> In a scenario assuming that current

Table VII-7  
LATIN AMERICA AND THE CARIBBEAN:  
INCREASE IN INITIAL UNIT COST AS A  
RESULT OF ADOPTING PERSONALIZED  
INSTRUCTION METHODS  
(1990 dollars)

Current unit cost (primary school)	205.00
Textbooks	3.00
Supplement for bilingual programmes	0.20
Teacher training	7.00
<b>Total</b>	<b>215.20</b>

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean.

5 M. Lockheed and A. Verspoor, *Improving Primary Education...*, op. cit.

6 Simulation carried out on the basis of the SMMG model, using the SIRI (Regional Information System) of the UNESCO Regional Office for Education in Latin America and the Caribbean) database. Since the exercise was carried out for the region as a whole, it was limited in that it did not differentiate among countries with respect to the magnitude of the task and the outlays required in accordance with each country's current educational situation, demographic trends and income level.

educational technology is maintained, the cost of primary and secondary education increases slowly (see table VII-8) and basically reflects the growth rate of the school-age population. When traditional teaching methods are retained, the impact of demographic increases is felt mainly in the primary grades. In this scenario, first-grade enrolment would increase by 1.5 million children in the coming decade, while sixth-grade enrolment would increase by barely 200,000 in the same period. Assuming that the high rates of repetition would continue, 40% of the pupils would not have access to secondary education, so that secondary-school enrolment would remain almost constant. If technology did not change and teacher salaries remained constant in real terms, the unit costs would also remain constant (US\$205 per pupil in primary school and US\$266 per student in secondary school). Therefore, total current costs would

increase at the same rate as the school-age population (0.5% per year). Lastly, demographic growth would require the construction of new facilities, but only for primary education. Assuming that classrooms are used in only one shift, the expansion of capacity to accommodate demographic growth would require an increase of only 0.6% annually in the region's total expenditures. Obviously, the need for such expansion would be greater in countries with greater demographic growth. However, even in these cases, pressure to expand the system would be confined to primary education, if teaching techniques remained unchanged.

To illustrate the extent to which secondary-school enrolment patterns are relatively independent of demographic growth when educational technology remains unchanged, another scenario simulates the effects of a situation in which

Table VII-8  
LATIN AMERICA AND THE CARIBBEAN: ACCESS, ENROLMENT,  
COSTS AND INVESTMENT

(Alternative I: constant technology, increasing population)

	1990	2000	Percentage variation
Access of each age group	93.2	93.2	
Enrolment in grade 1 (millions)	17.7	19.3	0.9
Enrolment in grade 6 (millions)	7.4	7.6	0.5
Enrolment in grades 1-6 (millions)	67.9	72.2	0.7
Enrolment in grade 7 (millions)	6.4	6.5	0.4
Enrolment in grade 12 (millions)	2.0	2.1	0.3
Enrolment in grades 7-12 (millions)	25.4	25.6	0.3
<b>Costs for grades 1-6</b>			
Per-pupil cost (1990 dollars)	205	205	-
Current public expenditure (millions of 1990 dollars)	12 103	12 854	0.7
Public investment (millions of 1990 dollars)	41	261	20.3
<b>Costs for grades 7-12</b>			
Per-student cost (1990 dollars)	266	266	-
Current public expenditure (millions of 1990 dollars)	5 127	5 168	0.3
Public investment (millions of 1990 dollars)	58	51	-1.3
<b>Total cost of primary and secondary education</b>			
Total cost (millions of 1990 dollars)	17 329	18 334	0.6
As a percentage of GDP	1.7	1.3	
Primary education	1.2	0.9	
Secondary education	0.5	0.4	

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, based on estimates obtained with the SMMG model and on figures from the SIRI (Regional Information System) database.

the number of pupils entering the school system each year remains constant (see table VII-9). It is apparent that, under these conditions, the number of pupils entering the sixth grade is very close to the corresponding figure in the previous table. This is due to the large concentration of pupils who remain in the initial grades and to the variation in the ages at which they enter higher levels. In other words, the fact that the number of children entering school remains constant does not substantially reduce the costs of operating the system, though it does decrease investment, since there is no need to increase the absorption capacity of the initial grades.

When educational technology improves and repetition decreases, while at the same time access is gradually broadened until all children can enter the

educational system, total enrolment in primary education drops slightly, but secondary-school enrolment grows substantially (see table VII-10). Nevertheless, even though overall primary-school enrolment changes little, the distribution of pupils in each of the first six grades changes significantly. First-grade enrolment decreases by 3 million during the decade, while sixth-grade enrolment increases by almost 2.5 million.

This increase is even more dramatic in lower secondary education, since the increase in primary-school graduates is assumed to increase the proportion of students entering secondary school.<sup>7</sup> Enrolment in the seventh grade (the first year of secondary school) would therefore increase by almost 50% during the decade, while enrolment in the twelfth grade

Table VII-9  
LATIN AMERICA AND THE CARIBBEAN: ACCESS, ENROLMENT,  
COSTS AND INVESTMENT

(Alternative II: constant technology, constant population)

	1990	2000	Percentage variation
Access of each age group	93.2	93.2	
Enrolment in grade 1 (millions)	17.7	17.7	-
Enrolment in grade 6 (millions)	7.4	7.5	-
Enrolment in grades 1-6 (millions)	67.9	68.0	-
Enrolment in grade 7 (millions)	6.4	6.4	-
Enrolment in grade 12 (millions)	2.1	2.1	-
Enrolment in grades 7-12 (millions)	25.5	25.5	-
<b>Costs for grades 1-6</b>			
Per-pupil cost (1990 dollars)	205	205	-
Current public expenditure (millions of 1990 dollars)	12 103	12 115	-
Public investment (millions of 1990 dollars)	5	0	-
<b>Costs for grades 7-12</b>			
Per-student cost (1990 dollars)	266	266	-
Current expenditure (millions of 1990 dollars)	5 127	5 150	-
Public investment (millions of 1990 dollars)	58	2	-
<b>Total cost of primary and secondary education</b>			
Total cost (millions of 1990 dollars)	17 293	17 265	-
As a percentage of GDP	1.7	1.2	
Primary education	1.2	0.8	
Secondary education	0.4	0.4	

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, based on estimates obtained with the SMMG model and on figures from SIRI (Regional Information System) database.

7 It is assumed that the proportion of primary-school graduates who go on to secondary school will gradually increase from 55% in 1990 to 85% in the year 2000.

Table VII-10  
**LATIN AMERICA AND THE CARIBBEAN: ACCESS, ENROLMENT,  
 COSTS AND INVESTMENT**

(Alternative III: improved technology, increasing population)

	1990	2000	Percentage variation
Access of each age group	93.2	97.4	
Enrolment in grade 1 (millions)	17.7	14.7	-1.6
Enrolment in grade 6 (millions)	7.4	9.9	2.7
Enrolment in grades 1-6 (millions)	67.9	73.2	0.7
Enrolment in grade 7 (millions)	6.4	9.3	3.7
Enrolment in grade 12 (millions)	2.0	3.8	7.9
Enrolment in grades 7-12 (millions)	25.4	38.7	4.9
<b>Costs for grades 1-6</b>			
Per-pupil cost (1990 dollars)	215	215	-
Current public expenditure (millions of 1990 dollars)	12 279	13 724	0.7
Public investment (millions of 1990 dollars)	96	160	5.3
<b>Costs for grades 7-12</b>			
Per-student cost (1990 dollars)	281	281	-
Current public expenditure (millions of 1990 dollars)	5 424	8 254	4.9
Public investment (millions of 1990 dollars)	224	1 701	22.6
<b>Total cost of primary and secondary education</b>			
Total cost (millions of 1990 dollars)	18 473	23 839	2.9
As a percentage of GDP	1.8	1.7	
Primary education	1.2	1.0	
Secondary education	0.6	0.7	

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, based on estimates obtained with the SMMG model and on figures from the SIRI (Regional Information System) database.

would nearly double (see figure VII-1). Thus, both current costs and investment in lower secondary education would increase considerably (8% per year) and, from representing less than half of public spending on primary education in 1990, would come to equal over two thirds of such spending 10 years later. Even so, total spending on primary and lower secondary education would remain at around 1.7% of GDP throughout the decade, meaning that the universalization of coverage and the improvement of quality would entail a cost increase of less than 0.5% of GDP over the amount spent under alternative I (see table VII-11). Moreover, the increase of barely 5% in the per-pupil cost of primary and secondary education would be amply offset by the 18% and 11% decrease, respectively, in the cost of each primary- and secondary-school graduate.

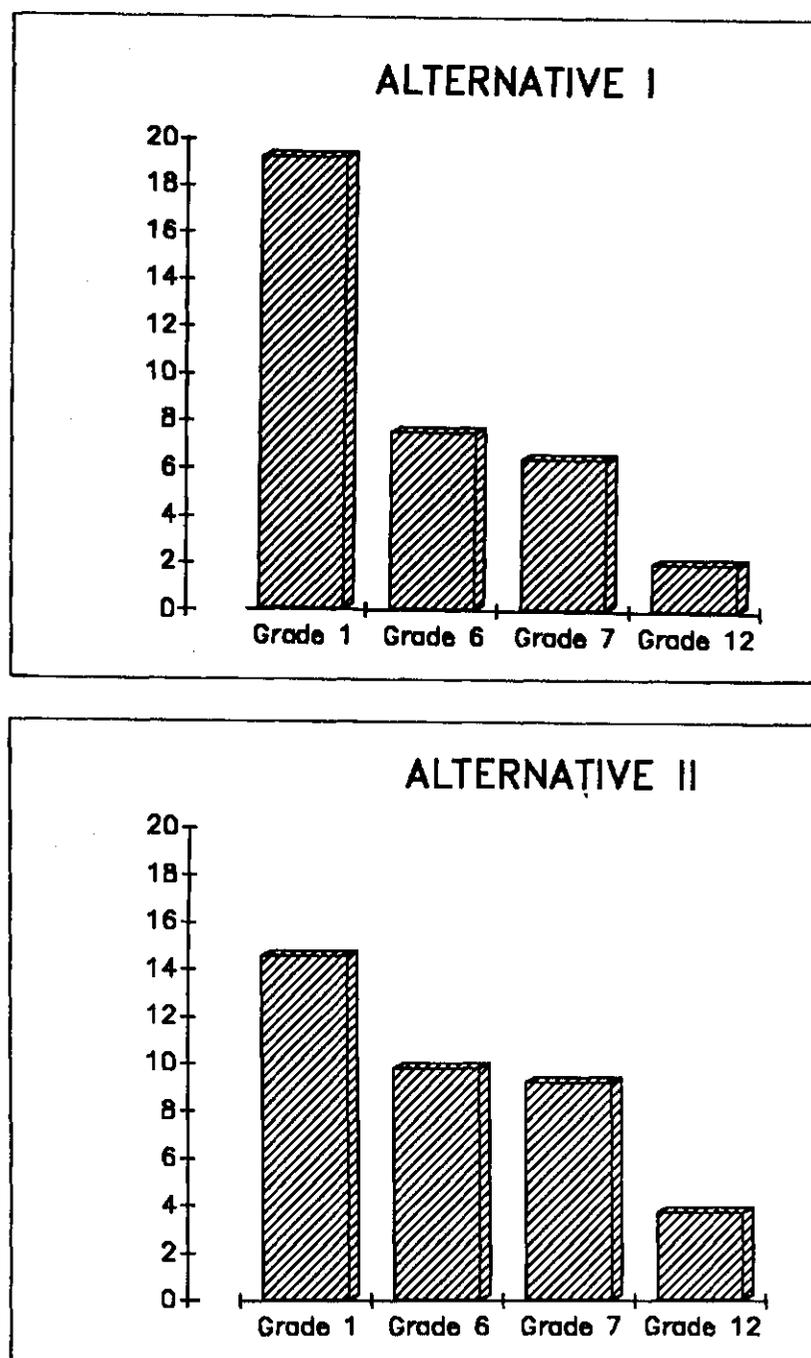
Table VII-11  
**LATIN AMERICA AND THE CARIBBEAN:  
 COST COMPARISON OF  
 ALTERNATIVES I AND III**

(1990 dollars)

	I	II
<b>Primary education</b>		
Per-pupil cost	205	215
Per-graduate cost	1 691	1 386
Total cost (as a percentage of GDP)	0.9	1.0
<b>Secondary education</b>		
Per-pupil cost	266	281
Per-graduate cost	2 461	2 172
Total cost (as a percentage of GDP)	0.4	0.7

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean.

Figure VII-1  
**LATIN AMERICA AND THE CARIBBEAN: ENROLMENT BY GRADE IN THE YEAR 2000**  
 (Millions of children)



Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, based on official figures.

Unquestionably, the increase in current expenses, and particularly in investment, would be greater in countries with rapid demographic expansion and only partial education coverage at the outset. However, an even more marked reduction in the per-graduate cost can be expected if the yield of existing investment is increased and the overall efficiency of the system is improved.

*c) Equitable access*

The positive effects expected of personalized education must be supplemented by targeted preschool learning programmes and attendance incentives for children in underprivileged socio-economic groups and in rural and indigenous areas in general. This is necessary to offset the relative disadvantages with which such children enter the school system. As noted previously, their performance is considerably lower than average, owing to the influence of factors external to the educational process itself.

Since formal preschool learning programmes are relatively expensive, they cannot be considered a realistic short-term alternative; in fact, since they are designed for small groups of children and require special teaching materials and a nutritional support component, the unit cost of preschool learning is usually two to three times higher than that of primary education. There are, however, a number of less expensive informal alternatives. For example, programmes based on the distribution of printed material and group sessions led by a local representative cost only one fourth of the unit cost of primary education. The cost of a community preschool learning programme in Colombia has been estimated at US\$130 per year per child, even with the inclusion of a significant nutritional component. Such programmes should target low-income sectors. In addition, awareness campaigns using the mass media (radio and television messages on the benefits of preschool education and suggestions for parents on early

educational stimulation) are very inexpensive (10 cents or less per child).

Informal preschool learning programmes might be preferable at first, and later combined with the introduction of a "grade zero" in primary schools, since the improved efficiency of the latter will open up vacancies in beginning courses.

The regional cost of this strategy to boost preschool learning (targeted informal programmes, awareness campaigns and gradual introduction of a "grade zero") can be estimated at slightly less than US\$2 billion, or a 5% increase in current public spending on education. Among preschool learning programmes, a choice can be made between the limited target of more comprehensive, and therefore more costly, programmes (community learning programmes of the type considered for Colombia, aimed at the 15 million Latin American and Caribbean children under age six living in indigence) or a somewhat broader dissemination of less comprehensive programmes (local learning groups with support materials, aimed at the 35 million children under age six living in poverty); in either case, the cost would be US\$1.93 to US\$1.95 billion. These measures would be supplemented by awareness campaigns aimed at families with children under six (67 million children), at an estimated cost of US\$7 million, and by training programmes for primary-school teachers as openings emerge for "grade zero" (US\$7 per child for 1 million children entering grade zero each year). However, this is really an overestimate, since it does not take into account current spending in this area in certain countries. Also, these costs should be shared with health, nutrition and family support institutions.

It is likewise difficult to arrive at an exact estimate of the cost of a more extensive and efficient system of attendance incentives. Most of these incentives should be aimed at the rural population, whose drop-out rates are usually higher and whose current educational deficit is more acute. The most common incentive for attendance at primary school is the lunch or breakfast

provided to pupils. The cost of such programmes seems to vary widely among different countries in the region,<sup>8</sup> based on an estimated cost of US\$100 per child for a target population of 27 million primary-school pupils from households below the poverty line, the total would amount to US\$2.7 billion, or 0.3% of GDP.

The cost of an attendance incentive system for secondary education would probably be higher, considering the higher cost of school attendance for this age group. Yet some sort of mechanism must be established to increase attendance by adolescents from poor households, especially those in rural areas, if the unequal distribution of educational achievement in the population is to be effectively mitigated. This is also a prerequisite for increasing secondary-school enrolment by 13 million students (as envisaged in alternative III), since it is foreseen that most of the new students will come from poor households. Attendance incentives for adolescents could consist of scholarships, transportation subsidies or free school supplies. Based on a cost of US\$500 per year for a target population of 10 million adolescents, the total would amount to US\$5 billion, or 0.5% of GDP.

Table VII-12 contains a synopsis of the projected costs of targeted remedial programmes to improve school attendance and performance by children from disadvantaged sectors. The total cost of these programmes is equivalent to 1% of GDP.

#### 4. The cost of promoting access to, dissemination of and innovation in science and technology

The proposed strategy for this area could benefit from a number of measures that do not require significant economic effort, such as information campaigns on science and technology, institutional strengthening of entities in charge of scientific and technological systems and of liaison between the latter and the

Table VII-12  
LATIN AMERICA AND THE CARIBBEAN:  
COST ESTIMATES FOR TARGETED  
REMEDIAL PROGRAMMES

(As a percentage of GDP)

Pre-school learning programmes	0.2
School meal programmes	0.3
Scholarships and financial aid for secondary education	0.5
<b>Total</b>	<b>1.0</b>

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean.

production system, and activities to disseminate and transfer technological information. Other measures, in contrast, require a more substantial financial commitment on the part of Governments and enterprises to develop and deploy new technologies; these include the expansion and strengthening of existing infrastructure and equipment, initial and ongoing training of specialized human resources and the establishment of funds or lines of credit to finance research and development projects and scientific and technological services.

As this type of action will have very different dimensions and scope in each of the countries of the region, it is difficult to produce a detailed calculation of its cost. UNESCO has traditionally recommended that developing countries should devote not less than 1% of their GDP to science and technology, and IDB also considers this percentage a reasonable estimate of the cost of a scientific and technological system in the region. In concrete terms, this would mean doubling current expenditures on science and technology, which would involve an additional annual amount of US\$5 billion (see box VII-1).

<sup>8</sup> The cost of some recent programmes ranged from US\$25 per child in Guatemala to US\$130 per child in Venezuela.

## Box VII-1

**RECENT NATIONAL SCIENCE AND TECHNOLOGY PROGRAMMES  
WITH FINANCIAL SUPPORT FROM IDB**

Efforts to enunciate an explicit policy on science and technology are relatively recent in Latin America and the Caribbean. However, in the wake of the crisis of the 1980s, some countries of the region have become concerned about forging effective links between scientific and technological capacity, the natural resource base and the needs of the national production sector, as a foundation on which to consolidate a competitive export sector and to realize their economies' potential.

This concern coincided with the decision of the Inter-American Development Bank (IDB), a traditional and important source of higher education funding in the region, to redirect its loans (which had thus far financed the construction and expansion of that sector's infrastructure) towards systemic projects closely related to the overall context of scientific and technological development. Thus, some recent loans by this multilateral entity were used to promote the exercise of existing research and development capacities and the establishment of mechanisms for liaison between technology suppliers and users.

Most of these programmes have four main features. First, they provide financing (in the form of grants to non-profit public and private universities and research centres, or as venture capital shared with private firms) for technological research and development projects with potential productive applications.

Second, they focus on the training of scientists and technicians in priority areas, and on the general improvement of science teaching at various levels of the educational system. Third, they seek to strengthen the existing infrastructure of laboratories and research centres through specific contributions. Fourth, they support various ways of disseminating and transferring technology, either through educational and public information activities, as in Costa Rica, or by implementing the pilot phase of a system for disseminating and promoting information on technology and investments, as in Brazil.

IDB has estimated that the development in the region of a science and technology sector capable of effectively supporting the production sector will require an increase in research and development spending to at least the equivalent of 1% of gross domestic product. Demonstrating its determination to support the initiatives of Latin American and Caribbean countries in this area, the multilateral entity has already granted loans for this purpose to a number of countries in the region (including Argentina, Brazil, Colombia, Costa Rica, Uruguay and Venezuela) totaling over US\$600 million, and is currently finalizing negotiations for several more to Chile, Ecuador, Mexico, the English-speaking Caribbean and Brazil, whose overall amount may exceed US\$1 billion.

### **5. The cost of responsible management**

To generate a viable basis for responsible management of the educational system and its institutions, information and evaluation mechanisms must be established or strengthened and wide-ranging training programmes must be carried out for central and local administrative personnel and teachers. These training efforts also dovetail with other strategic objectives, such as institutional reform, the design and management of targeted programmes and the establishment of regulatory and evaluation entities.

In the 1980s, some countries in the region established education databases and began using this information in their

decision-making, both public and private. The introduction or expansion of such systems should be extended within the region, though it is clear that they are not urgently needed in countries where the quality of primary education is so uniformly low that evaluations are not needed to determine which schools have problems. However, these systems are always useful for measuring initial progress and, subsequently, for identifying persistent problems. The gradual introduction of these systems should be scheduled over a reasonable period, considering their requirements in terms of design, adaptation and personnel training, and the current availability of technical assistance for this purpose.

Also essential to the smooth operation of technical training systems is the

creation of mechanisms to monitor and analyse the labour market and to coordinate training activities.

The estimated costs of installing computerized management information systems (MIS) range from US\$1 to US\$10 million, depending on the size of the country and the state of its infrastructure. The availability of such systems would obviously not be a priority in countries that lack even basic infrastructure. However, there are less ambitious options, better adapted to local deficiencies and generally lower in cost, that might be considered as tools for improving education administration. For example, the World Bank elaborated a project for the administration and development of primary education in Honduras that involves the gradual incorporation of all schools into a network of unified programmes for building construction and maintenance, teacher training, operational supervision and measurement of educational achievement. An innovative project of this type, including the corresponding initial and ongoing training programmes, could be carried out with 0.1% of GDP.

## 6. The cost of developing a professional, participatory teaching corps

As noted previously, in the early 1980s, the countries of Latin America and the Caribbean reduced the amount of financial resources allocated to education, yet access expanded and teaching load decreased. The paradox of this asymmetrical change in resources and results is explained by a decline of nearly 50% in average teacher salaries between 1980 and 1985, followed by only a slight recovery in subsequent years<sup>9</sup> (see table VII-13). Remuneration for primary-school teachers in the region approximates, on average, slightly more than twice the per capita GDP, though with considerable differences between countries. The recent upgrading of teacher salaries was not a direct consequence of changes in the average educational level or in the quality or performance of teachers, but of political decisions in response to the deterioration of salaries and union pressures. For the same reasons, and to ensure that the level of teacher salaries does not encourage personnel turnover and dual employment, the strategy must include improvements in this area.

Table VII-13

### LATIN AMERICA AND THE CARIBBEAN: TEACHERS AND TEACHER SALARIES

	1975	1980	1985	1988
Primary-school teachers (millions of persons)	2.0	2.2	2.6	2.7
Average annual salary (millions of 1990 dollars)	4.5	6.8	3.5	4.6
Salary/per capita GDP ratio	3.9	2.9	2.0	2.2

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, based on official figures.

<sup>9</sup> There is no absolutely reliable information available on average teacher salaries in the region. Figures for salary expenditures by ministries of education (see table VII-13) are the only statistics that include the entire region, but these amounts are usually much higher than those reported in direct surveys.

It should be borne in mind that changes are necessary not only in the average level but also in the structuring of teacher salaries. As mentioned earlier, the current structure has little relevance to the real degree of qualification, difficulty of work or relative performance of teachers. To enhance the efficiency of the educational process, an incentive plan to attract qualified personnel to the areas with the greatest needs (generally rural areas and indigenous settlements) must be introduced, and the commitment and dynamism demonstrated by teachers and school administrators must be rewarded. The specifics of the incentive system will vary by country and institutional situation. Some countries may decide to enact teaching regulations that are separate from the regulations governing other public employees; others may prefer to establish a system of specific bonuses

depending on professional qualifications and relative performance.

As an example, a simple simulation model has been elaborated to illustrate the effect of a teacher salary adjustment on total educational expenditures (see table VII-14). It was assumed that average teacher salaries would increase, over 10 years, at a rate equivalent to twice the rate expected for the population as a whole. This estimate indicates the direction in which teacher salaries should evolve, though it will be affected, in each country and educational level, by previous salary levels and by the real availability of resources to adjust them. The rationale for such increments may be based, depending on the country, on the need to catch up to a relative minimum level, the desire to attract better-qualified personnel or the recognition that education has gained in quality and practicality after several years

Table VII-14

## LATIN AMERICA AND THE CARIBBEAN: ACCESS, ENROLMENT, COSTS AND INVESTMENT

(Alternative IV: improved technology, increasing population and adjusted salaries)

	1990	2000	Percentage variation
Access of each age group	93.2	97.4	
Enrolment in grade 1 (millions)	17.7	14.7	-1.6
Enrolment in grade 6 (millions)	7.4	9.9	2.7
Enrolment in grade 1-6 (millions)	67.9	73.2	0.7
Enrolment in grade 7 (millions)	6.4	9.3	3.7
Enrolment in grade 12 (millions)	2.0	3.8	7.9
Enrolment in grade 7-12 (millions)	25.4	38.7	4.9
<b>Costs for grades 1-6</b>			
Per-pupil cost (1990 dollars)	215	288	3.4
Current public expenditure (millions of 1990 dollars)	12 729	18 320	4.4
Public investment (millions of 1990 dollars)	96	160	5.3
<b>Costs for grades 7-12</b>			
Per-student cost (1990 dollars)	281	372	3.3
Current public expenditure (millions of 1990 dollars)	5 424	12 514	13.1
Public investment (millions of 1990 dollars)	224	1 701	22.6
<b>Total cost of primary and secondary education</b>			
Total cost (millions of 1990 dollars)	18 473	32 695	7.7
As a percentage of GDP	1.8	2.3	
Primary education	1.2	1.3	
Secondary education	0.6	1.0	

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean, based on estimates obtained with the SMMG model and on figures from the SIRI (Regional Information System) database.

of reform. According to the basic scenario, the total expenditure for primary- and secondary-school teacher salaries would come to represent 2.3% of GDP in the year 2000, compared to 1.7% under alternative III, which provides for increased educational quality and coverage with constant real salaries. This means that teacher salary adjustments on the order proposed would cost an additional 0.6% of GDP.

### 7. The cost of the proposed strategy

Simply to give an idea of its magnitude, the estimated additional cost of the proposed strategy is summarized in table VII-15 as an increase in educational expenditures equivalent to 3.9% of GDP. If this amount is added to the 7% of GDP which Governments, enterprises and households currently spend on education, the resulting educational expenditure is around 11% of GDP, which is comparable to the figure for some industrialized countries, though still below that of others, such as Korea and the Chinese province of Taiwan.

Table VII-15

**LATIN AMERICA AND THE CARIBBEAN:  
ESTIMATED ADDITIONAL COST OF THE  
PROPOSED STRATEGY (SUMMARY)**

*(As percentages of GDP)*

Universal access to high-quality basic and intermediate education	0.4
Targeted remedial programmes	1.0
Adult basic education	0.1
Training programmes in enterprises	0.5
Training programmes for disadvantaged sectors	0.7
Promotion of innovation and creativity	0.5
Tools for responsible management	0.1
Adjustment of teacher salaries	0.6
<b>Total</b>	<b>3.9</b>

Source: Joint ECLAC/UNIDO Industry and Technology Division and UNESCO Regional Office for Education in Latin America and the Caribbean.

An overview of financial implications that reflects their order of priority in the proposed strategy can be obtained by grouping the latter's various components according to their contribution towards achieving the objectives of developing the exercise of citizenship and enhancing competitiveness, as well as fulfilling the prerequisites for these goals.

It must be remembered, however, that a fuller exercise of citizenship increases competitiveness, and that the latter, in turn, supports citizen participation in the long term; moreover, each of the proposed actions aims at the achievement of both objectives, though in varying degrees. Based on these considerations, it seems possible to establish a preferential relation between each action and the objectives towards which it is most directly oriented in the short term.

From this standpoint, it can be seen that the actions most clearly linked to the exercise of citizenship and the enhancement of social equity (universal access to high-quality basic and intermediate education, targeted remedial programmes, adult basic education and training for disadvantaged sectors) absorb 56% of the cost of the strategy (2.2% of GDP); those which promote increased competitiveness (training in enterprises and promotion of innovation and creativity), 26% (1% of GDP); and those which fulfil prerequisites for achieving both objectives, 18% (0.7% of GDP).

Both the amount of additional resources and the time they take to materialize will vary significantly according to each country's specific shortcomings and capacity to mobilize internal and external resources. In addition, since the task involves reforming institutions and patterns of behaviour, it is unrealistic to expect drastic increases and immediate results.

Nevertheless, what should be emphasized is, on the one hand, the necessity and expediency of initiating efforts as promptly as possible and, on the other, the need for a stable financial commitment which, if maintained for at least one generation, can decisively

change the pace and direction of Latin American development.

The returns that can be expected of primary education reform in Latin America and the Caribbean can be roughly calculated on the basis of income differences by educational level. Assuming that the differential in income between those who have completed primary education and those who have not represents the difference in their productivity, and multiplying this difference by the proportion of persons with incomplete primary education in the active adult population, it can be concluded that increasing levels of education, all other factors remaining the same, would produce a minimum increase in GDP of slightly more than 1% in countries with ample educational coverage (such as Costa Rica and Uruguay) and a maximum increase of 17% in the case of Brazil, where a large percentage of the active population has a low level of schooling (see table VII-16). Compared to this potential benefit, the cost of improving educational quality and coverage (0.5% of GDP), of extensive adult education programmes (0.1%) or of readjusting teacher salaries (0.6%) seems quite modest.

#### 8. Financial mechanisms and sources

As mentioned previously, the region's fiscal sector has been by far the most important source of education financing, though private, business and household contributions, and external funds from international cooperation entities, have also participated in specific ways.

In recent years, almost all the countries of the region have sought to increase the private sector's participation in funding social services, owing to current constraints on the generation and use of public funds, limited external assistance and expectations of greater efficiency associated with private financing. In view of its recognized role in increasing productivity and income, human resources training is an attractive market for consumers and for suppliers of

Table VII-16

**POTENTIAL INCREASE IN GDP BY  
RAISING THE EDUCATIONAL LEVEL  
OF THE ACTIVE POPULATION TO  
COMPLETION OF PRIMARY  
SCHOOL IN SELECTED  
COUNTRIES**

(Percentages)

Argentina	2.4
Brazil	17.1
Colombia	3.7
Costa Rica	1.2
Uruguay	1.4
Venezuela	4.0

Source: Joint ECLAC/UNIDO Industry and Technology Division, based on official figures.

such services. In addition, the experience of some countries in the region has shown that there is ample room for the expansion of private financing for education.

In the 1980s, however, most private financing for education was used to replace public funds. As noted earlier, the decline in fiscal spending in the past decade helped prompt the expansion of private contributions, either explicit (tuition payments) or implicit (funding of operational costs or educational materials).

Modalities for mobilizing family resources have been both formal and informal. In some countries, local parents' associations have been formed to collect community contributions for their schools. In others, the Government has relaxed or eliminated restrictions under which the retention of private funds by educational institutions had been difficult or impossible.

The main problem with household participation in primary education financing is its potentially unbalancing effect, since wealthier communities can generate more resources than less affluent ones. To offset this phenomenon, central authorities should grant considerable compensatory funding. One way of combining the collection of private funds with the compensatory role of the State is the system of matching funds, in which

public contributions to supplement the resources generated by each school are inversely proportional to the socio-economic level of each community.

Despite their promising expansion, household contributions to the financing of formal education seem to have a ceiling, as most households have a relatively limited capacity to increase their current contribution. It has already been noted that contributions from low- and medium-income households have grown considerably in recent years, so that it is neither realistic nor timely to expect additional increases prior to an upturn in real income. At the level of primary education, it would even be advisable to eliminate, for the poorest families and especially in the rural sector, any type of implicit fee that could lead to higher non-attendance and drop-out rates.

Contributions from high-income households are also limited by various factors: for example, since their level of participation in primary and secondary education is low, only institutions of higher education can hope for larger contributions, in the form of tuition payments. It should be recalled, however, that income generated by teaching activities in universities covers only a small part of their total expenses. In some countries of the region, tuition payments have come to represent only 5% to 20% of the income of these institutions. The establishment of fees for higher education, if accompanied by sufficiently broad scholarship and loan schemes, could result in greater social equity, since free tuition for high-income sectors would be eliminated.

The prospects for obtaining private financing as a supplement to public funds, either by expanding traditional activities in the educational field (such as training programmes) or as a result of new initiatives, are more promising. For example, training programmes in enterprises could be multiplied to meet the need to absorb new technologies and to enter international markets. Another possibility would be to make greater use of private educational services offering

post-secondary training, short technical courses or extra-curricular education. Both phenomena reflect an increase in private demand, which could be spurred even more through public information and advertising efforts and the design of appropriate financial and tax instruments. Worth mentioning in this respect are, for example, savings plans to pay university tuition, bank loans to students, recognition of training certificates as loan guarantees for small businesses, tax exemptions, etc.

Based on the background described, the additional private funding needed to implement the proposed education strategy amounts to an estimated 1% of GDP. It would then fall to the State to provide, either from its own resources or from external sources, the remaining 2.9% of GDP to cover the total estimated cost of education reform.

External financing of education, after stagnating in the 1980s, is currently on the rebound. Indeed, most multilateral and bilateral organizations have reaffirmed their interest in funding educational development in the countries of the region and have announced increased participation by all of the sector's loan operations. Even so, the estimated financial support that can be expected from them represents only 0.5% of the region's GDP. Furthermore, external funding is usually targeted by area and educational level. The World Bank, for example, has stated its intention to devote more resources to financing primary education, while IDB launched a series of programmes to support regional research and development systems; some bilateral assistance programmes, particularly the German Agency for Technical Cooperation (GTZ), have long experience in supporting technical apprenticeship and training. External cooperation could also play a major role in such areas as investment financing, textbook design and production, teacher training and the development of institutional capacities. Non-governmental organizations could bring the benefit of their experience to the

design and management of informal programmes targeting poor sectors.

It is therefore possible that the public sector could directly finance an amount equivalent to 2.4% of GDP to launch the proposed strategy. Indeed, most of the financial responsibility in almost all areas falls to the State (see table VII-17). This means that the budgeted public resources currently spent on the education sector would have to be increased by 50%, which will undoubtedly be very difficult in the current climate of fiscal constraints.

The benefits expected of the proposed reform may increase the likelihood that the public sector will be able to mobilize the necessary resources, especially if national consensus is reached on the pre-eminence of the education/knowledge factor in attaining development objectives. Although modalities, margins and constraints will vary by country, the general trend will be to utilize a combination, in varying proportions, of the following measures:

i) Reallocation of funds within the budget items for the education and

scientific/technological sector, since primary education promotes social equity and incentives for corporate technological research promote competitiveness.

ii) Reallocation of funds among budgets for various sectors; for example, from defence and debt-servicing to education and knowledge.

iii) Raising taxes, since the current regional tax burden is relatively low; in addition to collecting unified taxes, on which the stability of the system depends, some areas have experimented with imposing real estate taxes to finance local education costs, as well as taxes for specific purposes, such as the provision of textbooks or the improvement of training infrastructure.

To demonstrate the feasibility of carrying out the proposed reform, it can be pointed out that, for the region as a whole, the public resources needed over several years would equal about half the current annual amount for external debt-servicing, plus half the amount of annual military expenditures.

Table VII-17

## LATIN AMERICA AND THE CARIBBEAN: POTENTIAL SOURCES OF FINANCING

	Public sector	Enterprises	Families	External
Universal access to high-quality basic and intermediate education	x		x	x
Targeted remedial programmes	x			x
Adult basic education	x			x
Training programmes in enterprises		x		
Training programmes for disadvantaged sectors	x		x	x
Promotion of innovation and creativity		x		
Tools for responsible management	x			x
Adjustment of teacher salaries	x			

Source: Joint ECLAC/UNIDO Industry and Technology Division.

---

## Annex I

# THE HUMAN RESOURCES TRAINING DEBATE IN SOME DEVELOPED COUNTRIES

### Introduction

---

In the following pages, a review is made of the main arguments put forward in the human resources training debate in a group of developed countries, in order to identify the main issues under discussion and the practical proposals and appraisals which emerge in them. The aim is not to make a complete analysis of the situation of the educational system or of the policies applied in each country, but merely to outline the most salient aspects characterizing their experience in educational reform, which may be instructive for the Latin American case.

#### 1. The debate in the United States

---

It is in the United States that concern over the importance of education for the economy has been most pronounced and the deterioration in the educational system has been blamed most explicitly for the decline in national competitiveness. This situation has been the subject of keen debate, sparked off by many reports –both official and non-governmental– and has given rise to a number of proposals for educational reform which were reflected in 1991 in President Bush's announcement of an educational strategy for the 1990s.

What is the basis for this widespread concern and what are the issues under debate?

#### a) *The potential dilemma between quantity and quality in education*

The features of the United States educational system which have been most frequently commented upon are its very wide coverage and its low quality. Its coverage is one of the widest among all the OECD countries, since almost all young people between 16 and 18 attend school full time: a figure which is exceeded in the OECD only by Germany, Japan and Finland. Attendance at educational establishments by the following group (18-24 years of age) amounts to 60%: by far the highest level in the OECD (see table AI-1).

However, this very wide coverage is associated with dubious quality. The best-known report on the deterioration in the United States educational system, *A Nation at Risk*,<sup>1</sup> reported that in 1982, 13% of 17-year-olds were functional illiterates; that a quarter of the recruits in the United States Navy were incapable of reading and understanding written instructions on safety; that the results of the standardized achievement tests showed a continual decline throughout the 1960s and 1970s; and that when these results were compared with those of other countries,

---

1 National Commission on Excellence in Education, *A Nation at Risk: The Imperative for Educational Reform*, Washington, D.C., U.S. Government Printing Office, 1983, pp. 8 and 9.

Table AI-1  
**ENROLMENT RATES, BY AGE GROUP, IN SELECTED COUNTRIES**  
*(As a percentage of the corresponding age group)*

	Total enrolment (ages 3-24)		Preschool (ages 3-5) 1986	Post- compulsory secondary (age 17) 1986	Post-secondary (20-24 years) 1986		
	1975	1986			Total	Male	Female
Germany	74	74	93	100	30	34	26
Republic of Korea	-	-	-	78 <sup>a</sup>	38	50	24
United States	70	71	36	89	60	56	64
France	73	77	100	80	30	29	31
Italy	67	64	89	46	25	26	23
Japan	64	69	44	91	29	36	21
United Kingdom	70	70	31	49	22	24	21
Sweden	64	70	95	86	31	29	33
OECD average <sup>b</sup>	64	68	59	73	32	33	31

Source: Joint ECLAC/UNIDO Industry and Technology Division, on the basis of figures provided by OECD and UNESCO.  
<sup>a</sup> Net enrolment rate for 12-17 age group. <sup>b</sup> Simple (unweighted) average. Does not include Turkey.

the United States was at a similar level to that of Thailand. Against this background, it is easy to understand the title of this report and the warning it contains:

*"History is not kind to idlers... We live among determined, well-educated and strongly motivated competitors. We compete with them for international standing and markets, not only with products but also with the ideas of our laboratories and neighbourhood workshops. America's position in the world may once have been reasonably secure with only a few exceptionally well-trained men and women. It is no longer."*<sup>2</sup>

A great many studies have been carried out in the United States in order to try to identify the causes of this state of affairs. To begin with, they sought to link scholastic achievement with the inputs of education: expenditure per student,

student/teacher ratio, level of training of teachers, etc. The measurements made were conclusive, but not in the way that was expected: they showed that the inputs had steadily increased in quantitative terms, but the contribution of each of them to the final scholastic result was not statistically significant.<sup>3</sup>

Subsequent studies therefore sought to identify the influence of another two types of factors on educational achievement. The first to be mentioned, as might be expected, were those which are external to the school. Thus, there was a renewal of interest in the Coleman Report, which had stated in the 1960s that school results were linked with the features of the student and his family background, rather than those of the school and its teaching methods.<sup>4</sup> A similar conclusion was

2 Ibid., p. 6.

3 John E. Chubb and Eric A. Hanusheck, "Reforming educational reform", Henry J. Aaron (ed.), *Setting National Priorities: Policy for the Nineties*, Washington, D.C., The Brookings Institution, 1990.

4 James S. Coleman and others, *Equality of Educational Opportunity*, Washington, D.C., U.S. Government Printing Office, 1966.

reached in the following decade in the study by Jenks and his collaborators, which found that the quality of the output of schools depends on a single input: the student who enters them and his own characteristics. All the other factors, claims this study, such as the school's budget, its approach to teaching and the characteristics of the teachers are of secondary importance or do not enter into the matter at all.<sup>5</sup>

These kinds of observations would appear to dash the hopes traditionally placed in education as an instrument for doing away with differences of social origin and establishing a common culture: objectives considered as essential for the functioning of a democratic society. They also question the primary objective of United States educational policy: namely, to make up for economic and social disparities through a variety of measures ranging from school subsidies to programmes of positive discrimination in favour of specific groups such as women, blacks, poor people, etc.

The advocates of such policies responded by pointing out the benefits of some school programmes designed to reduce differences between economic and social groups (see box AI-1).

At all events, the controversy generated by the studies of Coleman and Jenks, which is still not over, led to the reappraisal of the potential impact of education as a factor of change and social equity and highlighted the need to apply direct policies to achieve these aims.

There has been equally keen controversy over the opposite phenomenon to that studied by Coleman and Jenks, namely, the impact on the educational system of the massive inflow of young people from homes with dissimilar features.

The deterioration in the quality of United States public education has often been presented as the expression of a Malthusian dilemma between quality and quantity, since it is claimed that it took

place simultaneously with the extension of secondary education to the masses. It is indeed reasonable to think that, because secondary education lost its exclusive and selective nature and began to take in young people with less highly developed academic aptitudes, this may have given rise to a decline in the average achievement of the student population.

The slackening of admission requirements, reduction of teaching time, and the search for teaching methods and curricula more suitable for the mass training of students with an unequal cultural base are developments which, it is claimed, must necessarily take place in the process of universalizing secondary education. For example, one-fifth of the United States public colleges are legally obliged to accept all students who have completed their secondary education, whatever the subjects they studied or the marks they obtained. Moreover, in a survey carried out in the early 1980s, 23% of colleges and universities admitted that they had lowered their admission requirements. As a result, a quarter of the mathematics classes given in these institutions are designed precisely to make up for the shortcomings in the students' initial training.<sup>6</sup>

It has also been maintained that this possible drop in the quality of education should not necessarily be considered negative, in so far as the extension of education in time has indeed succeeded in raising the level of education of the population as a whole. In other words, the level of education of the average graduate goes down, but there is an increase in the number of graduates in absolute and relative terms, together with an improvement in the level of education of the average citizen. Although this latter concept is hard to measure with precision, some studies are agreed that the average level of knowledge of each generation has been steadily rising in the industrialized

5 Christopher Jenks and others, *Inequality. A Reassessment of the Effect of Family and Schooling in America*, New York, Basic Books, 1972.

6 National Commission on Excellence in Education, *A Nation at Risk...*, op. cit., pp. 20-21.

## Box AI-1

## THE PROVEN BENEFITS OF PRESCHOOL EDUCATION

Enrolment in preschools grew faster in the OECD countries in the 1980s than enrolment in other levels of education, rising from 46% to 59% of the three- to five-year-old age group between 1975 and 1986. Although a number of factors contributed to this increase, the parallel increase in the number of women working is the leading cause; it is estimated that half the mothers of children under five years old in the United States worked outside the home in 1989, compared with just 28% in 1982.

The findings of the first empirical studies conducted on the effect of preschool experience on the way children performed at school later on were rather disappointing, a positive but temporary impact being recorded – the differences between children who had received preschool attention and those in a control group disappeared inside of a few years. However, more recent studies carried out in the United States to measure the consequences of preschool attendance over a longer period of time support the initial hypothesis that children who have benefited from preschooling show a higher rate of secondary and post-secondary enrolment, have access to better jobs and are less prone to end up in the poorest sectors of society.

Preschool programmes benefit children from all socio-economic groups, but their effects are more notable in the case of children from low-income households since they reduce the comparative disadvantages of such children and make it easier for them to enter formal education later on. They are also of help in the identification of learning problems, thereby lowering the rate at which children are held back in school in later years. The duration of the programmes is important to their effectiveness; three to four years is optimum, while a programme lasting only one year offers few benefits.

There are various possibilities for preschooling. In France and Belgium, programmes for preschool children have been part of the formal education system since the 1960s, although they are held in separate facilities and attendance is optional. Their coverage has increased rapidly, rising in France from 50% for the two- to five-year-old age group in 1960 to 84% in 1988, with close to total coverage (94%) in the case of the four- and five-year-olds. Other European countries have adopted similar approaches. In the Netherlands, for example, the basic education system was expanded from the bottom up by adding two years of preschooling.

In Japan and Italy, on the other hand, preschool services are provided primarily by private establishments, and in the United States, more opportunities for preschool education have been offered primarily to those groups at both ends of the income distribution scale in the form of upper-class private schools for children from more comfortable households and a number of informal programmes for the poorest children. The best known such programme is Headstart, in which early stimulation is combined with health-care and nutrition services and whose success has caused federal financing to grow in spite of the high unit cost of the programme (US\$3,500 per child per year). At the same time more informal and less costly programmes financed by the states, local communities and non-governmental organizations have spread. Private enterprise has also provided financing for this kind of educational service in recent years, either by supporting programmes which benefit the poorest urban neighbourhoods or by setting up child-care centres for the children of their own employees as an incentive for qualified staff to remain on the job.

countries since the beginning of this century.<sup>7</sup>

Another issue is that of the variation in the ranking of each country in the scale of measurement of educational achievement. In this respect, various studies point to a deterioration in the relative position of the United States, compared with other countries which

spend the same amount or less on education (see box AI-2).

*b) Organization and efficiency of the school system*

The relative decline of the United States in international comparisons of educational levels has led to the analysis of the possible effect of another factor in

<sup>7</sup> Christian Baudelot and Roger Establet, *Le niveau monte. Réfutation d'une vieille idée concernant la prétendue décadence de nos écoles*, Paris, Editions du Seuil, 1989.

## Box A1-2

## COMPARISONS OF EDUCATIONAL LEVELS

The administration of systematic tests to measure changes in the intellectual level of the population is a relatively recent practice. To obtain a longer-term view of this trend, tests are usually given to adolescents entering military service; these have the advantage of providing data which are relatively independent of the curriculum being followed and are consistent through time.

These tests, together with those administered in recent decades by specialized institutes in 14 industrialized countries, indicate that there has been a steady rise in the intellectual level of the population in all the countries in question: it has been increasing by an average of about 20 points per generation. Although this global trend is generally acknowledged, there is widespread debate on three of its possible implications.

The first is related to the sources of this phenomenon. The same factors do not always carry the same weight in all countries. In particular, there is disagreement as to whether the spread of formal education has been one of the actual causes of this trend, or whether it simply reflects the influence of exogenous factors such as nutrition, health or forms of social organization.

Secondly, it is of interest to determine whether this trend has been uniform or homogeneous for all the citizens of a given country, whether it reflects a progression towards greater equity in the distribution of knowledge or whether, on the contrary, it denotes a movement towards greater inequality. Although countries obviously differ from one another in this respect, the most representative movement seems to have been towards a greater dispersion of levels of knowledge, with an increase in relative participation of both the educational elites and the middle sectors, and a decrease in the number of persons at the lower educational levels, although the gap separating them from the middle sectors has widened.

Lastly, the topic of international comparisons, or measurements of the relative

position of each country at the world level, has received much attention. The most often mentioned comparisons have been those referring to the varying national achievements in science education, a matter which is regarded as crucial in view of the acceleration of technical change. The International Association for the Evaluation of Educational Achievement (IEA), an association of educational research centres, sponsored a series of tests in the mid-1980s to measure science achievement among children in the fourth grade (age 10), eighth grade (age 14) and final year of secondary school. The tests were conducted in 17 countries, including four developing economies in Asia (Hong Kong, Korea, Singapore and Thailand). The results of the first two tests are useful in evaluating the quality of mass education in science, since they correspond to age groups with an enrolment rate of nearly 100%. Conversely, the results of the third test allow for an evaluation of the education of the elite.

A number of countries (Japan, Korea and Sweden, for example) showed good results in the first two tests, but a relatively lower position at the third level. In turn, variations in the results of different schools in the same country are not very significant, a finding which would seem to reflect a relatively homogeneous level of educational opportunities in these three cases. The comparison of results by sex, however, reveals wide differences in the case of Korea. Other countries, including the United Kingdom and Singapore, seem to achieve good results in training their elites, but demonstrate serious deficiencies at the lower levels. Moreover, the results of the lowest 25% of students show a chance pattern, which would indicate that these children suffer from what could almost be called scientific illiteracy. Finally, this exercise in international comparison underlines the marked deterioration in the relative position of the United States compared to its level in the early 1970s; thus, the test results in eighth-grade students place the United States in next-to-last place, while a similar comparison showed them in seventh place 10 years earlier.

the deterioration of educational quality in that country: namely, inefficient use of inputs. This is the aspect which has received most attention during the 1980s, with heavy criticism of the content, teaching methods and institutional

organization of the United States school system.

It is stated that, with the dual aim of integrating the whole of the respective age groups and eliminating social disparities, secondary education has tried to reduce the diversity of institutions, while at the

same time liberalizing the composition of the curricula at this level. As a result, it is claimed, the last 30 years have witnessed the almost total disappearance of technical education, which received a substantial proportion of the total number of adolescents in the 1950s and 1960s.

Some vocational training high schools still exist (it is estimated that a quarter of all secondary students choose predominantly technical education), but the vocational nature of the training given in them is not very marked. Generally speaking, half the school time is devoted to general educational subjects, and even in the technical subjects the training is essentially theoretical.

The curricula of the general high schools, for their part, are highly diversified and include technical or professional options. There is no distinction between the diplomas awarded by the two types of establishments.

Official requirements with regard to the curriculum are usually very limited, so that optional subjects account for a growing proportion of secondary education. In 13 states, for example, over half the school time may be taken up with optional subjects. In 35 states, only one hour of mathematics and one hour of sciences studies are required per week in order to obtain the secondary leaving certificate. This, together with the variety of subjects offered, is felt to have helped to dilute the content of education to such a point that the proportion of students completing their secondary education without majoring in any subject whatever rose from 12% in 1964 to 42% in 1979.

Even more striking is the disaffection of secondary students from the traditional academic subjects: in the early 1980s, for example, only 31% of students studied algebra and only 6% calculus, although the latter course was offered by 60% of the establishments. On average, 25% of the

school time is taken up by such subjects as physical and health education, work experience outside the school, and remedial and personal development courses.<sup>8</sup>

The expansion of access to secondary education has been accompanied by an active search for teaching methods better adapted to the characteristics of the students more recently incorporated into the educational system. In particular, an effort has been made to find methods which are less standardized, more centred on the individual, and more flexible. In this way, the schools of the United States have become fertile ground for a large number of teaching experiments, some of them successful and subsequently adopted by other countries.<sup>9</sup>

It has been claimed that this wave of experimentation has had some negative impacts. Its detractors usually maintain that the practice of centering the educational process on the individual, with a tendency to reduce school requirements and demands, has brought with it a lowering of expectations, both among students and teachers and in society in general. Thus, for example, some studies have shown that around two-thirds of the students devote only one hour or less per week to their homework; that the majority of students are already capable of mastering over 80% of the material in the textbooks offered to them even at the beginning of the school year; and that the minimum official requirement has often become the final objective instead of being considered as the starting point for the course in question.

The publication and dissemination of findings of this nature gave rise to a wave of reforms in the 1980s. Except for five states, all the others in the Union raised their minimum requirements for graduation during this decade. California even went so far as to apply a specific

<sup>8</sup> National Commission on Excellence in Education, *A Nation at Risk...*, op. cit., p. 19.

<sup>9</sup> Bilingual teaching techniques, such as "English as a second language", are a good example of these advances in teaching methods.

common programme for the teaching of basic subjects in secondary schools.<sup>10</sup>

The low efficiency of the United States educational system has also been linked with its high degree of decentralization. Mention has been made, for example, of the lack of dissemination of successful teaching experiments and their very limited application by the system as a whole. When they are disseminated, this takes place in a slow and unequal manner. Various studies attribute this type of problem to the decentralization of the United States educational system, although until recently this was considered one of its greatest virtues.

These and other observations have given rise to a growing clamour for national rules and standards in order to restore coherence and give greater capacity for action to the system as a whole. Such a radical reform as the adoption of a national curriculum would be unacceptable in such a decentralized system as that of the United States, however. Indeed, the Federal Constitution itself assigns competence in educational matters to each of the states, which has often meant in practice that it is the districts within each state that finally exercise direct control over education.

The draft educational strategy announced in 1991 by the United States Government provides for the establishment of an evaluation system at the federal level, with the application of tests at various ages, although on an optional basis.<sup>11</sup>

The low level of dissemination of innovations in the United States educational system has also been attributed –together with the deterioration in United States education in general– to the very limited autonomy that the individual schools enjoy under the

institutional system.<sup>12</sup> It is held that in order to be efficient, the educational process calls for permanent adaptation by the establishments to the prevailing conditions, and although the United States system is very decentralized, it does not give schools the necessary autonomy. Some experiments in flexible payment of teachers on the basis of the results obtained (merit pay) show that the problems are located at the level of the educational unit as a whole, rather than at the level of its components taken individually.<sup>13</sup>

In this case, the main instrument recommended for increasing the effective autonomy of schools has been the free choice of students and their parents. Many states have in fact liberalized the rules on access to public schools, although only to a relatively limited extent (at most, within a particular school district). No state, however, has applied the more radical proposal of introducing a system of "vouchers" whereby the amount of public subsidies received by each school will be determined by the number of students voluntarily enrolling in it. However, the educational strategy recently proposed by President Bush does represent some progress in this direction.

### c) *Business and education*

During the 1980s it was also stressed that the United States educational system has been developed in line with the Taylorist form of organization of production, which generates a large number of jobs calling for few or no skills.

Now, however, companies are adopting new forms of organization which demand a much higher level of education from their staff, particularly those working on direct production tasks

10 J. Lesourne, *Education et société. Les défis de l'an 2000*, Paris, Le Monde/ Editions de la Découverte, 1988, p. 94.

11 United States of America, Office of Education, *America 2000. An Education Strategy*, Washington, D.C., 1991.

12 John Chubb and Terry Moe, *Politics, Markets, and America's Schools*, Washington, D.C., The Brookings Institution, 1990.

13 Ibid.

which were previously defined as semi-skilled or unskilled jobs. Thus, it is now recognized that the level of education of the labour force of a country is an important factor in its competitiveness. A number of top executives of United States firms, for example, say that the present state of education in the country puts them at a disadvantage compared with their foreign competitors.

In the United States, technical training is usually given within the formal educational system, through an extensive network of community colleges which give two-year post-secondary training courses. There are no "sandwich" training systems in which the student alternates between the school and his place of employment, as in many European countries. Although the training given by the community colleges does include periods of practical work in companies, these periods only play a subsidiary and supporting role, and it is the educational establishment which retains all the autonomy in teaching. Some analysts consider that these institutions, whose financing comes basically from fiscal sources, carry out a social rather than an economic function.

United States companies do not have a tradition of training their employees, except for the specific training required for each particular job. This training is usually brief (sometimes as little as a couple of hours), and is carried out at the workplace itself.<sup>14</sup> Furthermore, the high mobility of the labour force seems to have acted as a damper on internal training activities.

This does not mean, however, that United States companies do not participate in the financing of education: on the contrary, this has traditionally been the main item in their external expenditure.<sup>15</sup> Financing of education by companies is usually concentrated on philanthropic forms of assistance (award of scholarships, trust funds, contributions

to foundations, etc.) and on direct financing of higher education, especially for applied research which could directly benefit the firms.

During the 1980s, the relations between companies and the educational system underwent a rapid change. Internal training activities increased considerably, generally in connection with introduction of new technologies (automation, continuous quality control, etc.). When they introduced these technologies, the companies noted serious shortcomings in the general training of their employees and decided to strengthen their links with public educational institutions (see box AI-3). This movement has become so important that, in 1988, 70% of United States public schools were incorporated in some system of association with companies.<sup>16</sup>

The forms and purposes of these kinds of association have also changed. Although a certain proportion of them are designed to supply material to schools, often with commercial aims, other programmes with broader purposes have appeared and are spreading. In particular, because of the growing difficulties which companies have experienced in hiring staff with suitable general training, a number of them have collaborated in the preparation, implementation and financing of programmes to improve basic education in marginal urban neighbourhoods, associating themselves in some cases with the authorities of entire school districts. Other firms have financed and supported the integration of specialized vocational training programmes into the curricula of some secondary schools (see box AI-4).

Finally, it may be noted that the United States business community has taken a more active stance in defining the country's educational policy. Thus, for example, a coalition of companies supported the educational recovery plan

14 Richard Kazis, *Education and Training...*, op. cit.

15 Myra Alperson, *Corporate America in the Classroom*, Council on Economic Priorities (CEP) Research Report, New York, January 1990.

16 The Business Roundtable, *Business Means Business about Education*, Washington, D.C., June 1989.

## Box A1-3

**MOTOROLA'S TRAINING ACTIVITIES**

Motorola's experience provides an example of recent changes in attitude in large North American companies with regard to their staff training activities.

When continuous quality control was introduced and later when its Chicago plant converted to cellular technology, Motorola was able to see the serious educational gap which characterized its 25,000 employees, over half of whom failed to meet seventh grade reading, writing and mathematics standards. In performing their jobs, these employees were entirely dependent on information and instructions received from their supervisors—a situation which was hard to reconcile with the company's policy of removing layers of supervisory-level posts in order to achieve greater flexibility.

Against this background, Motorola developed an ambitious educational programme in which its employees were provided with continuous training. This programme ranged from remedial courses in elementary school subjects to courses

introducing the latest manufacturing technologies. Annual spending by the company on training rose from US\$7 million to over US\$60 million in less than a decade.

Over and above training employees to perform new operations in the future, Motorola sought, through its training activities, to foster in its workers a favourable attitude towards change and continuing education. Special efforts were needed to overcome many forms of resistance based on the workers' tradition of learning directly through imitation and on hidebound managerial practices in which financial indicators counted for more than concern for quality.

In implementing this ambitious programme, Motorola has established close links with educational establishments of various kinds. Its relationship with these institutions, which is in some ways similar to that between it and its suppliers, includes the exchange of teachers and teaching equipment and joint curriculum design.

put forward by David Kearns, then General Manager of Xerox and later Assistant Secretary of Education of the United States, formalizing their action through the establishment of the Business Coalition for Educational Reform in 1989.

The business sector is closely linked with the educational strategy announced recently by President Bush; it has undertaken to raise between US\$150 and 200 million in order to set up the New American Schools Development Corporation, which will help to form a new type of school in order to fulfill the objectives of that strategy. With an additional allocation from the United States Congress, it is aimed to set up at least one alternative school in each school district by 1996, in the hope that this will be a shot in the arm for the United States educational system as a whole.

## 2. The debate in the United Kingdom

A high degree of decentralization and total uniformity of education in the first eleven grades are also distinctive features

of education in the United Kingdom. Unlike the United States, however, British education is marked by relatively low levels of school attendance by adolescents: half of the young people leave school at sixteen, and the rate of entry into university is among the lowest in the OECD (see table AI-1 above).

The relative disadvantages of this situation became clear with the crisis of the 1980s, when unemployment among young people rose to an average of over 20%, reaching over 50% in some areas. In view of this, the authorities adopted various measures in the fields of education and training.

### a) *Training and Incorporation of Young People in the Labour Force*

Efforts have been focussed on training after the completion of regular schooling, in order to facilitate the incorporation of young people into the labour force. Various programmes have been established for this purpose, financed by the Manpower Services Commission,

## Box AI-4

## COLLABORATION BETWEEN BUSINESSES AND THE PUBLIC SCHOOL SYSTEM IN THE UNITED STATES

During the 1980s various kind of partnerships were established between cooperations and public schools in the United States at virtually all level of education.

Adopt-a-School, one of the most popular of those arrangements, brings businesses into partnership with particular schools through donations in money or in kind, the participation of the staff of a company in tutoring or monitoring, visits of students to plants and other production facilities and similar activities. Some countries have also devised their own incentive schemes. The Kroger chain of supermarkets has established a scholarship fund for the most outstanding students in a school in an impoverished Cincinnati neighbourhood, for whom up to US\$1,000 a year is placed in a personal account which they can use later on to finance their post-secondary studies.

The United States business sector has also participated in activities which are broader in scope. The prototype of such participation was the establishment of the "Compacts", which link a certain number of firms in a city up with the municipal educational authorities; although this system operates differently in different programmes, the model usually provides for the joint definition of a plan for reform, including changes in school curriculum to facilitate the entry of graduates into the labour market later on, the incorporation of ideas of efficiency in school administration and in some cases a commitment on the part of the businesses to hire some of the graduates of the reformed system. This kind of collaboration has met with relative success when it has been associated with an overall strategy to improve the educational system. For example, the local authorities in Pittsburgh, Miami and Memphis have managed to marshal corporate support, which is both significant and lasting by making businesses responsible for a specific contribution to an

overall project to renovate municipal public education. In the case of Cincinnati, the executive officers of the corporations involved have actually spearheaded the renovation effort, providing it with substantial support in terms of financing and staffing. In all these cities, a local tradition of participation by the business community or, in the absence of such a tradition, the creation of local joint action bodies has been a favourable factor.

Another structural long-term programme is the system of academies established and managed by American Express. The programme was initiated in 1982 when the first Academy of Finance was established in a New York secondary school. This was a two-year programme which combined traditional secondary education with specialized academic training for employment in financial services and offered summer internships in a local branch. The curriculum was devised by experts in education working in conjunction with companies in the financial sector, and special training was provided for the teaching staff of the participating school. The success of the programme facilitated its rapid expansion to other cities and in other sectors. There are now 62 academies with a total of 3,300 students training in the fields of finance, tourism, public services and the manufacturing sciences.

Finally, 50 Chicago corporations have joined together to create the Corporate/Community School of America (C/CSA), which opened in 1988 with funding of over US\$3 million in donations. Its aim is to provide children from one of the poorest Chicago neighbourhoods with quality education at a cost equal to what is spent by the public schools. The project is based on an active preschool programme, parental involvement and the use of corporate models of efficiency in financial management.

which is a Central Government body. These programmes are aimed at all young people between 16 and 18 who are not attending school and are not employed. Although the financing is centralized, the execution of the programmes is decentralized, being delegated to technical schools, companies, trade associations, etc. The only requirement for obtaining financing from the Commission is that the programme must give priority

to on-the-job training and must be supplemented with theoretical training in an educational establishment.

During the 1980s, the programmes were expanded until they covered a quarter of all young people between 16 and 17. The main programme, the Youth Training Scheme (YTS), covered one-third of all young people aged 16 in 1985 (see box AI-5).

## Box A1-5

## THE YOUTH TRAINING SCHEME

In response to the growing number of unemployed secondary-school graduates, the Manpower Services Commission in the United Kingdom established the Youth Training Scheme (YTS) in 1983 to facilitate the transition of these graduates to the working world. YTS offers one-year training programmes, emphasizing on-the-job training but including a brief period of study in an educational institution (usually a technical school). Young people receive a modest training allowance that is substantially below the minimum wage. The programme's coverage has spread rapidly and now trains some 400,000 persons each year, or approximately 60% of those 16-year-olds who are not enrolled in the formal school system.

The main feature of YTS is its decentralization. The training programmes themselves have a

number of different sponsors (among them firms, trade union associations, local groups and non-governmental organizations). Participants in the programme are mostly small businesses, two thirds of them from the services sector (especially hotels and restaurants) and slightly less than one fourth from the industrial sector.

About half of the youth who participate in YTS leave school before completing their training, but the other half go on to find steady jobs. One third of those who find jobs do so in the same firm in which they did their on-the-job training.

The programmes are funded centrally by the Manpower Services Commission, and half the cost is represented by the training allowance. Since 1987, the employers involved have paid a third of the cost of these scholarships.

The establishment of these programmes marks an important change in the structure of technical training in the United Kingdom.

Before the crisis which affected the traditional branches of industry, the system of apprenticeship was the main means of training, accounting for 15% of the age groups in question. Apprentices enjoyed a certain social prestige because of a selective entry process, a high degree of trade union protection (the wages of apprentices were indexed according to the scale of industrial wages, and entry quotas were controlled by the unions), and the prospect of stable and relatively well paid employment.

The contraction in industrial employment and the profound trade union crisis of the 1980s led to the virtual disappearance of this system of training.<sup>17</sup> In its place, and in order to tackle the acute problem of youth unemployment, the authorities decided to introduce public training programmes. The changes in the sources of financing was also radical: the apprenticeship system had been financed

by a tax on enterprises of up to 2.5% of the payroll, while 95% of the financing for the Youth Training System comes from fiscal funds. At the same time, coverage was more than doubled and there was a marked change in the type of companies associated with the system. The apprenticeship system had involved mainly large and medium-sizes industrial firms, but the companies taking part in the Youth Training System are mostly small services firms.

This state of affairs reflects to some extent the ambivalence of the relations between education and business in the United Kingdom. British companies, like those in the United States, have been becoming more aware of the importance of human resources for their competitiveness and have begun to participate in the preparation and financing of general education projects, but the process is still on a small scale (30 partnerships of this type have been announced by mid-1988).<sup>18</sup>

At the same time, British business has reduced its financial participation in

17 Jean Pierre Jallade, "La formation professionnelle à l'étranger. Quels enseignements pour la France?", *Ecole de la deuxième chance, deuxième chance de l'école. Former des professionnels pour le 21ème siècle*, Commissariat Général du Plan, Paris, la Documentation Française, 1988.

18 William E. Nothdurft, *Schoolworks: Reinventing Public Schools to Create the Workforce of the Future*, Washington, D.C., The Brookings Institution, 1989.

training proper. The efforts of the authorities to persuade a larger number of companies, especially the big ones, to participate in the running and financing of the Youth Training Scheme and other projects have not been successful; consequently, in 1990 the Government set up the Training and Enterprise Councils, whose purpose is to reorganize and semi-privatize the existing training programmes and mobilize private financing against a background of diminishing public funding.

These Councils are designed to bring together business leaders and public authorities for the planning and running of technical training programmes, but the decision-making capacity is given to the companies. Participation by companies is on a voluntary basis, while the public financing received is earmarked essentially for the Youth Training Scheme.

So far, formal participation by companies in these Councils has been limited, and their financial participation almost nil. Most businessmen are reluctant to collaborate in the financing of the Youth Training Scheme, which they claim has essentially social aims, as reflected in its large scale and the importance given to general training.<sup>19</sup>

What really is the purpose of programmes like the Youth Training Scheme? Its initial purpose was to facilitate the entry of young people into the labour force. It is calculated that on average, a quarter of the young people registered in this type of programme find work, one-third of them in the companies where they received their training. The remaining 75%, however, complete the programme without finding work and without having increased their formal qualifications.

The persistence of high unemployment among young people, together with a relative shortage of qualified technicians, is leading to the redefinition of the Youth Training Scheme in order to

convert it into a formal training system which awards diplomas on completion of its courses.

#### *b) Academic training and employment*

The warm welcome given to the Youth Training Scheme (leaving aside the criticisms made by businessmen and the debate which arose over these criticisms) revealed the existence of heavy demand for post-secondary education and showed up shortcomings in the training young people receive in school. It was considerations of this type which led to the adoption of the 1988 school reform Act, which has two main purposes.

The first is to change the content of education with the aim of increasing the relative weight of branches connected with working life. An example of this is the experimental Technical and Vocational Education Initiative financed by the Manpower Services Commission with the aim of furthering the redefinition of the curriculum for young people between 14 and 17 by offering a four-year course more adapted to local employment potential and favouring the development of more positive attitudes to industry. The Initiative is carried out on a decentralized basis: the Commission finances the extra expenditure on teaching material and the salaries of teachers, while the local authorities are responsible for the execution of the project. This programme, which was initially of limited coverage, has spread rapidly and should cover the whole of the school system in 1992.<sup>20</sup>

In higher education, it was decided to favour the polytechnic institutes, which are considered to offer a more flexible and cheaper solution than the universities. Most polytechnics offer a wide variety of courses, from three-year courses for school-leavers to part-time courses for adults, often given in collaboration with local companies. In spite of the increase in the number of partnerships between

19 "The training trap", *The Economist*, 21 April 1990; "Still stuck over training", *The Economist*, 5 January 1991.

20 W. Nothdurft, *Schoolworks: Reinventing Public...*, op. cit.

companies and educational institutes, however, the financing of higher education continues to depend mainly on fiscal contributions, since, unlike United States companies, British firms do not have a tradition of financing universities. However, the pressure exerted by the Government on the universities to rationalize their activities, which has led to sharp reactions in academic circles, and the slashing cuts in public financing for these institutions have obliged them to seek more private financing for their activities.<sup>21</sup>

### c) Centralization and decentralization

The second objective of the 1988 reform was to change the institutional system of British education. Traditionally highly decentralized, in recent years the system has been affected by contradictory trends which are pushing it simultaneously towards greater central control and greater autonomy of school establishments. In this context, the 1988 Act sought to reduce the power of the local authorities (regions and municipalities) and increase that of parents (who are now represented on the boards of management of primary and secondary schools), business (whose representatives are on the management councils of the universities), and school establishments in general.

It has even been proposed to limit the role of the local authorities to the allocation of financial resources on the basis of centrally defined explicit rules (for example, number of students per establishment, age of students, size of schools and economic and social differences), which would considerably enhance the powers of school headmasters. The rules in question, which have already begun to be put into practice, will cover all primary and secondary schools with more than 200 students.

There have been a number of objections to this measure, such as the criticisms that it is being applied too quickly, especially in view of the limited administrative capacity of headmasters, who have not been trained to carry out these functions; that it uses excessively rigid financial formulas; and that the schools do not yet have sufficient autonomy, since for example they cannot hire or fire their staff and still less change salaries fixed by collective negotiation. For the time being, consequently, it is hard to know what the effective field of application of this measure will be.<sup>22</sup>

Other initiatives are aimed at increasing the overall coherence of the system. An important example of this concerns the certification of technical training qualifications. The present system of certification, which is highly decentralized, is carried out through various independent bodies which, it is claimed, often act in an uncoordinated manner, so that there is a high degree of heterogeneity in British technical training qualifications. The lack of transparency of the system of certification is a source of confusion for students as far as the organization of courses and the possibilities of transfer from one speciality to another are concerned. In response to this situation, in 1986 the authorities set up the National Council for Vocational Qualification in order to establish a coherent global system. So far, however, this Council has been criticized for its slowness, and this has given rise to growing demands for greater intervention by the central authorities in these matters.<sup>23</sup>

The 1988 reform Act also provided for the introduction of a national curriculum with 10 branches considered to be of fundamental importance and the establishment of a national system of achievement tests, to be applied at the ages of 7, 11, 14 and 16 years of age. The

21 "Pots versus Plato", *The Economist*, 6 July 1991.

22 "But what will they learn?", *The Economist*, 9 April 1988; "Wanted: A head for figures", *The Economist*, 25 November 1989; "Trying harder", *The Economist*, 28 July 1990.

23 J.P. Jallade, "La formation professionnelle...", *op. cit.*

postponed, however, because of the growing opposition from local authorities and from those who criticize the potential difficulties of their implementation and the high costs involved.<sup>24</sup>

### 3. The debate in Japan

Most of those who have studied the matter would assuredly place Japan at the other extreme from the United States, as an example of economic success based on high investments in human resources. Nevertheless, the educational systems of the two countries show many similarities. As in the case of the United States, Japanese education has evolved continually since the 1970s towards the reduction of the differences between the various branches of compulsory education and towards the expansion of its coverage to almost the whole of the corresponding age group. The methods used to achieve this have been similar to those employed in other countries: growing uniformity of curricula, automatic promotion from one grade to the next, and gradual reduction both of the number and the specialities of technical and professional training establishments. Beyond these formal similarities, however, there are profound differences between the two systems.

#### a) Companies as training agents

Unlike the United States, for a number of decades there has been a clear division of responsibilities between the educational authorities and business firms in Japan.

The public school system is responsible for providing all students with a general training which varies little from one school to another; the companies are responsible for providing technical training to the persons they hire. Internal training activities have therefore been extensively developed within the companies. Although a relatively high

proportion of young people (almost half the corresponding age groups) enter the labour market on completion of their secondary education, this does not mean that their education stops there. On the contrary, they usually receive quite intensive complementary training in the companies where they work, initially through direct practice and job rotation. Japanese firms use these collective learning procedures more than theoretical classes for training their employees.<sup>25</sup>

In recent years, however, with the increased requirements for formal knowledge, a number of firms have established programmes to provide such knowledge, while others have financed educational programmes for their staff in Japanese or foreign universities.

It is well known that the intensive educational activity of Japanese firms corresponds to their particular form of organizing labour and social relations within the firm. Thus, the practice of lifetime employment ensures that the company will enjoy the benefits of the expenditure it incurs in training its staff, and the performance of staff members on these programmes may help them to earn promotion. In these circumstances, it will be understood that flexibility and capacity to learn are considered more valuable than specific aptitudes at the beginning of a career, and there is relatively little connection between the possession of specialized diplomas and higher income levels. The smaller differences in income according to initial educational levels are reflected in less specialization in production and less rigidity in employment structures.

The high level of development attained by training activities in companies does not mean that there are not other forms of post-secondary education, however. Unlike the United States, such forms of education are almost entirely private, especially the universities (over 80% of which are private), which

24 "But what will they learn?", *The Economist*, op. cit.; "Major scholarship", *The Economist*, 6 July 1991.

25 J.P. Jallade, "La formation professionnelle...", op. cit.

receive two-thirds of all post-secondary students.

Because the number of graduates of secondary education has increased without there being a parallel rise in the number of university places, this has intensified both the selectivity of the entrance examinations and the demand for other types of training. There has therefore been a big increase in the number of institutes, also private, which provide short professional training courses (one to two years); these institutes absorbed 3% of total post-secondary enrolment in 1976, but over 13% in 1983. Most of them are connected with some business firm, and the quality of the training provided is variable.

The remainder of the post-secondary enrolment is accounted for by colleges which offer two-year courses. They have not received much acceptance on the labour market, and their students are mostly women.<sup>26</sup>

#### *b) Uniformity and selectivity of school systems*

Another difference between the school systems in Japan and in the United States is that in Japan institutional uniformity has been accompanied by uniformity and centralization of curriculum; in general, elective subjects are relatively rare in Japanese education. Also, instead of teaching methods based on the individual which are favoured in the United States, the Japanese system prefers methods which concentrate on group behaviour and are aimed at

transmitting attitudes such as the value of consensus, team spirit, a sense of responsibility and respect towards higher-ups.<sup>27</sup> It has frequently been argued that it is the "hidden curriculum" in the Japanese system (the system of values transmitted coherently to the society surrounding it) which constitutes the decisive factor in forming those components which are of value within the framework of the new approach to the organization of production patterns.

The lack of differentiation in content does not stand in the way of a high degree of differentiation in the quality of educational establishments, even from the first years of compulsory education. The absence of a national evaluation examination makes it easier for schools to use different criteria for selecting students. Because greater selectivity was needed in the case of university entrance, a second examination was established. The first examination measures the academic level and the second (which is in fact the decisive examination) is based so much on chance that it resembles a lottery for places in the universities.<sup>28</sup>

This selection system gives rise to two problems, the first of which is related to equality of opportunity. Some social groups are better prepared to do well in the university entrance exam by virtue of factors such as their parents' level of instruction and the level of household income. Such inequality of opportunity was increased in the 1980s by the notable growth of private services engaged in preparing young people for the examination, which give students from

<sup>26</sup> Ibid.

<sup>27</sup> In her article entitled "Turning out Japanese: back to school in Yokohama", published in the *Washington Post* on 9 September 1990, Deborah Fallows describes the procedure followed in dividing a class of 41 children into equal units in preparation for an outing. "The first step was easy: the kids simply split up voluntarily into clusters. But one group ended up with four kids and another with seven. Just move one student over, right? No. The students and their teacher all felt that it would be unkind to single out one child to move by himself; they felt it would be smoother to move two together. Then they agreed that not only the movers have to agree but each child in the four-member group would have to approve each of the pair being moved to join them. For three days, during hour-long meetings, the class, under the watchful but unintrusive eye of the teacher, bartered back and forth."

<sup>28</sup> Earl H. Kinmonth, "Engineering education and its rewards in the U.S. and Japan", *Comparative Education Review*, vol. 30, No. 3, August 1986.

well-off families advantages over other candidates and even make it possible for them to repeat the final year of secondary education in preparation for the examination. Inequality between the sexes is also notable. In addition to the fact that girls with access to post-secondary education represent a smaller proportion of their age group than do boys (see table AI-1), they usually tend to be concentrated in short courses of study, which are not in high demand.

The second problem is the impact which the final examination has on the content of previous studies. It has been pointed out, for example, that the use of this kind of standard examination puts greater emphasis on the quantifiable aspects of knowledge to the detriment of other elements and that this tends to diminish the importance of creative ability, independence and diversity, all of which are necessary for the generation of technological innovation.

In addition, the fact that this examination is used as a virtually universal point of reference establishes a uniform model which does not meet the aspirations of certain groups of young people, with the result that they are relegated to the fringes of society. Their frustration with the rigidity of the system may be expressed in explosions of violence which have now become a matter of serious concern to the Japanese authorities.

That concern was reflected in some measures adopted in 1988 and 1989 under the third Japanese educational reform.<sup>29</sup> The priority objectives of that reform were to build structures which paid greater heed to individuality and to promote independence, critical judgement and a sense of individual responsibility. The curriculum has been made even more flexible, allowing greater room for individual choice; a new subject point system has been gradually introduced in the examinations given during the second cycle in secondary school, and an effort is

being made to improve the system for selecting candidates for university.

The measures for dealing with the problem of equality were less ambitious, being limited to the establishment of national education centres and the use of public schools as adult education centres.

Finally, in order to offset whatever negative effect the lowering of the quality of the education acquired in schools, by comparison with other sources of training, such as television, may have had, it was decided to promote the establishment of parents' associations and to support non-governmental organizations whose functions relate to on-going education and the transmission of values.

#### 4. The debate in Sweden

Another example of a uniform, centralized and wide-scale school system may be found in Sweden. Swedish young people are virtually all incorporated in the nine years of compulsory education provided under a system in which there is no differentiation.

However, the Swedish model is best known for the constant effort made by the school authorities to eliminate educational and other forms of inequality among social groups. The methods used to achieve this end have been reflected in some degree of relaxation of traditional standards within the school system in order not to leave any group of children outside. For example, marks are not given during the first seven years of school; promotion from one grade to another is automatic, and at the end of the compulsory education period, a certificate is automatically awarded on which the marks obtained while attending school are noted.

At the same time, curricula are highly uniform. Only in the final two years of compulsory education are some elective studies introduced (a second foreign language, for example), which are chosen by the local authorities.

<sup>29</sup> I. Suzuki, "La reforma educativa en el Japón con miras al siglo XXI", *Perspectivas*, vol. XX, No. 1, 1990, pp. 21-28.

Another original feature of the Swedish educational policy is the explicit establishment of an education/job training continuum which allows curricula to be constantly adapted to the realities of the job market. The accommodation made to working life as an explicit component of school curricula in Sweden from the earliest age makes it possible to avoid abstraction and to narrow the distance traditionally maintained between education and the world of production. Efforts to bring general culture closer to technical culture using general training programmes which are less theoretical than in other countries and technical/vocational training programmes which are less narrow or specialized are aimed at the dual goal of increased social equity combined with greater economic utility.

The two most lively topics of the educational debate in Sweden are the strengthening of the two traditional pillars of the country's educational policy – an equitable school system and the relationship between it and the production system.

#### *a) The unending search for equality*

The education policies applied by successive governments have produced considerable homogeneity in the distribution of opportunities to education. For example, the proportion of children of workers who attend school until they are 17 or 18 years old is the highest in all the OECD countries. Even so, the school performance of children is still affected by the socio-economic level of the households from which they come.

The impact had by differences in social level is particularly apparent at the two ends of the period of schooling. On the one hand, the proportion of children who are not successfully incorporated into primary school has not declined for the past 10 years. There seems to be an irreducible core of between 10% and 15% of the population who are excluded from

the educational system. At the other extreme, access to higher education is determined by a highly competitive examination (barely 30% of the appropriate age group gains access to university education). Entrance into university depends strongly on the social stratum to which a student belongs and, in the last analysis, on the kind of post-secondary training received, students with a long period of general training, who usually come from the wealthier classes, being favoured; in other words, the establishment of a highly uniform school system has not succeeded in completely eliminating the effect had by social factors relating to the origin of students.<sup>30</sup>

This has not deterred the authorities from seeking to establish greater social equity and has in fact helped to diversify the methods used to achieve it. In recent years preference has been given to individual treatment for those excluded from the system by means of a network of programmes in support of children and adolescents unable to enter the school system. Special programmes have also been established for adolescents who drop out of or leave the system without having acquired the skills they need to gain employment. The most original feature of these programmes lies in their marked contrast with the sameness of traditional assistance programmes operated by the Swedish Government. For example, under the general rule that municipalities must help young people with no post-compulsory-school education to find appropriate education and work opportunities for them (the so-called "youth guarantee"), different types of programmes have been organized for the purpose of developing the basic aptitudes and increasing the self-esteem of school drop-outs. Young people participate in these programmes, which are highly individualized, on a voluntary basis, and it seems that they have succeeded in reducing the proportion of the general population which has been left behind by

30 J. P. Jallade, "La formation professionnelle...", *op. cit.*

the school system, although at a relatively high cost.<sup>31</sup>

*b) Strengthening the links between academic training and employment*

In a context of accelerated technological change and slower growth of employment, the Swedish authorities have chosen to strengthen the links between the school system and business. To this end, short post-secondary school courses of study have been established, which serve as a bridge to university or labour market. Although they are not compulsory, these courses of study are attended by nearly everybody.

Post-secondary courses of study differ as to content and duration. The three main types include i) four years of general training, ii) two years of general training and iii) two years of technical/vocational training. These three types of cycle usually coexist within a single multidisciplinary establishment. About 50% of the students at this level are enrolled in technical/vocational programmes, which have shown the greatest growth in recent years. The authorities are even considering a reform to establish a uniform three-year cycle for all types of post-secondary training.<sup>32</sup>

The education/job training continuum is also supported by a busy employment service, which operates as an intermediary, filling 75% of the job openings in the country and meeting the placement needs of 80% of the unemployed, thereby considerably facilitating the transition between school and work.

The functions of the national Training Service are to package training programmes and sell them to public and private employers; it also manages some 100 training centres throughout the country, which provide training for about

80,000 individuals a year. The training provided by these agencies is usually delivered in modular form, which makes it easy to tailor it to individual requirements. Roughly 20% of the curriculum relates to basic remedial education.

Following a trend to bring schools and businesses even closer together, in 1987 the Swedish authorities introduced training modules into enterprises under all of the aforementioned short cycles of post-compulsory training. Formal education was reorganized into a core curriculum (Swedish, English, mathematics and specialized training), which is supplemented by practical training in firms, to which a maximum of 10% to 20% of student's time in the first and second years (8 to 16 weeks a year) was devoted, this proportion reaching 60% (three days a week) in the third year. Each student organizes his own practical training with a vocational counsellor, who works in cooperation with a local vocational committee composed of representatives of businesses, trade unions and civil associations. This system has led to an increasing number of agreements between schools and businesses concerning the exchange of educational services (see box AI-6).

Although this is a policy with ambitious objectives, the tendency has been to execute it slowly and carefully. Changes are adopted only after patient experimentation and rigorous evaluation of the results obtained before eventually applying them nationwide. Instead of radical reforms every decade, the Swedish authorities have opted for gradual incremental adjustments designed by or in conjunction with the participants (in particular those who are masters in their field) and constantly assessed and redesigned to ensure that they are appropriate to the goals pursued.<sup>33</sup>

31 William Nothdurft, *Schoolworks: Reinventing Public ...*, op. cit.

32 Ibid.

33 Ibid.

## Box AI-6

## SKF'S INDUSTRIAL SCHOOL

The enterprise SKF runs a secondary-level industrial school in its main plant in Gothenburg, Sweden, for students preparing for a career in industrial engineering. The curriculum combines a series of basic subjects (languages, mathematics, etc.) with theoretical and practical courses in engineering and automation. Classes are conducted by a teacher (paid by the Gothenburg Education Department) and two instructors per class (paid by SKF). The school's annual budget is 7 million Swedish kronor, with the Government providing 1.5 million and SKF the rest.

During the first year, the students spend most of their time in the classroom and in specially equipped laboratories at SKF headquarters. Beginning with the second year, the time spent gaining practical experience increases gradually. Students receive a wage during the second and third years.

Some 96% of the students from this school go to work for SKF when they graduate. The firm also uses the school for the ongoing training and education of its own employees.

### 5. The debate in Germany

The German school system is famous for its dual training structure under which the majority of young people in Germany are trained. The system has been praised and imitated by other countries and it is frequently associated with the success achieved by German industry, with the country's highly skilled labour force and with rates of unemployment of young people which are among the lowest in Europe. In recent years, however, it has been subject to criticism, and proposals have been made for its partial reform.

#### a) *Concerted training*

The German school system combines total coverage of the country's adolescents with a high degree of concentration (79% of German young people) in technical and vocational training. The system is characterized by its ability to draw an early distinction between those entering the types of training offered—at the end of the primary school cycle (at 10 years of age). The majority of the students are cycled into technical training with only a few steered into the academic stream. The two types of training are clearly differentiated in terms of their objectives and the methods used.

After receiving general secondary training in special schools for that purpose, students who have opted for technical training enter a company as apprentices for a period of three years. During that time they receive practical training in the company (four days a week) and theoretical training in vocational schools financed and managed by the regions (one day a week). Apprentices are paid in an amount negotiated collectively within each sector, which is the equivalent of 20% to 40% of the wages they may expect to receive when their period of training is over. At the end of the training period and after taking a theoretical and practical examination, apprentices receive a diploma which is recognized throughout the country.<sup>34</sup>

What is under discussion here is a massive technical training system, which is independent of the academic training system and characterized by marked internal diversification and hierarchization. Among its various points of interest, attention should be drawn to the active and predominant participation in it by enterprises. Close to 50% of the country's small and medium-sized enterprises and 20% of its large enterprises receive one or two apprentices every year. In this way enterprises bear the majority

34 J.P. Jallade, "La formation professionnelle...", op. cit.; William Nothdurft, *Schoolworks: Reinventing Public...*, op. cit., Antoine Schwartz, *The Dual Vocational Training System in the Federal Republic of Germany*, World Bank Discussion Paper, No. 36, Education and Training series, July 1986.

(although not all) of the costs to the system. They undertake to pay the wages of the apprentices, the teachers and the instructors assigned to them and to cover the costs of the teaching materials and additional specialized courses used. Large enterprises usually provide the equipment needed to operate the regional schools.

The contribution made by German business was estimated at DM25 billion in 1985, or 3% of the wage bill. Almost half that amount corresponds to the wages of apprentices and another 40% to the wages paid to instructors employed by the firms.

Participation by enterprises is voluntary and usually depends on their staff-training needs. However, the majority of the participating companies receive 10% to 20% more apprentices than their final hiring plans allow for, but this creates no excess staffing problems since apprentices usually find jobs easily in other non-participating enterprises in the sector concerned. Actually, one of the most frequently cited advantages of this system is that under it labour supply and labour demand are in better balance than they are under more rigid schemes which have a long history of sectoral maladjustment problems.

The volume of financial support provided by enterprises (in spite of the strong likelihood that they will lose trained staff, especially in the case of small and medium-sized firms) gives them the final say in the management of the training system. This does not mean that they can manipulate it as they wish because the second original feature of the system is concerted quadripartite action by the Federal Government, the regional authorities, trade unions and management. This concerted action is highly formalized and is based at the Bundesinstitut für Berufsbildung (BIBB), an independent body responsible for selecting and changing the content of the diplomas awarded. Because of the amount of financing they provide, enterprises wield all the power in determining the number of places available, the content and duration of the training offered and

the way in which students are selected and examinations organized. The public sector tries to make up for any differences between enterprises and to guarantee uniformity of skills among those coming out of the system by taking responsibility for the theoretical training (although some of the instructors delivering this training come from the enterprises involved).

The chief requirements for the smooth operation of the system are that its participants agree on its final objective and that agreements on its modes of application are negotiated periodically. Although the system as a whole has frequently been criticized, especially by trade unions, the pivotal role played by enterprises (rather than by the Government) has not been questioned, as it has in other countries. The consensus reached in this respect is based on a social philosophy whereby responsibility for the training of young people falls basically on management. Moreover, in practice the participation of enterprises in the training process increases the usefulness of the skills acquired, and this is reflected later on in the kind of jobs acquired and the income earned.

In practice, the efficiency of the system depends on solid contractual relations, on which the prestige of the training programmes is based; and the independence of BIBB, whose decisions, which are reached by consensus among the four parties involved, have the force of law, so that the competence of an institution to provide vocational training is legally recognized.

Another distinctive characteristic of the system is that it gives students an opportunity to continue their education after exercising their vocation for three years so they can be certified as having mastered it. Although education under the general system is long and selective, it is the main route to the university. Some technical training cycles, which are also relatively long, extend as far as the higher-education level, and there are a certain number of linkages which make it possible for apprentices to be

reincorporated into the formal education system later on.

Because of the relative success of the existing system, it could be foreseen that the question of education would not be debated as intensively in Germany as in the other European countries. However, although its basic principles are not in doubt, recent economic and social events have revealed some limitations in the system, which present new challenges and give rise to criticism and demands for reform.

#### b) *Specialization and flexibility*

The fact that the training provided under the system may be over-specialized and therefore difficult to adapt rapidly to accelerated technological change is worrying. In this connection, the choice between a multidisciplinary approach and specialized training is a difficult one to make. The care taken to ensure a multiskilled labour force tends to do away with the idea of a trade and leads to a loss of accumulated experience.

Rapid technological change also reveals the rigidity of the system as an institution. The full training cycle leading from apprentice to worker to master usually takes 10 years, and this tends to give rise to rigid specialization and to reduce the lateral mobility of labour. The idea of shortening the training period is opposed both by labour organizations, which defend the position of workers and by entrepreneurs, who do not want to finance training which is too patchy and less viable for them. Thus, the system tends to produce workers who are skilled but lack flexibility.

The movement away from specialization which began in the past decade within the framework of BIBB has

been tremendously slow to develop. After 10 years of negotiations, it proved possible to reduce the number of metallurgical trades from 42 to 6, with 16 specializations. In the electricity sector, it took five years to bring the number of trades down from 12 to four, with eight specializations.<sup>35</sup>

Another problem is related to the stricter demands placed on theoretical training and training in the management of machinery to ensure that they keep pace with technical advances. The trade unions and federal authorities agreed to recommend that theoretical training should be extended from one to two days a week—an idea which was opposed by the entrepreneurs since its implementation would raise their costs enormously. As a negotiated solution, it was decided to add one year of preparation in the Berufsschulen (secondary schools preparing students for apprenticeships). The number of places in the vocational training programmes financed by the State were also increased. Even so, an increasing number of firms are conducting part of their training programmes separately from their production activities in order to lower the cost which the training process might impose by immobilizing and damaging their increasingly sophisticated and expensive machinery.<sup>36</sup> The largest enterprises have therefore begun to set up specialized training centres on their own premises but apart from their production plant. Small businesses have adopted forms of cooperative training, such as inter-business centres managed and financed by trade organizations with some additional fiscal support.<sup>37</sup>

Finally, attention should be drawn to the problem of the diminishing quality of the training evinced by students graduating from Berufsschulen; in addition to the reasons already referred to in connection with the

35 J.P. Jallade, *“La formation professionnelle...”* op. cit.

36 The cost of in-house training (taking account of the net contribution made by an apprentice to production and of capital depreciation) has been estimated at US\$5,000 a year per student, ranging from a minimum of US\$2,000 (hairdressing) to a maximum of US\$12,500 (electronics). The cost decreases significantly between the first and the last year of the training periods. These costs benefit from a number of tax deductions. Schwartz, op. cit.

37 A. Schwartz, *The Dual Vocational...*, op. cit.

United States, which are related to the system of universal education, differentiated school systems, such as the German system, ran up against the problem that higher social value is placed on general education with the result that the best students prefer it. Consequently, students in the dual system have lower expectations and experience some feeling of failure, and for that reason the period of secondary preparation for the dual system plays a restorative role in the end although that was not its initial purpose. The aforementioned decision of adding a year to the training provided by the Berufsschulen provides a partial solution to this problem. The German Ministry of Labour has, for its part, begun to organize programmes with a specific reinforcement role. Owing to deficiencies in their basic training, however, graduates of Berufsschulen have increasingly been displaced in dual vocational training programmes by youngsters with a general

education background.<sup>38</sup> There is therefore the possibility that schools in which different streams of education are introduced early on, as happens in the Berufsschulen, may be turned into training institutes lacking in prestige and low in productivity, similar to those which have emerged in other European countries, including France and the Netherlands (see Box AI-7).

### c) *Specialization and social equity*

The dual training system has also been accused of undermining social equity by putting students on different educational tracks when they are too young and by using unfair criteria in selecting students. The graduates of the dual system have different social status. The enterprises involved decide on the size of their own training programmes with the result that enterprises may differ significantly with regard both to the financing they receive

#### Box AI-7

#### ONE SCHOOL FOR ALL OR DIFFERENT SCHOOLS ACCORDING TO TALENT: THE DEBATE IN THE NETHERLANDS

In the Netherlands' educational system students are separated early on (after seven years of the same basic education for all) into a strictly academic option and several others in which technical subjects occupy more or less of the curriculum. Enrolment in these last-mentioned types of schools has increased notably, from 9% to 20% of total enrolment between 1975 and 1985. However, several factors have prevented this movement from being structured into coherent and coordinated educational sequences (first secondary-level programme, second secondary-level programme, upper level) in the technical field. The main factor is related to the criteria for selecting technical education, in so far as those students who usually do so are those whose basic educational deficiencies prevent them from going on to take traditional academic courses. That is also confirmed by the presence of remedial programmes for individuals in most of the technical schools, designed to support students with serious learning disabilities, most of whom

are from immigrant families. For that reason, the basic curriculum of technical secondary education has become more of a special education course. Most (80%) of those who finish the second level of technical school enter directly into the labour market, while more than half of those who enter the upper level technical programme come from general secondary schools.

In this context, an animated debate has gone on for decades about the desirability of establishing one school for all students. Several reports by experts have been published recommending an extension of common (undifferentiated) education to a more advanced age, for example 15. However, the rather negative results of the first experiments along these lines in the 1970s, along with concern about an increase in the number of drop-outs and loss of motivation that such a measure could mean for lower-income groups and foreigners, have caused the adoption of this reform to be postponed.

38 In 1983, 10% of the young people recruited as apprentices had a post-secondary diploma (see A. Schwartz, op. cit.)

and to the quality of the training they provide. In addition to such differences, there are certain problems relating to supervision, which, is in theory the responsibility of trade organizations. They supervise with varying degrees of severity, depending on the sector and region concerned.<sup>39</sup> The existence of long vocational training cycles, open to graduates regardless of the enterprise in which they were trained, makes up for these differences to some extent. Moreover, in order to equalize the financial burden among enterprises, the establishment of a vocational training fund financed through a corporate tax has been proposed. This proposal, which is endorsed by the trade unions, has become a subject of sharp dispute among enterprises, and the federal authorities have yet to take a decision with regard to it.

Another problem concerns the selection and evaluation criteria used by enterprises. Since these criteria are not strictly academic, some children whose school performance is low can be evaluated at a higher level. However, the criteria have been subject to increasing criticism because they are based on performance over a very short span of time and do not take the impact of demographic or social changes into account. For example, women and ethnic minorities, whose share in the labour market is increasing, are still kept on the margins of the dual system, relatively speaking, or are concentrated in training programmes for low prestige jobs. Access of foreign residents in Germany (nearly 10% of the population of the Western states) to the dual system is a matter of particular interest since these groups are educated in their national language and are therefore unable to apply for the majority of the apprentice vacancies after graduation. The large majority of foreigners are steered towards dual training courses for services, which offer lower income and prestige.

Even so, the federal authorities are still refusing to effect radical changes in the system such as, for example, by initiating a centralized entrance examination or establishing stiff requirements which might replace the examinations organized by the enterprises themselves. They allege that the present selection process, although imperfect, is more varied and pluralist and much more flexible than selection made strictly on the basis of the academic criteria applied to the rest of the German school system. In practice, however, as juvenile unemployment and the initial academic training requirements of the candidates increase, enterprises are attaching growing importance to the criteria traditionally applied in the evaluation of academic performance.

In order to cope with the specific social problem of the increase in juvenile unemployment and the drop in the demand for unskilled labour, it was agreed to raise the number of vacancies in the dual system above the goals explicitly agreed to by the enterprises and to effect a simultaneous increase in government financing of the system. The inclusion of this measure, which serves a social, rather than a strictly economic, purpose in the dual system was criticized since it tends to lower the quality of the training provided and the prestige of the diploma awarded. However, it would seem that its adoption has reduced the social pressures encountered, perhaps more efficiently than the system applied in, for example, the United Kingdom, has been able to do.

## 6. The debate in France

---

The French school system is characterized by broad diversification of the kinds of education offered in combination with rigid hierarchization and management which is all but exclusively under the control of the central authorities. For over a decade the system has experienced reforms, whose aims are often opposed, owing to growing dissatisfaction with its results.

---

39 A Schwartz, *op. cit.*

### a) *Diplomas and social equity*

The aim of nearly all the reforms has been to increase the coverage and, to some extent, the uniformity of the system. French education has traditionally been characterized by the stratification of its content and the institutions involved, resulting in tremendous selectivity.

Secondary education is divided into three general streams (academic, technical and vocational), each of which is in turn divided into so many specialties that in 1990 close to 80 different types of secondary diploma were awarded.<sup>40</sup>

This degree of diversification has turned France into a land where the diploma reigns and there is a strong and relatively rigid relationship between the kind of diploma an individual holds, the skills with which he is endowed, his job and his income.<sup>41</sup> As opposed to the German system, however, in France the central authorities are almost wholly responsible for structuring the system, with other economic agents playing little part in it.<sup>42</sup>

The resulting structure, which is often justified on grounds of social equity and objectivity, has been criticized for its rigidity and unequitable social impact. As mentioned in the section on the debate in Germany, accelerated technological change prevents the establishment of a close relationship between the diplomas awarded and the skills of their holders and also means that non-cognitive elements are valued more highly by enterprises. The role played by the French authorities as the sole agents in the creation or adaptation of technical and vocational

diplomas slows down the process of change and increases the resulting rigidity of the job structure of enterprises. In addition, the rigid relationship between diplomas and income scales gives a diploma the value of a life annuity and makes it difficult to restructure companies and adopt new and more flexible production processes.

The rigidity of the system has also been partially responsible for the continuous depreciation of medium-level scientific and technical training; thus, the percentage of adolescents in the final year of secondary school who were enrolled in scientific disciplines fell from 55% to 42% between 1960 and 1985,<sup>43</sup> while the percentage of holders of secondary school diplomas whose training was predominantly vocational and the majority of whom were headed towards tertiary sectors of employment was rising (from one third to one half of the graduates between 1975 and 1985).

On the other hand, the polarization of graduates with a full secondary education (40%) and those who lacked such an education (60%) increased, and the ratio between level of income of parents and amount of instruction received by their children became closer. The way in which the diploma system was set up, with frequently incomplete and badly coordinated technical options and the higher social standing attached to academic training, helped to accentuate social inequalities.<sup>44</sup>

The problem of social equity grew more serious during the 1980s, when employment opportunities for young people decreased and the proportion of

40 Claude Durand-Prinborgne (comp.), *Le système éducatif, Les Cahiers Français*, No. 249, Paris, La Documentation Française, January-February 1991.

41 J. Lesourne, *Education et société ...*, op. cit.

42 The technical and vocational diplomas offered in France are in theory determined by 19 advisory committees, in which entrepreneurs, wage-earners and representatives of various civil associations (teachers associations, chambers of commerce, etc.) participate in conjunction with Government representatives. These committees take concerted action and carry out resolutions, but the authority to create or change diplomas rests exclusively with the Government. Therefore, as may be expected, the participation of businesses and trade-unions in the committees has been marginal. J. P. Jallade, "La formation professionnelle...", op. cit.

43 Ibid.

44 Ibid., C. Baudelot and R. Establet, *Le niveau monte...*, op. cit.

those who left school prior to graduation increased (comprising between 25% and 30% of each age group). Surveys show that three years after leaving school, two thirds of this group are still unemployed or have only managed to obtain work with no future –a situation in which only 20% of those with diplomas in the same age group find themselves.<sup>45</sup>

As in the United Kingdom, the first step taken by the authorities has been to promote the rapid development of post-school training, which since 1983 has been provided for between 15% and 20% of the country's young people. The results have been similar to those observed in the United Kingdom –better returns in terms of placement than of acquisition of skills and passive participation on the part of business.

In addition, since 1975, progress has been made towards greater uniformity of secondary education, not in terms of decreasing the types of training offered but of integrating them all under one roof and of establishing a common and increasingly full curriculum. To counter the resistance to making explicit changes in the existing hierarchies, it was decided to increase the types of diploma offered and the grades of skills acquired with a

view to implicitly relaxing the criteria of evaluation, making the system less hierarchical, facilitating the building of bridges between different levels and creating continuity from the pre-secondary to the university cycle as regards a number of specialized technical courses taught which had previously been omitted.

The final objective of the authorities is to bring 80% of the members of every generation, regardless of income, through the secondary stream. A second objective is to increase the number of people enrolled in scientific disciplines. The reform introduced in 1991 with regard to training for civil engineers in order to provide them with access to technical facilities is an example of that strategy (see table A.I.8).

#### *b) Decentralization and differentiation*

Greater variety in the student body and in the expectations of students under this policy of uniformity in diversity presents a major pedagogical challenge –how to make the system more efficient without segmenting its output excessively. This goal by definition calls for a change in management methods at

#### Box A1-8

##### REFORM IN THE TRAINING OF CIVIL ENGINEERS IN FRANCE

The recent reform in the training of civil engineers in France was a response to three concurrent problems. The first was the scarcity of engineers in the labour market and the fact that half of those currently functioning as engineers were inadequately trained. The second concern came from the growing demand on the part of mid-level technicians for the chance to advance professionally. That revealed the inadequacy of current ongoing training programmes and the fact that firms were spending most of their funds for training on high-level personnel (managers or administrators). Third, enterprises, especially small and medium-sized enterprises, found it difficult to hire production and application engineers. Indeed, owing to the highly academic

character of the training, more than half of those graduating from engineering school go into research and only 13% take jobs in production.

The recent reform, therefore, aims to promote training of a new kind of engineer, more oriented to applied technology. It seeks to combine specialized, technology-intensive training on the job with the acquisition of high-level theoretical knowledge. Communication skills, thorough knowledge of the overall process of production and sales and a sense of teamwork are also stressed in the curriculum. Enterprises have been given a greater role in defining and evaluating the programme, and the on-the-job training time has been increased to a level similar to that spent in acquiring theory.

45 C. Durand-Prinborgne (comp.), *Le système éducatif...*, op. cit.

the institutional level in order to give greater freedom to all components of the system and to enable each of them to draw up its own strategy in the face of an increasingly diverse demand.

Another salient characteristic of education reform in France is the decentralization and internal differentiation of the system, which is probably the greatest change ever attempted in a system which has always been characterized by a high degree of centralization. The central authorities alone control virtually every aspect of the school system, from the recruitment of teachers to the awarding of diplomas to students. This degree of centralization has been justified on the basis of the unifying role which the school must play in the context of a social philosophy in which an effort is made to keep differentiation to a minimum. This is why the history of the French educational system is associated with such goals as the elimination of regional dialects and the exclusion of religions.

Attempts at decentralization made since the 1970s have met with a great deal of resistance, in particular on the part of central and local government authorities who refuse to provide financial support for such initiatives, arguing that they might promote community clashes and social fragmentation and rejection. However, since social tension and rejection increased while the school system remained as rigid as ever and social diversity grew, the need for decentralization became all the more pressing.

Three reforms have been introduced in the past few years with decentralization in mind: increasing the autonomy of schools, increasing the autonomy of families and increasing the autonomy of regions.

Increasing the autonomy of schools is closely related to the objective of expanding the coverage of the system. The attempt to find means of reducing failures on the part of the schools has caused

schoolteachers themselves to challenge the centralized regulations. The French system of educational regulations is the opposite of the system applied in the United States in that a large amount of schoolwork is assigned every day, promotion from grade to grade calls for meeting a certain number of rigid standards established on the basis of a totally impersonal measure and the curriculum for each grade and each specialized field of study is drawn up by the central authorities, who enforce strict achievement standards for each age group. Actually, however, since children mature at different rates, the application of strict standards helps to create harmful notions of "ahead" and "behind", which may have a permanent effect on the later performance of students.<sup>46</sup>

Efforts made by teachers to achieve greater autonomy did not have much impact until 1981, when the first selective, compensatory policy measure was adopted in respect of the allocation of resources. Selective financing was confined to certain pedagogical programmes designed up at local levels and seemed at improving the results achieved in the case of the most disadvantaged groups (see box AI-9). In view of the relative success of these initiatives, primary teachers were given slightly more autonomy through the introduction of continuous training cycles which sought to smooth the transition between preschool and primary education.

Efforts to increase family autonomy were even more circumscribed. The growing demand on the part of families for greater freedom in choosing schools was not taken into consideration by the authorities until it became a national political issue in 1983. From September 1984 on, as schools were given greater autonomy, they were also, gradually and to a limited extent, desectoralized. Initially confined to five departments, these reforms were extended to the entire country in 1989. Since desectoralization is

<sup>46</sup> J. Lesourne, *Education et société...*, op. cit.

## Box A1-9

## DECENTRALIZED EDUCATIONAL PROGRAMMES IN FRANCE

From the 1970s onward, educational establishments were given autonomy to introduce original activities, as a way of encouraging schools to open up to their environment and teachers to work together. However, the central authorities did not adequately fund these "educational action projects" until 1981, the year in which "educational priority zones" (EPZ) were created.

The main objective of the EPZ is to overcome school failure in a selective and decentralized manner. The basic presupposition is that children's problems in school cannot be dealt with apart from their environment. Isolated solutions are therefore abandoned (such as special "remedial" sections, created during the 1960s and 1970s). The goal is to organize realistic plans for a coordinated attack on all the factors that might diminish school performance, be they outside or within the educational system.

The educational priority zones are centrally defined on the basis of indicators that simultaneously measure scholastic deficiencies (repeated grades, drop-outs, learning problems) and the socio-economic characteristics of the population. The schools in those zones are

invited to help draw up a project with other local actors outside the school system, such as local groups, neighbourhood organizations, or businesses. The teachers' work is complemented by a team in charge of promoting the project throughout the zone, and by a coordinator whose function is to organize the activities of the participants.

The schools that participate in the EPZ project are provided with additional resources to create new teaching posts, credits for functioning or equipment, etc. An uneven distribution of public resources is therefore justified as a way to efficiently compensate for social inequalities.

The EPZs have had mixed results up till now. Only a small number of schools and teachers have opted to participate in the project. The impact on school performance has been positive (the repeater rate in first grade of primary school dropped from 18% to 10% and from 15% to 6% in eighth grade), but the same results were not achieved in later years. The most beneficial effects have been on student attitudes; participation in school activities has become more active and less aggressive.

still limited to certain areas in each department (usually those with the most political pull), it now extends to only half of the nation's primary schools and one fifth of its lycées.

Central and local authorities and politicians in general are resistant to full desectoralization, adducing school transport problems and problems relating to social equity in particular. Although barely 10% of French families have chosen to change the school their children attend since 1984, the fact that most families which have done so are middle-class families leads the authorities to fear the advent of increased social polarization.

At institutional level, some progress has in fact been made towards decentralization by increasing the financing available to local authorities and their power to take decisions. Under the general decentralization act of 1983, the regions financed the construction and maintenance of all primary and secondary schools, the central authority's role being

confined to the provision of additional national support for ironing out regional disparities. The result was a marked increase in investment expenditure, especially by municipalities.

With these additional funds in hand, the local authorities began to expand their radius of action to include pedagogy and curricula, coming into conflict with the central authorities fairly frequently. The relative scarcity of financial resources from the central Government at a time when projects are being implemented in which the concept of regional financing is extended to cover some institutions of higher education makes it likely that local authority over education will continue to expand.

### 7. The debate in Italy

The Italian school system is both more decentralized than the German system and more diversified than the French system. Consequently, much of the debate

on the training of human resources in Italy has concerned ways of making the system more uniform and of increasing cooperation between business and labour in this field.

*a) Decentralization and uniformity*

As a number of commentators have observed, the decentralization of the Italian system is occurring in a setting where the central Government is remote, bureaucratic and relatively inefficient and society is powerful and highly structured at both the private (enterprises) and the public (regions) levels.

The regions, where the greatest power is concentrated from the standpoint of Italian industrial policy, have assumed similar power over training. However, the system was made even more diverse during the 1980s, when there was a proliferation of relatively long training cycles directed by a variety of institutional agents (the State, the region and business). Thus, the proportion of graduates from the school systems who have received technical/vocational training has increased (from 50% to 60% in 10 years), but there has been no parallel development of a post-secondary system of technical education enabling students to continue their studies, with the result that this kind of training is still held in low social esteem.

A huge number of public post-school technical training programmes have also been established. These programmes, which are usually organized by regional centres, come in many varieties, ranging from short cycles (two to three years) for young people without jobs to training provided under job contracts which give young people with a low level of instruction an opportunity for temporary employment.

The original intention of the authorities was to involve large enterprises in the initial stages of training

and in the struggle against juvenile unemployment. However, as in France and the United Kingdom, the leading participants were small enterprises (72% of the firms subscribing to the scheme), which prefer these systems to apprenticeship systems since they involve fewer training obligations.

In spite of the demonstrated advantages of its decentralized approach to the management of training in terms of adaptation to the requirements of the labour market and employment trends, the Italian system has in recent years been the object of criticism in two respects which are reminiscent of the institutional dilemma in the United Kingdom.

In the first place, the lack of central control resulted in a dearth of uniform criteria and in too much diversity, which increased the inequality between the regions. In particular, the trade unions are critical of the absence of links between central and regional schools in respect of technical/vocational training. As for the entrepreneurs, they argue that too small a role has been assigned to them and even maintain that regional governments lack the authority to be able to manage the public financing of training deftly enough to satisfy the practical requirements of industrial microspaces. In some regions, however, agents at various levels of competence and authority have managed to get together to identify their mutual responsibilities <sup>47</sup> (See Box AI-10).

*b) Entrepreneurs, trade unions and training*

Another matter of concern in Italy relates to the possibility of changing social relations as they are adapted to the changes occurring in the organization of work. This is especially true of large enterprises which have distinguished themselves by implementing a globalization strategy along with a strategy aimed at internal reorganization,

<sup>47</sup> Olivier Bertrand and Danielle Kaisergruber, *Resources humaines et réussite économique. Comparaison internationale: USA, Italie, Allemagne, Japon, Corée du sud*, Collection des études, No. 50, Paris, Centre d'études et de recherches sur les qualifications (CEREQ), 1989.

## Box AI-10

## INSTITUTIONAL FLEXIBILITY IN TUSCANY

The 15,000 textile enterprises in Prato, Tuscany, most with less than five employees, together comprise the world's leading producer of combed wool and provide 10% of all Italian textile exports. They serve a very diversified clientele with highly variable and rapidly changing demands. Such frequent changes in products and processes require a good deal of flexibility in the management of workers, compelling enterprises to actively participate in locally available professional training programmes.

According to Italian law, responsibility for training falls to the region, which is ultimately the only instance of public regulation of the whole system. Indeed, Tuscany's 1976 attempt to delegate its entire responsibility for training to a lower administrative level, the province, was found unconstitutional. A compromise formula was later worked out, making it possible to combine the flexibility desired by enterprises with the overall objectives defined by the community. According to a 1984 law, the

region defines and adopts a programme of goals and priorities for training on the basis of local demands. Within this framework, it delegates the administration of training centres and resources collected for that purpose to inter-community associations, which act through an administrative council formed by representatives of communities, employer organizations and trade unions. The provinces then serve as intermediaries between the regional level and the local level.

Seven Prato communities have formed a group to administer a professional training centre. The region provides operating funds, with contributions in kind from enterprises and trade unions. The main characteristic of the centre is the diversity in the training it gives, which is regularly revised on the basis of demands from enterprises. In the last few years, the courses have given more emphasis to advanced technologies, new marketing techniques and process control. The centre trains 1,200 people a year, mostly young people.

management reform and increased productivity.<sup>48</sup>

Frequent mention is made of the rapid advances being made by large Italian firms in the decentralization of their internal organization. The first experiments made at FIAT in the mid-1970s were difficult but innovative and rewarding in terms of the lessons learned from them and demonstrated to other Italian firms that the management of new technological systems call for new forms of conduct and the redefinition of workers' skills (see box AI-11).

Job profiles, hierarchies, technology and the organization of work appear to be increasingly interdependent. The controlled transition of those elements calls for help from the trade unions, especially in countries like Italy where the proportion of unionized workers is high.

In actual fact, their diminished importance has made it necessary for the unions themselves to redefine their position and adapt themselves to the

practices designed to increase the productivity and competitiveness of Italian industry. Italian trade unions temporarily abandoned their traditional demands for gradual unification of technical/vocational categories in support of the concept of professionalism, which places more emphasis on autonomy and the capacity to take decisions and exercise individual control than on the stricter definition of job qualifications.

The establishment of new industrial relations also makes it necessary to abandon the attitude of confrontation which previously prevailed in favour of an attempt to reach framework agreements on basic business problems, the recognition of reciprocal responsibilities, the exchange of information, greater willingness to act in concertation and the inclusion of technological change in trade union negotiations for the purpose of obtaining the greatest possible degree of transparency within businesses.

<sup>48</sup> Ibid.

## Box AI-11

**FIAT'S DIFFICULTIES IN TRAINING EMPLOYEES TO WORK  
IN ITS AUTOMATED PLANTS**

Through its recognized efforts to incorporate technological innovations during the 1980s, Fiat has become one of the most automated firms in the world: in its modernized plants, 85% of productive operations are automated. At the same time, Fiat has developed an impressive plan to train its workforce, with specific programmes including 8 to 18 months of training per worker in the use of automated equipment. Fiat had already gained a great amount of experience in training, since it had successfully integrated many former agricultural workers into its workforce during the 1970s. However, training in the new production and maintenance technologies turned out to be an experience for which the company was ill-prepared.

Above and beyond technical management, the new automated forms of production require

that operators have an understanding of the overall process and the ability to solve complex problems, as well as that new channels of communication be opened up. The difficulties encountered by the firm in the efficient use of its new teams of workers, even after its intensive efforts to train them, demonstrate the importance of taking into account, before introducing new technologies, the modifications that need to be made in the organization of production and the parallel decentralization of responsibilities, without which automation is not really operative. Paradoxically, automation, which was originally regarded as a means of controlling the relative power of the trade unions, has in some ways become more important than the unions as an interlocutor in industrial relations.

### 8. The debate in Korea

The case of Korea is often adduced as the most patent example of the close association between economic growth and a good educational policy.

The extraordinary growth of school enrolments in Korea beginning in the 1950s is frequently related to the later development of the country's industrial structure and the tremendous increase in per capita income. Those achievements called for a huge effort with regard to the financing of both the public sector (whose expenditure on education rose from 2.5% of total fiscal spending in 1955 to 17% in 1966) and the private sector.<sup>49</sup>

#### *a) A voluntary educational policy*

The extent of the Korean effort largely reflects the idea that investment in education should be one step ahead of the needs of production because of the time it takes such investment to mature. This criterion has been the backbone of Korean

policy on human-resources management and has on a number of occasions been subject to criticism and warnings, mostly by foreign analysts. The most common argument is that mistaken projections can cause as much damage as failure to act. Nevertheless, the Government of Korea has continued to ply the same course as is shown by its plan for the development of vocational education and training for the 1990s.

Since the changes observed and projected in the structure of employment and in the demand for education point towards a probable shortage of multiskilled workers in the next few years, the authorities have embarked on a methodical plan to expand the country's training services during the 1990s. The plan is based on a precise identification of the needs of the production system, the target population and the impact of the incentives provided in order to increase the participation of enterprises in the financing of training. It contains a proposal for the gradual implementation of the measures for which provision is

<sup>49</sup> Public expenditure represents just one third of total expenditure, which means that both families and enterprises made a tremendous contribution to the joint social effort required to raise the level of the instruction provided for human resources.

made, between 1990 and 1996, identifying specific targets for each year (see box AI-12).

As noted by some observers, the Korean authorities have sometimes been mistaken in their forecasts. For example, the private demand for education has invariably exceeded the estimates made in the plans, which has forced the authorities to apply their increased enrolment policy faster than they would have liked.<sup>50</sup> It has, however, been possible to cut the losses due to these errors that continually redefining the education policy, which, as in the case of Sweden, tends to be based on permanent adaptation and gradual change. Moreover, even when mistaken projections were made, the human resources planning policy may have offered the advantage of increasing the

exchange of information and other communications and raising the level of coordination between the various agents involved.

#### *b) Limited research capacity*

Another drawback of the Korean system of education is the limited capacity of the institutions in it to conduct their own research. The growth of university education in the 1970s, when the number of students increased by a coefficient of six and the percentage of adolescents entering university increased by over one third, was achieved within a context of a marked increase in the ratio of students to lecturers and limited investment in research. The universities devoted themselves almost exclusively to teaching in the absence of

#### Box AI-12

##### THE HUMAN RESOURCES DEVELOPMENT PLAN OF THE REPUBLIC OF KOREA

In the 1980s, the authorities of the Republic of Korea continued to implement an integral policy which provides comprehensive coverage of macroeconomic, employment and educational variables. In the face of changes which have occurred at domestic level and in international trade, they have begun to take explicit account of training as a tool to bring the demand for wage increases into harmony with the maintenance of stable external accounts.

The Korean Development Institute and Ministry of Labour have prepared a five-year human resources development plan. On the basis of detailed projections of labour supply and demand, the plan identifies emerging imbalances in the labour market, including the growing deficit of skilled labour in the manufacturing sector, especially in the areas of computation and high technologies; the difficulties experienced by small manufactures in retaining their personnel; the growing tendency of workers to transfer to the services sector; the reduction in the number of graduates from training programmes partly because of the drop in the spending of firms on vocational

training; and the steady increase in demand by families for general academic education, to the detriment of the technical and industrial schools.

The mainstay of the policies designed to correct these imbalances is a thorough restructuring of the country's vocational training facilities by effecting a 50% increase in the capacity of its technical/industrial schools and public training institutes. An attempt is also being made to stimulate training opportunities in the private sector by means of a set of obligations (such as that of effecting a gradual rise from 0.3% to 1% in the minimum expenditure of businesses on training, expressed as a percentage of their wage bill), or incentives (such as tax benefits and direct subsidies to small businesses). The number of vacancies for the study of scientific subjects in university was also supposed to increase significantly. Other provisions made in the five-year plan had to do with monetary and non-monetary job incentives in manufacturing firms and the development of an information system on the labour market.

50 Tun-Jen Cheng, "Dilemmas and choices in educational policies. The case of South Korea and Taiwan", symposium on education and development in South-east Asia, China University of Hong-Kong, 1990.

sufficiently well-organized teams of senior engineers and scientists.<sup>51</sup>

At present universities account for only 10% of national expenditure on research although they employ one third of the people engaged in pure and applied research and 78% of holders of doctors degrees working in the country.

To solve this problem, the authorities have established a number of public research institutes sponsored by the Ministry of Science and Technology; this solution has been challenged because it could reduce the area and the time span in which research findings are disseminated. Underinvestment by the public sector in higher education may prove costly since recent developments outside the country (the pressure exerted for the

establishment of an international code on patterns and the protection of intellectual property rights, for example) and at the internal level (wage hikes in particular) make it more difficult to absorb foreign technologies.

At the same time, however, expenditure on research and development by private firms rose from 32% of total spending in 1971 to 80% in 1987. That increase, which is associated with greater spending on R & D throughout the country (an increase of from 0.3% to 1.9% of GDP) reflects a strategy adopted by enterprises determined to invest in order to be able to continue expanding the frontiers of technology in their field of interest<sup>52</sup> (see Box AI-13).

#### Box AI-13

##### CORPORATE INNOVATION FOLLOW-UP STRATEGIES

Corporations with little capacity of their own for innovation and those from countries where the university system is not very highly developed have in some cases drawn up strategies for keeping pace with developments in the technological frontier in their own area of interest. For example, a number of Korean firms have offices in California whose job is to observe technological changes as they occur and to purchase advanced semi-conductor and computer technology. These branch offices provide a base where scientists and engineers

from the firm or the staff of research centres with which the firm maintains relations may be trained.

The Italian firm Montedison has also adopted the practice of systematically sending young, newly recruited managerial staff to selected foreign countries on technological observation missions. In this capacity they act as "technological terminals" which may be approached for information by the company's directors.

51 Linsu Kim, "Absorptive capacity and industrial growth: a conceptual framework and Korea's experience", document submitted to the Twentieth Anniversary Symposium on Economic Growth and Social Capability organized by the Korean Development Institute, Seoul, Republic of Korea, 1-3 July 1991.

52 Ibid.

## Annex II

### SOURCES OF BOXES

#### 1. Sources of boxes

The boxes were prepared by the Joint ECLAC/UNIDO Industry and Technology Division and the UNESCO Regional Office for Education in Latin America and the Caribbean on the basis of the internal work of both institutions, studies prepared by consultants and information provided by external sources.

**Box II-1. External factors responsible for developments in education in Latin America in the 1980s**

ECLAC, *La equidad en el panorama social de América Latina durante los años ochenta* (LC/G.1686), Santiago, Chile, 31 October 1991.

**Box II-2. Independent academic research centres**

José Joaquín Brunner and Alicia Barrios, *Inquisición, mercado y filantropía*, Santiago, Chile, Latin American Faculty of Social Sciences (FLACSO), 1987.

**Box II-3. Establishment of private universities: the cases of Spain and Chile**

Spain, Royal Decree 557/1991 of 12 April 1991 on the establishment and recognition of universities and junior colleges.

Council of Rectors of Chilean Universities, *Régimen jurídico de la educación superior*. Normas Generales, vol. 1, Santiago, Chile, 1982.

**Box II-4. Education and agricultural productivity**

ECLAC, *Educación y transformación productiva con equidad en la agricultura. Problemas y propuestas* (LC/R.1084), Santiago, Chile, 11 November 1991.

**Box II-5. Gender discrimination in schoolbooks**

M. González-Suárez, *Barriers to Female Achievement: Sex Stereotypes in Textbooks*, Comparative and International Education Society, 1987.

A. Binimelis and M. Blásquez, *Roles y estereotipos sexuales en los textos escolares chilenos. Informe de avance de la investigación*, Santiago, Chile, National Women's Service (SERNAM), 1991.

National Women's Office of Guatemala (ONAMI), *Análisis de roles y estereotipos sexuales en los textos escolares en Guatemala*, Guatemala City, undated.

**Box II-6. Growth of education and of population**

Latin American Demographic Centre (CELADE), "Volumen y crecimiento de la población demandante de políticas educacionales dentro del marco de la transformación productiva con equidad", Santiago, Chile, September 1991, manuscript.

**Box II-7. The Monseñor Leonidas Proaño National Literacy Campaign, Ecuador, 1989-1990**

Monseñor Leonidas Proaño, National Literacy Campaign, *Informe de evaluación final*, Quito, United Nations Children's Fund (UNICEF), August 1990.

**Box II-8. Training for micro-enterprises in El Salvador**

Ernesto Parra Escobar (adviser), *Situación y perspectivas de la microempresa y los programas de apoyo en El Salvador*, Bogotá, September 1991. This document was prepared for ECLAC/ILPES/UNDP Project ELS/90/004 on "Strengthening of the Ministry of Economic Affairs for purposes of the implementation of the Structural Adjustment Programme in El Salvador".

**Box II-9. Human resources policies of export enterprises in Uruguay**

ECLAC office in Montevideo, *Transformación productiva y recursos humanos. Modernización y desequilibrios en la industria exportadora de Uruguay (LC/MVD/R.68)*, Montevideo, September 1991.

**Box II-10. Bolivia's new vocational education and training institute**

Institute for Manpower Education and Training (INFOCAL), Ministry of Planning and Coordination of Bolivia and the German Agency for Technical Cooperation (GTZ), ZOPP Seminar on Bolivia ("Fields of Work and Human Resources Training"), La Paz, 1991, manuscript.

Interview of Dr. Luis F. Hartmann, Executive Director of INFOCAL.

**Box II-11. A new stage of educational development: the Quito Declaration**

UNESCO Regional Office for Education in Latin America and the Caribbean, the Major Project of Education in Latin America and the Caribbean, *Bulletin*, No. 24, Santiago, Chile, April 1991.

**Box III-1. The new educational qualifications demanded by firms**

Philippe Zarifian, "Ouvriers, maîtrise et techniciens, acteurs du changement industriel", *CEREQ Bref (Bulletin de recherche sur l'emploi et la formation)*, No. 35, Paris, September 1988.

Olivier Bertrand and Thierry Noyelle, *Human Resources and Corporate Strategy. Technological Change in Banks and Insurance Companies*, Paris, Centre for Educational Research and Innovation (CERI), Organization for Economic Cooperation and Development (OECD), 1988.

**Box V-1. How apt is the term "competitiveness"?**

Various interviews and consultations.

**Box V-2. Efficiency as a policy criterion**

Various interviews and consultations.

**Box V-3. Advantages and risks of decentralization**

Various interviews and consultations.

**Box VI-1. Decentralization in a country in transition: the case of Colombia**

Colombia, Act No. 24 of 11 February 1988 of the Republic of Colombia and official information.

**Box VI-2. Decentralization in a country with a federal system: the case of Argentina**

Inés Aguerrondo, "La descentralización de la educación en la Argentina. El caso de las transferencias de escuelas primarias a las provincias", Buenos Aires, 1991, manuscript.

**Box VI-3. Links between universities and the production sector**

G. Esthela Redorta Zúñiga and Juan Antonio Flores Lira (advisers), "Mecanismos de vinculación del Instituto Tecnológico de Estudios Superiores de Monterrey con la industria y su relación con el sector productivo", ECLAC and the UNESCO Regional Office for Education in Latin America and the Caribbean, Mexico City, 1991, manuscript.

Arturo Infante Villarreal, "Administración y distribución de los recursos financieros provenientes de la investigación, consultoría e interacción entre la Universidad y el sector productivo", *Vinculación universidad-sector productivo*, Inter-American Development Bank (IDB), Inter-university Center for Andean Development (CINDA) and SECAB, Santiago, Chile, 1990.

**Box VI-4. Dual-track training and stimulus for employer organization in the Dominican Republic**

*Proyecto de fortalecimiento de la formación profesional en República Dominicana*, Santo Domingo, February 1991. This document was prepared with help from Mr. Jaime Ramírez, an adviser for UNDP/ECLAC Project RLA/88/039, on design of policies to strengthen the capacity for technological innovation and enhance international competitiveness in the Latin American entrepreneurial environment.

**Box VI-5. Retraining for workers displaced by the retrofitting of industry in Mexico**

Information supplied by the World Bank.

**Box VI-6. Curriculum reform in Mexico**

Mexico, Office of Public Education, Consejo Nacional Técnico de la Educación, *Hacia un nuevo modelo pedagógico*, No. 2, Modernización Educativa series, Mexico City, 21 February 1991.

**Box VI-7. Recommendations for eliminating gender-based stereotypes in textbooks and teaching**

UNICEF Subregional Office for Central America, Panama and Belize and United Nations Development Fund for Women (UNIFEM), *Manual de recomendaciones para la eliminación de estereotipos en los textos escolares y en los materiales educativos en general*, Guatemala City, November 1990.

**Box VI-8. Evaluation of post-graduate programmes in Brazil**

Ricardo Chaves de Rezende Martins, "Modelos e practicas de avaliaço de programas de pos-graduaço: em busca de novas alternativas", 1988, manuscript.

**Box VI-9. Creating a quality secondary-level technical training programme: the CONALEP system in Mexico**

Information supplied by the World Bank.

**Box VI-10. Training offered through joint efforts by employer associations**

Enio E. Klein, *A teoria da vantagem competitiva de Porter e a Industria Brasileira de Calçados*, National footwear fair (FENAC), 1990.

ECLAC, *La cadena de distribución y la competitividad de las exportaciones latinoamericanas; las exportaciones de calzado del Brasil* (LC/G.1669), Santiago, Chile, 1991.

Interviews with Enio Klein (September 1990); Manuel Muñoz Guzmán, General Manager of the Association of Ivo Creaciones, May 1991 and Jean Pierre Echeverría, Exporters of Manufactures (ASEXMA), May 1991 and information supplied by Luis Alberto Lima, Director of the Consorcio de Ingeniería Electromecánica, S.A.

**Box VI-11. Search for a consensual and participative educational reform in the Dominican Republic**

Commission for the Study of Education in the Dominican Republic, *Un pacto con la Patria y el futuro de la educación dominicana*, report submitted to the President of the Republic pursuant to Decree No. 209-91 of 31 May 1991, Santo Domingo, 24 July 1991.

**Box VI-12. The Escuela Nueva: A national-level experiment in personalized education**

Ernesto Schiefelbein, *In Search of the School of the XXI Century. Is the Colombian Escuela Nueva the Right Pathfinder?*, Santiago, Chile, UNESCO Regional Office for Education in Latin America and the Caribbean and the UNICEF Regional Office in Latin America and the Caribbean, 1991.

**Box VI-13. Ecuador's MACAC educational model**

United Nations Educational, Scientific and Cultural Organization (UNESCO), *Alphabétisation des femmes: Action des ONG*, Paris, 1991.

**Box VI-14. Education and television**

Valerio Fuenzalida, "Educación y comunicación, Third Ibero-American Meeting on Communications", article contained in a book compiled by T. Drago and L. A. Ruiz de Gopegui and published in Madrid by the Sociedad Estatal Quinto Centenario, Turner Libros in 1989, pp. 129 and 130, and information from the World Bank.

**Box VI-15. PEBA, an integral educational concept: the radio school of the Archdiocese of San Salvador**

María Nelly Cuculiza and Dina Kalinowski (eds.) *Medios de comunicación al servicio de la alfabetización y postalfabetización*, UNESCO Regional Office for Education in Latin America and the Caribbean, Santiago, Chile, 1991.

**Box VI-16. Two companies' in-house academic training programmes**

Paulo César Teixeira, "Companhia Renascença Industrial. Projeto: Educação de Trabalhadores", ECLAC and UNESCO Regional Office for Education in Latin America and the Caribbean, Belo Horizonte, July 1991, manuscript, and information provided by the firm involved.

UNESCO Regional Office for Education in Latin America and the Caribbean (OREALC), the Major Project of Education in Latin America and the Caribbean and Regional Network for Training of Personnel and Specific Support for Literacy and Adult Education (REDALF), *Alternativas de educación básica de adultos* (final document of the REDALF Regional Seminar/Workshop held at Colonia Tovar, Venezuela, in October 1986, Santiago, Chile, 1987.

**Box VI-17. Plan for sociocultural participation in Venezuela**

Information supplied by the Venezuelan Ministry of the Family.

**Box VI-18. Project to support training in small and medium-sized enterprises in Mexico**

Information provided by the World Bank.

**Box VI-19. Public training and production workshops in Costa Rica**

Bernardo Blanco M. and Ligia M. Sánchez M., "Los talleres públicos de capacitación-producción en Costa Rica", San José, April 1991, manuscript.

**Box VI-20. A training programme for young people in Chile**

Vocational Training Programme for Young People, "Un análisis de demanda y oferta de recursos humanos en Chile", Santiago, Chile, undated manuscript.

Vocational Training Programme for Young People, "Breve resumen del programa", Santiago, Chile, undated manuscript.

- Box VI-21. CONACYT (Mexico) programmes in support of technological development**  
Information provided by the National Council for Science and Technology of Mexico (CONACYT), published in *La Jornada*, Mexico City, 27 May 1991.
- Box VI-22. Uruguay's scientific community and its interaction with expatriate scientists**  
Adela Pellegrino, "La movilidad de profesionales y técnicos latinoamericanos y del Caribe", Santiago, Chile, Latin American Demographic Centre (CELADE), June 1991, manuscript.
- Box VI-23. Industrial subcontracting**  
Documents issued by the regional project executed by the United Nations Industrial Development Organization (UNIDO) on the promotion of assembly production in Latin America and information provided by the subcontracting exchanges of Bogotá, Lima, Medellín and Santiago, Chile.
- Box VI-24. Working groups for technological management in the Dominican Republic**  
Eduardo A. Doryan (adviser), *Propuesta de un proyecto de inversión en modernización tecnológica para la reestructuración industrial en la República Dominicana*, Santo Domingo, February 1991. This document was prepared for UNDP/ECLAC Project RLA/88/039 on "Design of policies to strengthen the capacity for technological innovation and enhance international competitiveness in the Latin American entrepreneurial environment".
- Box VI-25. Promoting technological and commercial studies and human resources training at the sectoral level**  
A. Cárdenas (adviser), *La industria petroquímica colombiana: transferencia y gestión de tecnología*, Bogotá, 1991. This document was prepared for UNDP/ECLAC Project RLA/88/039 on "Design of policies to strengthen the capacity for technological innovation and enhance international competitiveness in the Latin American entrepreneurial environment".  
Heinz Meder (adviser), *Estudio de la situación de la joyería de oro y plata con piedras preciosas*, La Paz, 1991. This document was prepared for UNDP/ECLAC Project RLA/88/039, *ibid.*  
G. Fernández de la Garza (adviser), *El desarrollo de las empresas de base tecnológica en Morelos*, Mexico City, 1991. This document project was prepared for UNDP/ECLAC Project RLA/88/039.
- Box VI-26. Human resources training and research and development in a Korea steelworks**  
Information provided by the Research Institute of Industrial Science and Technology (RIST) of the Republic of Korea, the Pohang Institute of Science and Technology and the Pohang Iron and Steel Co. Ltd. (POSCO).
- Box VI-27. Systems for measuring the quality of basic education. Some regional experiences**  
UNESCO Regional Office for Education in Latin America and the Caribbean, The Major Project of Education in Latin America and the Caribbean, *Bulletin*, No. 23, Santiago, Chile, December 1990.
- Box VI-28. Institutional evaluation tools**  
Serge Cuenin, "The use of performance indicators in universities: an international survey", *International Journal of Institutional Management and Higher Education*, vol. 11, No. 2, 1987.  
Leo C. J. Goedegebuure, Peter A. M. Maassen and Don F. Westerheidjen (eds.), *Peer Review and Performance Indicators. Quality Assessment in Britain and Dutch Higher Education*, Utrecht, Netherlands, Uitgeverij Lemma B. V., 1990.  
Hans A. Acherman, "Quality assessment by peer review", *Higher Education Management*, vol. 2, No. 2, 1990.

**Box VI-29. Principles and preconditions for evaluating higher education**

Ulrich Teichler and Helmut Winkler, "Performance of higher education. Measurements for improvement. Evaluation of outcomes", document presented at the World-Wide Senior Policy Seminar on Improvement and Innovation of Higher Education in Developing Countries, organized by the World Bank at Kuala Lumpur, and held from 1 to 5 July 1991.

**Box VI-30. Institutional evaluation proposal: quality control of higher education in Chile**

Chile, Ministry of Public Education, Commission to Study Higher Education, *Una política para el desarrollo de la educación superior en la década de los noventa*, Santiago, Chile, January 1991.

**Box VI-31. Evaluation and financing modalities of the Monterrey Institute of Advanced Technological Studies**

G. Esthela Redorta Zúñiga and Juan Antonio Flores Lira (advisers), "Mecanismos de vinculación del Instituto Tecnológico de Estudios Superiores de Monterrey con la industria y su relación con el sector productivo", ECLAC and the UNESCO, Regional office for Education in Latin America and the Caribbean, Mexico City, 1991, manuscript.

**Box VI-32. The LOGOS II programme for training teachers**

Marlaine E. Lockheed and Adriaan M. Verspoor, *Improving Primary Education in Developing Countries. A Review of Policy Options*, World Bank, Washington, D.C., October 1989.

**Box VI-33. New policies for professionalization of teaching**

Commission for the Study of Education in the Dominican Republic, *Un pacto con la Patria y el futuro de la educación dominicana*, report submitted to the President of the Republic pursuant to Decree No. 209-91 of 31 May 1991, Santo Domingo, 24 July 1991.

Brasil, Government of the state of Ceará, *Escola pública: a revolução de uma geração*, undated.

**Box VI-34. Private financing for public schools: draft legislation in Uruguay**

Uruguay, bill on the rendering of accounts by the Government of the Eastern Republic of Uruguay, and press information.

**Box VI-35. Chile: tax exemptions for training, technical execution agencies (OTE) and intermediary technical bodies (OTIR)**

Interview with Mario Cerda, Director of the National Training and Employment Service (SENCE), contained in an article entitled "SENCE, balance de un año de trabajo", *Capacitación y desarrollo*, May 1991.

Mario Cerda and Mario Marcel, "Capacitación laboral y educación para el trabajo. Apuntes sobre la agenda del gobierno democrático", Santiago, Chile, 1990, manuscript.

Chile, General Treasury of the Republic, *Informe financiero del tesoro público, ejercicio 1990*, Santiago, Chile, 1991.

*La Nación*, Santiago, Chile, 14 May 1991, and *El Mercurio*, Santiago, Chile, 5 July 1991.

**Box VI-36. Sources of financing for the National Industrial Apprenticeship Service (SENAI) of Brazil**

Inter-American Research and Documentation Centre on Vocational Training (CINTERFOR) and the International Labour Organisation (ILO), *Vocational Training on the Threshold of the 1990s*, PHREE Background Paper series, No. PHREE/91/35, vol. I, Washington, D.C., February 1991.

**Box VI-37. Cooperation initiatives in the field of higher education**

UNESCO Regional Centre for Higher Education in Latin America and the Caribbean (CRESALC), *Documento base*, International Meeting to Consider the New Roles of Higher Education at the World Level: The Case of Latin America and the Caribbean, Caracas, April 1991.

Alison de Puymège, *University Networking Across the World: A European Contribution*, Conference on Higher Education in the 21st Century, Taipa, Macao, University of East Asia, 22 March 1991.

**Box VI-38. Regional cooperation in the field of education research**

UNESCO Regional Centre for Higher Education in Latin America and the Caribbean (CRESALC), *Documento base*, International Meeting to Consider the New Roles of Higher Education at the World Level: The Case of Latin America and the Caribbean, Caracas, April 1991.

Patricio Cariola, "La investigación educacional en América Latina: factores asociados a su desarrollo (1960-1991)", Santiago, Chile, Centre for Educational Research and Development (CIDE), 1991, manuscript.

Latin American Faculty of Social Sciences (FLACSO), "Regional Project on Higher Education Policies", Santiago, Chile, 1991, manuscript, and reports on the Latin American Research Network on Training of Human Resources for Science and Technology.

**Box VII-1. Recent national science and technology programmes with financial support from IDB**

Information provided by the Inter-American Development Bank (IDB).

**2. Sources of boxes in annex I****Box AI-1. The proven benefits of preschool education**

Marvin Cetron and Elizabeth Gayle, *Educational Renaissance. Our Schools at the Turn of the Twenty-first Century*, New York, St. Martin's Press, 1991.

Claude Durand-Prinborgne (ed.), "Le système éducatif", *Les Cahiers Français*, No. 249, Paris, January-February 1991.

**Box AI-2. Comparisons of educational levels**

Christian Baudelot and Roger Establet, *Le niveau monte: réfutation d'une vieille idée concernant la prétendue décadence de nos écoles*, Paris, Editions du Seuil, 1989.

International Association for the Evaluation of Educational Achievement (IEA), *Science Achievement in Seventeen Countries. A Preliminary Report*, Oxford, Pergamon Press, 1988.

**Box AI-3. Motorola's training activities**

William Wiggernhorn, "Motorola U: when training becomes an education", *Harvard Business Review*, July-August 1990.

**Box AI-4. Collaboration between businesses and the public school system in the United States**

Myra Alperson, *Corporate America in the Classroom*, Council on Economic Priorities Research (CEP) Report, New York, January 1990.

The Business Roundtable, *Business Means Business About Education*, Washington, D.C., June 1989.

Paul T. Hill, Arthur E. Wise and Leslie Shapiro, *Educational Progress, Cities Mobilize to Improve Their Schools*, Santa Monica, California, Rand Corporation, January 1989.

Information provided by American Express and Kroger.

**Box AI-5. The Youth Training Scheme**

William E. Nothdurft, *Schoolworks: Reinventing Public Schools to Create the Workforce of the Future*, Washington, D.C., The Brookings Institution, 1989.

Jean-Pierre Jallade, "La formation professionnelle à l'étranger. Quels enseignements pour la France?", *Ecole de la deuxième chance, deuxième chance de l'école: former des professionnels pour le 21e siècle*, vol II, Commissariat Général du Plan, Paris, La documentation française, January 1988.

**Box AI-6. SKF's industrial school**

William E. Nothdurft, *Schoolworks: Reinventing Public Schools to Create the Workforce of the Future*, Washington, D.C., The Brookings Institution, 1989.

**Box AI-7. One school for all or different schools according to talent: the debate in the Netherlands**

Jean-Pierre Jallade, *La formation professionnelle à l'étranger. Quels enseignements pour la France, Ecole de la deuxième chance, deuxième chance de l'école*, Commissariat Général du Plan, Paris, La documentation française, 1988.

**Box AI-8. Reform in the training of civil engineers in France**

Haut Comité Education-Economie (HCEE), 2001, *d'autres temps, d'autres enjeux: de nouveaux parcours en formation initiale et continue. Rapport présenté au ministre de l'Education nationale*, Paris, La documentation française, December 1990.

**Box AI-9. Decentralized educational programmes in France**

F. Oeuvarads, "Les ZEP huit ans après création", *Regards sur l'actualité*, No. 160, Paris, La documentation française, April 1990.

**Box AI-10. Institutional flexibility in Tuscany**

Olivier Bertrand and Danielle Kaisergruber, *Ressources humaines et réussite économique. Comparaison internationale*, Collection des études, No. 50, Paris, Centre d'études et de recherches sur les qualifications (CEREQ), 1989.

**Box AI-11. FIAT's difficulties in training employees to work in its automated plans**

Olivier Bertrand and Danielle Kaisergruber, *Ressources humaines et réussite économique. Comparaison internationale: USA, Italie, Allemagne, Japon, Corée du Sud*, Collection des études, No. 50, Paris, Centre d'études et de recherches sur les qualifications (CEREQ), August 1989.

**Box AI-12. The human resources development plan of the Republic of Korea**

Ministry of Planning of the Republic of Korea, *Nuevo plan laboral para el sector industrial coreano: estrategia para superar el déficit laboral en el sector manufacturero*, translated from Korean to Spanish by the Joint ECLAC/UNIDO Industry and Technology Division, 6 June 1990.

Republic of Korea, Ministry of Labour, "Long term plan for vocational training development (1991-1996)" (abstract), *Fundamental Frameworks and Tasks for Vocational Training Development Toward Twenty-first Century*, Republic of Korea, Vocational Training Research Institute, Seoul, Korea Vocational Training and Management Agency, December 1990 (in Korean only).

**Box AI-13. Corporate innovation follow-up strategies**

Olivier Bertrand and Danielle Kaisergruber, *Ressources humaines et réussite économique. Comparaison internationale*, Collection des études, No. 50, Paris, Centre d'études et de recherches sur les qualifications (CEREQ), 1989.

### Annex III

## LIST OF THOSE INTERVIEWED OR CONSULTED DURING THE PREPARATION OF THIS BOOK

In preparing this document, a variety of people were consulted from government, private and academic sectors of the region and international organizations connected in one way or another with education, training, science and technology, development in its political and economic dimensions and international cooperation. These contacts took place in a number of ways. Some were consulted in the early stages; others commented on a draft presenting the main ideas; a third group was consulted during the case studies on which the boxes were based, and finally, a group of colleagues participated in a seminar held at ECLAC, giving their suggestions and criticisms of a preliminary version of this text.

- Jorge ACEVEDO, Director, Instituto SER de Investigación, Bogotá.
- Lionel AGUDO, Sectoral Director of Programming, Planning and Budget, Ministry of Education, Venezuela.
- Eduardo ALDANA, Founder of the Instituto SER and Ex-President of the University of Los Andes, Bogotá.
- Joo Carlos ALEXIM, Director, Inter-American Research and Documentation Centre on Vocational Training (CINTERFOR), of the International Labour Organisation.
- Emil ALVARADO, Director, Inter-American Center for Research and Studies in Educational Planning (CINTERPLAN).
- Carlos ALVAREZ, Technical Unit for Industrial Development (UTADI), Ministry of Economic Affairs, Development and Reconstruction, Chile.
- Oscar AMARGOS, National Technical and Professional Training Institute (INFOTEP), Santo Domingo.
- Jorge ARANGUIS RUZ, Executive Director, Bolivian Institute for Small Industry and Handicrafts (INBOPIA), Bolivia.
- Judy BALL, The Kroger Company, Cincinnati, Ohio, United States.
- Sandra Rebeca de BARRAZA, Head of Social Studies, Department of Economic and Social Studies, Salvadorian Foundation for Economic and Social Development (FUSADES).
- Nancy BARRY, President, Women's World Banking, New York.
- Manuel BARTLETT, Minister of Education, Mexico.
- Luis Alejandro BORRERO, Vice-President, Colombian Association for the Advance of Science.
- Eduardo BRAUN-CANTILLO, Astilleros Argentinos del Río de la Plata (ASTARSA), Buenos Aires.
- Guillermo COMACHO CARO, Project Coordinator, Nueva Colombia Industrial.
- Patricio CARIOLA, S.J., Director, Centre for Educational Research and Development (CIDE), Santiago, Chile.

- Ramón CASANOVA, Ministry of the Family, Venezuela.
- Rolando CORDERA, Coordinator of DEDEM, Department of Economics, National Autonomous University of Mexico (UNAM).
- Guisepepe CORO, Instituto Ricaldone, El Salvador.
- Cristián COX, Adviser, Ministry of Education, Chile.
- Fernando CHAPARRO, Regional Director for Latin America, International Development Research Centre (IDRC), Canada.
- Hernando DE SOTO, President, Instituto Libertad y Democracia (ILD), Lima.
- Francisco, DELICH, President, National University of Córdoba, Argentina.
- Adalberto DIAZ, Head of the Technical-Vocational Department, Fundación Empresarial para el Desarrollo Educativo, (FEPADE), El Salvador.
- Torcuato DI TELLA, Professor, University of Buenos Aires.
- María Angélica DUCCI, Special Consultant on Working Women, International Labour Organisation, Geneva.
- Eduardo Augusto DURAN BARRAZA, Director of Vocational Training, Ministry of Labour and Social Security, El Salvador.
- Jean-Pierre ECHEVERRIA, Asociación de Exportadores de Manufacturas A.G. (ASEXMA), Santiago, Chile.
- Rodrigo ESCOBAR NAVIA, Ex-Minister of National Education, Colombia.
- Roberto FANTUZZI HERNANDEZ, President, Corporación de Capacitación Ocupacional y Desarrollo Laboral de la Industria Metalúrgica (CORCAPLAM), Santiago, Chile.
- Manuel FELIU, President, Banco Concepción, Santiago, Chile.
- Oscar FLORES, Researcher, Instituto CET, Colombia.
- Luis Gustavo FLOREZ, Head Adviser, Nueva Colombia Industrial.
- Alejandro FOXLEY, Minister of Finance, Chile.
- Augusto FRANCO, Ex-President, Universidad Pedagógica y Tecnológica de Colombia, Ex-Director, Colombian Institute Educational Loans and Advanced Studies Abroad (ICETEX).
- Dorothea FURTH, Organization for Economic Cooperation and Development (OECD).
- Mario GALOFRE, President of the Board of Directors of the Instituto SER de Investigación, Principal, Colegio Gimnasio Moderno, Bogotá.
- Jorge GARCIA, Multinational project of education for employment, Organization of American States (OAS).
- Víctor GARCIA SOLIS, Director of Information, Ministry of Education, Mexico.
- Bernard GESSWEIN, Head of the Department of Studies, National Training and Employment Service (SENCE), Ministry of Labour and Social Security, Chile.
- Lorenzo GUADAMUZ SANDOVAL, United Nations Development Programme and Ministry of Education, Fine Arts and Religious Affairs (UNDP/SEEBAC), Dominican Republic.
- Francisco De Paula GUTIERREZ, Dean of the Department of Economics and Government, Central American Institute of Business Management (INCAE).
- Sven GROENNINGS, The American Express Company, New York.
- Leo HARARI, Consultant for Science and Technology, Inter-American Development Bank (IDB).
- Luis Felipe HARTMANN, Executive Director, Instituto de Formación y Capacitación Laboral (INFOCAL), Bolivia.
- Ann HEALD, Director, Employment and Education Fund, German Marshall Fund of the United States.
- Thomas Charles HELLER, Professor, Stanford University, California, United States.
- Rainer HERLETH, German Agency for Technical Cooperation (GTZ)/National Technical and Professional Training Institute (INFOTEP), Santo Domingo.
- Renato HEVIA, Principal, Colegio San Ignacio, Chile.

- Agustín E. IBARRA ALMADA, Director, Department of Employment, Ministry of Labour and Social Security, Mexico.
- María de IBARROLA, Department of Educational Research, Centre for Research and Advanced Studies, National Polytechnical Institute (CIEA), Mexico.
- Antonio ISA CONDE, President, Asociación de Industriales de Herrera, Parque Industrial Herrera, Santo Domingo, Dominican Republic.
- Teresa JUSTINIANO, Confecciones "El huso", La Paz, Bolivia.
- Enio E. KLEIN, Superintendent, Instituto Tecnológico do Couro, Calçado e Afines (ITCCA), Novo Hamburgo, Brazil.
- Bernardo KUGLER, Principal Economist, Population and Human Resources Department, World Bank.
- Ricardo LAGOS, Minister of Education, Chile.
- Jacques LESOURNE, Director of *Le Monde*, Paris.
- Luis A. LIMA, Director, Consorcio de Ingeniería Electromecánica, Asunción.
- Adolfo LINARES, Director, ORBOL, La Paz.
- Wolfgang LINDEMANN, Head of the German Agency for Technical Cooperation (GIZ)/INSAFORP, San Salvador.
- Roberto E. LIZ, Executive Director, Acción Pro Educación y Cultura, Santo Domingo.
- Juan Luis LONDOÑO DE LA CUESTA, Assistant Director, National Planning Department (DNP), Colombia.
- Gustavo LOPEZ, Director, UNESCO Regional Centre for Higher Education in Latin America and the Caribbean (CRESALC).
- Rodrigo LOSADA LORA, doctor of political science and education, researcher on Educational development in Colombia.
- Sylvain LOURIE, International Institute for Educational Planning, Paris.
- César MAIA, Congressman, Brazil.
- Francisco MALDONADO BUSTOS, General Manager, Corporation for Vocational Training and Labour Development in the Metallurgical Industry (CORCAPLAM), Santiago, Chile.
- Eliodoro MATTE, Vice-President of the Board of Directors, Paper and Cardboard Manufacturing Corporation, Chile.
- Román MAYORGA, Head Specialist for Education, Science and Technology, Project Analysis Department, Inter-American Development Bank (IDB).
- Jorge MENDEZ MUNEVAR, President, Federación Colombiana de Industrias Metalúrgicas (FEDEMETAL), Ex-President of the National University of Colombia, Ex-Manager of the Industrial Development Institute (IFI), member of the Science and Technology Mission.
- Leonard MERTENS, Regional Employment Programme for Latin America and the Caribbean (PREALC), Santiago, Chile.
- José MINDLIN, President, Metal Leve, S.A., So Paulo, Brazil.
- Gabriel MISAS, Ex-Director of the Science and Technology Mission.
- Sergio MOLINA, Minister of Planning and Cooperation (MIDEPLAN), Chile.
- Manuel MUÑOZ GUZMAN, General Manager, Ivo Creaciones, Santiago, Chile.
- Guiomar NAURO DE MELLO, University of So Paulo, Brazil.
- Hans NEUMAN, Presidential Commissioner for the Improvement of Technical Education, Caracas.
- Gail NIEDERNHOFER, Director, Office of Private Initiatives, United States Department of Education.
- William NOTHDURFT, Researcher, William Nothdurft Associates, Washington, D.C.
- Iván NÚÑEZ, Adviser of the Ministry of Education, Chile.
- Marisela PADRON, Minister of the Family, Venezuela.
- Nora PAGOLA, Venezuela.

- Laura PALOMARES, Department of Political and Social Sciences, National Autonomous University of Mexico (UNAM).
- Ernesto PARRA, CORFAS, Bogotá.
- Jesús Alberto PEREZ, Venezuela.
- Víctor Hugo PEREZ D., President, Occidental Bolivia, S.R.L.
- Luis PISANI, Education and Vocational Training Specialist. World Bank.
- George PSACHAROPOULOS, Director, Population, Education and Human Resources Department, World Bank.
- Jaime QUIJANDRIA, President, Petróleo del Perú (PETROPERU).
- Clemente QUINTERO, Director of Higher Education, Ministry of Education, Venezuela.
- Eliana RAHAL, TOP Consultores, Santiago, Chile.
- Germán RAMA, Director, ECLAC office in Montevideo.
- Jaime RAMIREZ, CORFAS, Bogotá.
- Luis RAMIREZ, Lead Economist, Division for Bolivia, Colombia and the Dominican Republic, Latin America and the Caribbean Region, World Bank.
- Luis RATINOFF, Director, Strategic Planning Office, Inter-American Development Bank (IDB).
- Fernando REIMERS, Harvard University, United States.
- Coromoto RENAUD, Venezuela.
- Eduardo RIVAS CASADO, International Affairs Adviser of the Ministry of Education, Venezuela.
- Juan José RIVAS PORTER, Executive Coordinator, Vocational Training Programme for Youth, Ministry of Labour and Social Security, Santiago, Chile.
- Carlos ROJAS, Systems Engineer, Researcher at the Instituto SER de Investigación, Bogotá.
- Gustavo ROOSEN, Minister of Education, Venezuela.
- Igor SAAVEDRA, Professor, University of Chile.
- Orietta SACRE, Regional Coordinator for Latin America and the Caribbean, Women's World Banking, New York.
- Francico SAGASTI, Principal Adviser, World Bank.
- Fernando SANCHEZ ALBAVERA, Ex-Minister of Energy and Mines, Peru.
- Julio María SANGUINETTI, Ex-President of Uruguay.
- Gonzalo SANCHEZ DE LOZADA, President, Revolutionary Nationalist Movement of Bolivia.
- Simón SCHWARTZMAN, Director, Research Nucleus on Higher Education (NUPES), University of São Paulo.
- Gabriela SIMON DE BRONFENMAJER, General Director, Youth Department, Ministry of the Family, Venezuela.
- Víctor SOLOGAISTOA, General Director of International Relations, ministry of Education, Mexico.
- Nelson STEVENSON PALAMARA, Executive Director, Educational Corporation La Araucana, Santiago, Chile.
- Alfredo TAMPE, Inter-American Research and Documentation Centre on Vocational Training (CINTERFOR) of the International Labour Organisation (ILO).
- Víctor A. THOMEN, Vice-President of the Board of Directors of the National Technical and Professional Training Institute (INFOTEP), Coordinator of the Entrepreneurial Sector, Santo Domingo.
- Víctor TOKMAN, Director, Regional Employment Programme for Latin America and the Caribbean (PREALC).
- Alejandro TOLEDO, Professor of Economics, Harvard Institute of International Development.
- Enrique TONO, Biologist and Industrialist.

- 
- Alejandro TOTH NOBEL, General Manager, National Professional Training Institute (INACAP), Santiago, Chile.
  - Benjamín TRAJTMAN GROSSMAN, General Manager, Centre for Administration and Training (CENAC), Santiago, Chile.
  - Carlos TUNNERMAN, Ex-Minister of Education, Nicaragua, Member of the Executive Council of UNESCO.
  - Francisco URDANETA, Project Coordinator, Nueva Colombia Industrial.
  - Miguel URRUTIA MONTOYA, Ex-Minister of Mines and Energy, Colombia, Ex-Vice-President of United Nations University.
  - Joo Paulo Dos Reis VELLOSO, President, Instituto Brasileiro de Mercado de Capitales (IBMEC), Rio de Janeiro.
  - Alfonso VALDIVIESO SARMIENTO, Minister of Education, Colombia.
  - Adriaan VERSPOOR, Principal Economist, Population and Human Resources Department, World Bank.
  - Hebe VESSURI, Researcher, Instituto Venezolano de Investigaciones Científicas (IVIC), Venezuela.
  - Pedro Daniel WEINBERG, International Labour Organisation Office in Buenos Aires.
  - Gerardo ZEGERS GANDARILLAS, General Manager, Association of Metallurgical Industrialists (ASIMET), Chile.