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Education in basic *skills and training* for productive work

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The success of global policies and strategies aimed at training for productive work depends to a large extent on the level of development of basic skills among the work force and, likewise, training costs will vary according to the level of general preparation of those entering on the process. In view of the close relationship between the structure of the school system, the development of basic skills and actual training, different options are available for attempting to resolve imbalances between training for productive employment and previous basic education. These range from expanding and upgrading formal education to hiring persons with a low level of education and compensating for their weaknesses through training, with a number of variants that lie somewhere between those two alternatives. Our conclusions, based on the available information, are that training cannot replace basic education, that the process of technological change goes hand in hand with an increased demand for workers with a high level of education, that substituting training in specific skills for good basic education is not the most efficient option, and that one of the favourable effects of primary education is that it facilitates after-school training. Attempting to improve labour productivity solely through specific training would not appear to be the most efficient option. Basic skills development is a necessary complement, if not a downright prerequisite, for vocational training. This article seeks to identify certain dimensions of human resource training which are often overlooked in relation to both basic skills and specific training proper: namely, the imbalances existing between vocational training and previous education, and the options available for correcting them.

I

Preliminary considerations

Since the late 1980s, there has been evidence in Latin America of renewed interest in securing an adequate human resource base to ensure a production structure permitting high growth rates. In numerous publications, attention has been drawn to the importance of human capital to economic development. Both microeconomic analyses (Becker, 1975; Amsden, 1989) and macroeconomic studies (Romer, 1986; Lucas, 1988; Azariadis and Drazen, 1993) have stressed the importance of human resource training for increasing productivity and economic growth. These studies and the empirical data on which they are based suggest that, under certain circumstances, vocational training can help to increase personal income, enhance competitiveness through improved productivity, and lower costs without the need for wage reductions. This factor of production also occupies a key position in recent considerations on growth theory. Solow (1993) affirms that investments lead to a permanent improvement in productivity and that the adverse effects on distribution can be offset by State policies, among which policies on education and training play an important role.

The value of education and training is confirmed by studies which point to the high returns on investments in this field. However, such studies often overlook two points. Firstly, the "distribution" factor affects the benefits of education, so that the more egalitarian the access to general education of equal quality, the greater the returns on investment in education and training. Hence, in order to obtain better results it is not enough merely to increase the expenditure on education: this must be accompanied by a general improvement in the quality of teaching. This assertion is supported by the fact that although the investment per student in private schools in the region is, in absolute terms, equal to or greater than the corresponding outlays of public establishments in most countries of the Organization for Economic Co-operation and Development (OECD), which display a more egalitarian distribution, the actual educational results are inferior. [1] A similar state of affairs may be observed with respect to vocational training.

Secondly, experience in rural sectors suggests that, in formulating strategies for human resource development, it should be borne in mind that "increases in productivity are only to be observed in a context of technological change; in areas of traditional technology, in contrast, no significant differences in productivity are to be noted between those who have been to school and those who have not...In a context of technological change, there is greater demand for and interest in schooling and other types of education and training" (Dirven, 1995). This is linked to the fact that the supply of technological innovations is generally endogenous to peasant agriculture (Figueroa, 1986), which leads to a demand for education.

A study carried out by ECLAC and the UNESCO Regional Office for Education in Latin America and the Caribbean (OREALC) (1992) sets out a number of these views, pointing out that the two main objectives of development in the 1990s are to achieve true competitiveness and greater equity. Education, in all its forms, is crucial to the fulfilment of these two objectives.

In Latin America, these views have aroused a great deal of interest, as demonstrated by government pronouncements and statements by employers' and workers' associations. However, many of these broad proposals, aimed at applying a systemic approach, tend to be vague and are often lost in a welter of generalizations which are confusing or difficult to apply. Policy thus remains at the level of general guidelines, to the detriment of practical considerations such as those relating to programme management, the identification of specific groups targeted for preferential treatment, the most suitable methods to be adopted, or the resources needed to implement effective strategies.

[1] For example: official curricula for mathematics and science, which are very similar throughout the region, are more limited in content than in the OECD (mathematics does not include analytical geometry, calculus or trigonometry, while sciences are taught in a manner that stresses encyclopaedic knowledge rather than experimental skills and do not take into account the most recent advances). In establishments affiliated to the International Baccalaureat system and to the French Baccalaureat, the curricula are similar to those in the industrialized countries, but the results are poorer.

At the same time, there is some confusion as to the most efficient strategies for building up a reasonable stock of human resources; the absence of coherent policies on the subject and the imbalance between demand for and supply of skills usually lead to inefficient use of resources.

From the institutional point of view, this can be attributed to the complex nature of the problem and to the number of organizations and bodies involved. Another factor that clouds the picture is the lack of coordination among organizations and the absence of institutions capable of implementing such complex policies. But other decisive factors are the lack of precision in defining the problems involved and the educational technologies used within the region for training human resources. Moreover, policy and strategy objectives are generally vague, the quality of results is either difficult to assess or else the measures used only assess performance within limited areas, and there is no efficient system of incentives.

Other aspects affecting strategic planning and policy formulation which are of quite a different nature yet very often affect their effectiveness and outcome include the following:

i) The demand for any type of education is very elastic, tending to rise faster than demand and immediately affecting the quality of the service. In addition, since education, viewed as a good, is both a consumer product and an investment, demand for this good is not regulated by market forces.

ii) Education is such a complex good that we should perhaps speak instead of a variety of different products with demand elasticities associated with the different levels and products available. Within each of these products there are different items that affect this elasticity. For example, both regular schools and vocational training institutions provide, in addition to the actual training which is their main product, a series of by-products –knowledge, prestige, access to higher levels of education and to specific types of employment, etc.– which may often appear just as desirable as the training itself, if not more so. Supply is much more inelastic than demand, and attempts to control the two through market forces have not produced the expected results.

A number of exogenous factors enter into the supply/demand ratio, including the following:

i) The educational system applies internal criteria, such as previous performance and certificates issued by the system itself.

ii) Education is an ongoing process which is not definitively completed within a set time-frame.

iii) Education carries prestige, and this prestige contributes to a demand for certain professions or occupations to the detriment of others.

iv) Since "wrong decisions" only become evident in the long term, such mistakes cannot easily be taken into account in subsequent decision-making or corrected in line with market trends, even when there have been drastic changes.

II

Imparting basic skills

The concept of "basic skills" evolves and changes in keeping with the technological progress of a society. For example, computerization has made the capacity for abstract and logical thought more important than manual skills or even highly developed motor skills (Delker, 1990). The structure of basic education in most countries of the region dates back to an era when the demands of society did not correspond exactly to those of today or to the qualifications required by those who will not be going on to the secondary or higher educational levels.

Basic skills include, among others, the ability to identify and formulate problems, the ability to work in a team, and willingness to learn. These have been examined recently in a number of publications. However, as we shall see in section VI below, no such analysis has yet been made of the content of specific training for each trade, with a view to improving productivity and quality, in situations such as that of Latin America.

There is a close relationship between the structure of the school educational system, the development of basic skills, and training proper. This means that there is also a relationship between the State, educators and the companies (private and public) which will be offering employment to qualified

persons. Different combinations of public and private systems have generated three basic models for the organization of education and training.

In the first model, the State does not play a significant role in vocational training, which is market-regulated. The best-known examples of this model are to be found in Great Britain, the United States and Japan. In these countries, vocational training is not linked to the formal educational system, nor does it come under government control or regulation: it is directly linked to production.

In the second model, the State plans, organizes and controls vocational training; the system may be described as one of distribution or allocation, since the most widely-used policy instrument is the supply subsidy. This is the model applied in France, Italy, Sweden and in most of Latin America. Its main characteristic is a close association with the school system and a direct relationship between school diplomas and professional qualifications.

The third is a market-based model, subject to State control. This has been developed especially in Germany, Switzerland and Austria. There is close collaboration between the Government and businesses, with a clear demarcation between vocational training and public education. This system was established to meet the needs of artisans, but later it was also adopted by industry.

The first of the models described above is structured in relation to demand, the second in relation to supply, while the third seeks a balance between the two.

Supply-based systems, which are applied in the majority of vocational training institutes (the National Vocational Training Institute (INACAP) in Chile, and the National Association for Technical and Vocational Training (CONALEP) in Mexico, to name only a few), follow academic programmes whose performance criteria are determined by the educational system itself and not by the demands of the production sector or by students' need to find a place in the job market or in society. Much of the instruction provided, including vocational and technical training, bears no relationship to the needs of employers. Programmes are excessively long and inflexible. Theoretical classes bear no relation to practice and are geared more towards getting ahead within the system than to satisfying the needs of the job market outside: an attitude in keeping with assessment criteria defined from the supply side itself. The rigidity of these systems and the emphasis on performance for internal progress mean that students are poorly fitted to meet the changing needs of the job market.

For its part, the production sector finds it difficult to convey its requirements, primarily because, despite the existence of critical demands for skills, employers do not have instruments for formulating them nor the organizational channels for communicating them. The qualifications required today are complex, imply new methods of organizing work and are changing very fast as a result of technological innovation and the importance now attached to international competition.

The supply/demand imbalance in basic education and in vocational training institutes often leads to waste and hence to a by no means negligible loss of resources. Policies for overcoming such imbalances should address two problems: defining what has to be taught, and accomplishing this at the lowest possible cost.

Demand-based systems seek to adjust and correct supply. Policies which favour demand, through consumer subsidies or other similar instruments, seek to increase its quality and quantity through market pressures. However, some policies for subsidizing demand can also have adverse effects when not accompanied by concrete steps to achieve market transparency. This is noteworthy in the case of items whose deficiencies in terms of quality or quantity can only be corrected by the market in the medium or long term, as is usually the case with non market-oriented social goods, and above all with human resource training. In such cases, demand subsidies will be effective provided they are accompanied by measures and instruments for adjusting demand.

The educational model applied in Germany, Austria and Switzerland, known as dual or alternating education, whose application in the region will be examined below, seeks to overcome the shortcomings of inflexible supply-based systems by putting the emphasis on demand and introducing mechanisms for articulating it with participation from the employers and workers who will benefit from such mechanisms: it seeks to organize school training programmes, with active participation from the production sector in the planning and management of formal education, and to design courses for developing skills and determining suitable performance standards for the trades in question.

III

The school system and the cost of training

Whatever form the relationship between the educational and training systems and the productive sector may take, the role of basic education is important. One of the effects of primary education is that it facilitates training outside the school. There is a direct relationship between the quality and quantity of basic education received and the extent and intensiveness of training required in order to enter productive activities and attain a level of performance equal to or approaching the average (table 1).

In table 1, columns 1 to 3 indicate the average cost of initial training of workers in different low-productivity sectors. Columns 4 to 6 indicate the savings that these same companies would have made if their workers had benefited from approximately three additional years of education.[2] In countries where primary education enrolment rates are close to 100%, as in the case of Argentina and Chile, the savings for the companies approach zero. In countries with lower primary education coverage, however, the savings are considerable, amounting in some cases to half the cost of initial training. But the greatest benefits for these countries are of a different nature, since additional education would create suitable conditions for raising productivity and increasing receptiveness to technological innovation.

TABLE 1

Latin America: Estimated cost of training, and saving on that cost through extra spending on education in school [a]
(In 1990 dollars)

Countries: \ Sectors	Average cost of initial training needed to achieve levels of performance equal to the company average			Estimated saving on training costs through extra spending on education in school [b] (%)		
	Foodstuffs, beverages and tobacco (1)	Footwear, wood and furniture (2)	Earthenware, pottery and china (3)	Foodstuffs, beverages and tobacco (4)	Footwear, wood and furniture (5)	Eartherware, pottery and china (6)
Argentina	200	600	300	-	-	-
Brazil	188	450	225	48	37	41
Chile	130	390	260	-	-	-
Colombia	120	320	160	31	25	25
Costa Rica	192	516	256	27	26	24
Guatemala	103	246	123	49	40	87
Honduras	136	318	159	50	42	39
Jamaica	100	500	250	50	40	40
Panama	392	980	490	52	37	53
Peru	110	290	160	32	21	80
Dominican Republic	152	363	182	47	27	42

Source: PADI (Industrial Dynamics Analysis Programme); ECLAC; surveys.
[a] Prepared on the basis of minimum wages, data obtained from company surveys, and projections.
[b] Extra spending equivalent to three years of school coverage per student, based on public expenditure per primary-level student in 1990. Average productivity equal to 50% of the sectoral average during the period was estimated. Only wage costs were taken into account. No costs were included for materials, supervisors, loss of raw materials, etc.

"Assuming that the minimum mathematical proficiency required to handle the new technological packages is equivalent to what is learnt in the fourth and sixth years of basic education (in agriculture and industry, at least eight years are necessary), the scope for technological innovation in the region, although better than in the past, remains low" (Dirven, 1995).

[2] Based on national and international inter-company comparisons.

Just to give a few examples, in the late 1980s the average number of grades successfully completed was 3.3 in Brazil and 4.8 in Paraguay and Peru; the best averages were recorded in Chile, Argentina, Uruguay and some of the former British Caribbean islands, but even then they did not amount to six successfully completed years.

Low educational levels affect not only technological innovation but also job performance. It is common for workers to be unable to convert centimetres into inches, estimate curved areas or calculate the pressure of liquids and gases, which leads to inaccurate measurements and decisions that result in wastage.

The sectors referred to in table 1 are low-productivity sectors in the region, but they currently employ a very high percentage of the industrial labour force (ranging from 40% to 70%, depending on the country). This low productivity is due mainly to the technological level attained. To achieve substantial increases in productivity, important investments in machinery, instrumentation and organization are necessary. But when such investments are made, individuals with a low level of schooling find themselves excluded because they lack the necessary basic skills. As will be seen below, developing in adults the skills they need to attain the cultural level required by new technologies is a very costly business.

Comparisons with Southeast Asia and with some sectors in certain European countries indicate that organizational and process improvements generated within production plants (endogenous innovations) may become a very important source of increased productivity. Within companies in the region, the factors that inhibit the production and application of endogenous innovations are educational deficiencies and unsuitable management procedures. The development model in Southeast Asia and Japan has fostered such innovations, which have been made possible, in part, because the educational levels of the labour force are consistent with forms of management which stimulate the creativity of each worker.

In all the countries studied, savings in training costs are particularly noticeable in such sectors as footwear, wood and wood products (excluding wood pulp), and furniture and non-metallic fittings, which use virtually artisanal, labour-intensive technologies learnt mainly on the job. Such technologies depend to a great extent on the initial training workers possess when they join the establishment. Savings in the food and beverages sector are lower in absolute terms, but high in proportion to the cost of initial training. The technologies used by companies in this category tend to require less highly-skilled labour.

IV

Basic skills and technological development

The option of using persons with low educational levels and making up for their shortcomings (lack of qualifications) through training demands high investments –just as high as, if not higher than, the training itself– and it is less efficient than hiring persons with at least ten years of education. Roese found companies in Brazil which adopted the first-named strategy in 1989 but subsequently abandoned it when there were signs of a recession; one of them, with a total of 3,000 workers in production activities, had 300 workers undergoing compensatory training programmes and another 300 waiting to start them; another company, with 400 production workers, had 90 in programmes of this kind (Roese, quoted in Fleury and Humphrey, 1993). Some Brazilian companies which were carrying out restructuring programmes to improve quality were obliged to raise their workers' educational levels by giving them courses in Portuguese, basic mathematics and elementary statistics (Gitahy and Rabello, 1991). The same situation was observed in Jamaica in 1994. This strategy has limitations and involves risks for employers, on account of its direct and opportunity costs, but it may be used when all else fails.

Preparation for the use of more complex technologies, such as those employed in more capital-intensive production functions, supposes a higher cultural or educational level than that provided by primary education alone. Automobile companies established or restructured over the last few years are a case in point. A particularly enlightening example is that of two automobile plants in Argentina belonging

to Ford Motors, one situated in Buenos Aires and the other in Córdoba. The workers in Córdoba have a much higher level of education than those in Buenos Aires: those with only primary education represent barely 6% in the case of the first-named plant, whereas for the latter, the figure is 50%. With respect to non-manual workers, at the Córdoba plant over 60% have full secondary or university qualifications, while at the Buenos Aires facility only a quarter have attained a similar level of education.

In 1993, the Córdoba plant exported nearly 85% of its production to Europe and Brazil. Technologically, it is much more advanced than the Buenos Aires operation, and its installations, organization and design are more modern: for example, some operations which are mechanized in Córdoba are still performed by hand in Buenos Aires. This illustrates the relationship between the degree of technological development and the level of qualification of the work force. Technological improvements generate a demand for workers with higher levels of basic training, which can be the foundation for an efficient training process. The Córdoba plant, which is newer, represented an investment of US$ 250 million, whereas the one in Buenos Aires still has some equipment that is over thirty years old.

On the basis of the available data, we may conclude that the process of technological substitution of capital for labour goes hand in hand with a greater demand for workers with an educational base equivalent to secondary education. When this is not available, consideration must be given to compensatory education programmes. In the best of cases, a training process for workers over 18 that makes up for the most important gaps due to lack of secondary schooling would take about 20 months, at the rate of approximately 25 hours per week (such programmes are offered, for example, by the Fundación DUOC Vocational Training Institute in Chile). At the end of this period, the individual would then normally be in a position to start initial training proper –which in high-technology industries in the region means a further two to four months– before being able to start working as a full member of the production team.

The estimated cost of programmes like these in some countries of the region is shown in table 2. This cost is the opportunity cost for the workers, if they pay directly for the compensatory programme, or, for companies with more advanced technologies, the cost compared with that of finding educated or experienced workers on the market, or, for the State, the cost if it decides to cover the expense of such training. This last scenario does not depend on the educational model implemented but rather on the role assigned to governments in human resources training. Compensatory programmes, although aimed at enabling persons to make up gaps in their secondary education, are equated with training programmes. This means that they are governed by the policy instruments which lay down guidelines for the latter and by the emphasis on supply or demand which characterizes them.

When compensatory programmes are determined by supply, it will be the State which will tend to assume a greater portion of the costs and, at the same time, establish evaluation, monitoring and certification mechanisms to bring these programmes in line with the school system. When demand is the decisive factor and there is a close link between training and basic skills education, the tendency will be for the costs to be borne by workers, companies, or by the State (through subsidies for on demand from individuals or companies). But the greatest difficulties in carrying out these programmes are not related to costs but to institutional factors including certification, the preparation of teaching programmes, and their coordination with the demand generated by production activities.

TABLE 2

Latin America: Estimated cost of compensatory programmes versus four years of secondary education[a]

(In 1990 dollars)

Country	Compensatory programme (20 months)	4 years of secondary education
Argentina	2 285	412
Brazil	1 220	669
Chile	1 714	677
Colombia	1 372	270
Ecuador	1 437	317
Guatemala	641	185
Honduras	916	317
Jamaica	1 118	795
Dominican Republic	1 029	191

Source: UNESCO, 1992.

[a] Present value of schooling estimated using a discount rate of 10% per year compared with 1990 expenditure. The present value of opportunity costs was based on 1994 minimum wages, with a monthly discount rate of 0.8%.

Table 2 shows the present costs of compensatory training. In each case, the opportunity cost is assumed to be equivalent to the minimum wage for workers: a very conservative assumption not only when dealing with workers in high-technology companies but also in many cases with self-employed workers too. A productivity level of 50% is assumed for the compensatory training period. These values are compared with the present cost of four years of conventional secondary schooling, in line with each country's expenditure on education: i.e., on the assumption that current quality levels are maintained [3]

This information suggests two possible options for attracting investments in the most productive sectors, which are generally capital-intensive and require a workforce trained to carry out complex tasks, or for upgrading the educational level of firms using advanced technologies. The first option is to increase the coverage of the school system in order to improve the education of young people before the age of 18, and the second is to encourage the extension of special compensatory programmes to make up for gaps in secondary education.

The present value and externalities of each option would suggest that preference should be given to improving school education, since it costs between 0.5 and 8 times less than compensatory programmes for those over the age of 18. Nevertheless, if this were the sole and exclusive option, it would mean ignoring the existence of a very important contingent of older workers in the region who lack the basic skills for modern industry and who would benefit from compensatory programmes.

It is also necessary to consider the problem of the quality of education, which has not been touched on in the previous considerations and estimates. Given the characteristics of education in the region, for the most part highly unsatisfactory, some quality deficiencies could be compensated for by extending the coverage of basic education when lack of resources, technology or time prevent the introduction of substantial qualitative improvements.

It would be a matter of achieving universal coverage of at least eight years of schooling, assuming that the more appropriate alternative –better quality schools– is not possible. An average increase of three years of basic schooling could reduce training costs appreciably. But an increase in schooling would be of benefit not only in terms of reducing the cost and duration of training; other incomplete information suggests that it would also improve professional performance, improve career prospects for workers, ensure absorption of implicit knowledge on the job, and help the adaptation of knowledge to new working situations, thus facilitating the introduction of new technologies or moves from one job to another. In addition to these considerable benefits, a sound basic education would enable workers to make the most of subsequent educational opportunities and would offer collateral benefits such as a reduction in vagrancy, delinquency and unemployment among young people.

Thus, it is imperative to create conditions whereby the entire population will have access to what society defines as basic education. In the member countries of the Organization for Economic Cooperation and Development (OECD), no profitability studies have been carried out for primary education because the economic profitability variable does not enter into policy considerations at this level of education. The Latin American countries also hold that all persons have the duty to undergo basic education, which consequently creates the right to receive it, quite apart from the economic benefits that it may procure.

[3] Compensatory programmes cannot be completely equated with four years of secondary schooling, so that strictly speaking they are not interchangeable goods. However, the comparison is useful as it provides valuable background information for policy formulation.

V

Human resources in low-productivity sectors

The sectors represented in table 3 are low-technology industries operating within the region on a labour-intensive basis requiring, supposedly, a workforce with the equivalent of at least six years of complete primary education. Not all countries have a workforce with this level of education, however (the average of grades passed in the region is 4.2 years; in Chile it is 5.6 –the best average–, in Argentina, 5.3, in Brazil 3.3, in Peru, 4.8 and in Mexico, 4.9).

Even though a good general education is a profitable asset and employers are aware of the fact, they are reluctant to make the necessary investments because the returns are visible only in the medium or long term. Moreover, the actual benefit may be zero because basic skills education facilitates a high turnover of workers.

Assuming that the relationship between primary and secondary education and integration in the workforce is maintained, table 3 shows the effect of investments aimed at upgrading the level of education in segments of the population with low levels of schooling. Their integration in the job market would be enhanced by improvements in primary and secondary education. Increased rates of coverage at the secondary level would have more significant results than at the primary level. Improvements would be perceptible both in occupational status and in the level of remuneration.

TABLE 3

Latin America: Additional costs involved in extending schooling by three years at the primary and secondary levels, and hypothetical effects on integration of population segments of 15 years and over into the workforce [a]
(1990 dollars)

	Extra cost of increasing primary-level schooling (grades 0-6) by 3 years (US$'000)	Improvement in occupational status through increasing expenditure on primary-level schooling (simulation) (%)	Extra cost of increasing secondary-level schooling (grades 6-10) by 3 years (US$'000)	Improvement in occupational status through increasing expenditure on secondary-level schooling (simulation) (%)
Brazil	105 542	18.3	670 928	2.3
Bolivia	2 162	6.9	173 377	5.8
Colombia	58 013	9.8	219 871	-
Costa Rica	6 435	14.5	56 037	25.2
Chile	16 731	7.1	56 027	23.0
Guatemala	14 935	24.3	66 750	26.0
Mexico	49 878	19.7	1 439 123	20.4
Panamá	12 600	17.5	40 242	31.9
Paraguay	2 070	12.2	34 907	34.7
Uruguay	13 740	13.8	21 325	18.3
Venezuela	22 134	17.3	58 163	21.2

Source: ECLAC, Special tabulations of household surveys of the respective countries; UNESCO, 1992.
[a] Employment in more productive activities.

VI

In-company training

A great deal of emphasis is now placed on the importance of basic skills education as a means of improving worker productivity. This is a justifiable concern, since limitations in terms of productivity and scope for applying new technologies are due in large part to deficiencies in this area.

The tendency in the region today is to assign to companies all kinds of responsibilities, including that of basic skills training, which traditionally has been provided by the public educational system. Peres (1994), however, suggests that although this may be unavoidable in the current economic situation, it seems to be due less to any non-interventionist virtue on the part of the State than to omissions in the fulfilment of some of its essential functions. Similar trends can be observed in the health sector and in the development of national science and technology systems.

Innovations in human resource education and training of young people through the school system, dual education and courses offered by vocational training institutes are not going to benefit workers already engaged in productive jobs. It is highly probable that over 80% of the persons currently employed will still be working 10 years hence, at least 60% 20 years hence, and over 50% 30 years hence. To these numbers must be added all the young people now entering the job market and those who will be entering in the next few years without having benefited from possible progress in the school system. The effects of any reform in the general or dual education systems will not be apparent until at least five years have passed. This is why the issue of on-the-job training is so crucial if there is to be any serious attempt to improve productivity levels.

With respect to those currently working, one may well ask whether, to what extent, and under what conditions this training can compensate for their deficiencies. In various countries of the region, it has been observed that training is not a substitute for basic education. The latter has specific features and develops skills which are taken for granted when training proper is started.

Companies concern themselves almost exclusively with specialized training, since they do not have any incentives to invest in the teaching of basic skills. The greatest hindrance to investment by business in such training is the turnover of qualified workers. This is facilitated by the level of training and the professional experience of a worker, which increase his value on the job market: a worker with experience and qualifications can find a job with more attractive conditions. Businesses are therefore reluctant to offer general training to the workforce, preferring to give specific training defined as the practical expertise required for operating the tools of the trade. In order for businesses to get involved in basic skills training, they would have to be offered incentives in excess of the cost associated with staff turnover and the risk that such investment implies. Such a policy would be difficult to implement. A more useful proposal seems to be that of Ramos (1994) who, following the same track as Becker, suggests a private loan market for investments in human capital. According to Ramos, the lack of loans leads to poor allocation of resources in the economy, which is detrimental to efficiency and equity; in this regard, he suggests the establishment of a loan system using pension rights as collateral.

Training schemes with a general training component would appear to be very attractive in firms with a very large conventional capital component. In the Hermosillo motor plant in Mexico, initial expenditure on general training amounts to between 0.5% and 1% of total investment (US$ 500 million). However, a similar training scheme does not have the same effect on the total investment structure of firms (including those with a similar-sized workforce) that are more labour-intensive but have lower fixed assets. Trying to apply this scheme to firms that have not made or are not in a position to make capital-intensive technological changes would mean allocating a higher proportion of total investment to human capital development.

This raises the question of whether capital/labour mixes in which the labour component is predominant require, or can benefit from, such intensive training processes; and secondly, whether an investment with a higher than usual human resources training compo-

nent is cost-effective. These questions have a direct bearing on decisions regarding the advisability of investing directly in training, independently to some extent of fixed capital investments.

Although there is no information that allows for a definitive answer, there are some indications that may serve as guidelines in this type of decision-making. With respect to the first question, what was achieved in the case of the Hermosillo plant in Mexico was the teaching of basic skills, together with the development of specific know-how required for working in the automobile industry. This is necessary in order to bring workers up to a level of actual production similar to that of comparable industries in the industrialized countries (Shaiken, 1990) by upgrading their general and specific training. This level would thus be comparable to that of workers in many German or Japanese firms who have completed the initial training course. [4]

In the industrialized countries, it is not only the leading companies that have workers with this level of education, and nor are they the only ones that offer intensive specialized technical training to their workers. In those countries, the productivity of firms –whether old or new, large or small– is attributable primarily to the qualifications of their workforce. In Japan, for example, the training period does not necessarily depend on the companies' production function. In Germany, the educational level and level of qualifications in production units are famous for their high standards, whatever the size of firms or the sector in which they operate, and the same is true of their labour productivity.

In the industrialized countries, it is not only productivity which is associated with high levels of training, but also the industrial sector's capacity to introduce technological innovations. The scope for continually incorporating new production technologies is dependent, among other things, on such excellent levels of training.

If the experience of these countries is applied to our own region, it might be concluded that this kind of training could also benefit companies with less capital-intensive production functions. However, it is necessary to determine under what conditions such schemes can be applied in firms less committed to building up their human capital.

First, there is the cost. In Hermosillo, the initial expenditure per worker on training during the first years of operation was US$ 1,555 dollars merely in terms of wages; in addition, there are costs for materials, teaching staff and the premises used, not to mention the opportunity cost involved in bringing the workers up to average productivity levels, once they have completed their training. It would be difficult for labour-intensive businesses to make similar outlays and, even if they were able and willing to do so, it is doubtful whether they would thereby attain a level of productivity which would place them in a sufficiently competitive position to offset such investment.

As mentioned above, investment in training may not appeal to employers since it contributes to labour turnover. This was one of the most serious problems encountered by the Ford plant in Mexico: in the early years, the turnover rate was 40%, which naturally meant a high additional cost. The cause of this high worker mobility was precisely the training they had received, which encouraged them to seek better-paid jobs or to opt for self-employment in the same sector, but outside of the company.

Employee mobility in the region is a chronic problem. The development of skills does not help to solve it unless it is accompanied by social benefits such as some industries have offered (child-care centres, production bonuses, long-service awards, training incentives, etc.). [5] These measures imply additional costs and, undoubtedly, important management changes.

Lastly, raising the basic educational level of workers may be counter-productive in so far as it leads to ambitious expectations as to the type of job to which workers can aspire. Fleury and Humphrey (1993), basing their study on a sample of companies in São Paulo and Rio Grande do Sul, report that in Brazil workers who upgrade their education and obtain certificates expect to "move up" to an administrative job. In order to keep workers with high

[4] In the Japanese automotive industry, new workers receive an average of 340 hours of training (Krafcic, 1990), which is only half of that received by workers in Hermosillo. The reason why extra training is needed in Mexico is that the workforce has a lower level of education on entry.

[5] Examples of such firms are Fantuzzi in Chile and Hofab in Jamaica.

educational levels in production operations, Fleury and Humphrey recommend raising the overall coverage of the educational system. If this is not done and only a few workers improve their educational level, then they are going to seek jobs outside of production.

This confirms the relationship that exists between the educational level of production workers and the school enrolment ratio of the population. The type of mobility described is more common in countries like Brazil which have a low enrolment ratio than in Chile or Argentina, where the ratio is in the vicinity of 90% for the 7-14 age group, and it is even less common in the industrialized countries, where there is 100% school coverage.

VII

Investment in training

Even though the present level of investment in training is very low, employers have little control over its benefits. These emerge over the medium or long term, are not always obvious, and employers may well reap only a fraction of the benefits, given the high rate of turnover in the workforce. Human capital is a factor of production whose behaviour is difficult to predict and even more difficult to control in view of the numerous social, economic and political considerations that come into play.

In some cases, the additional investment in training does not always produce an additional benefit. Very frequently, benefits are achieved only when all workers in the plant are trained. In other cases, there may be a temporary gain, but without technical and motivational training, or without on-going refresher courses, whatever progress is achieved is soon lost.

In the region, an apparently contradictory situation has emerged: on the one hand, there is a high degree of consensus among employers and employees as to the value and desirability of more and better education and training (Fleury and Humphrey, 1993; Ferraz, Rush and Miles, 1992), but on the other, economic decisions do not encourage expenditure in this area.

An easy but at the same time contradictory response would be to assign greater responsibility in this field to governments. This is not a convincing solution, however, because many experiments of this kind in the region have given unsatisfactory results; because centralized State training does not take into account the specific needs of each industry and does not systematically take account of on-the-job training; and finally, because it is necessary to improve on-the-job training without removing it from the context of actual production and without separating the companies from it.

Every strategy to improve this training should take into account the amount that companies are able and willing to spend on human capital training. The response is not the same in all sectors or all sizes of firms, and it is influenced by the degree of technical progress attained or aspired to.

Companies which use capital-intensive production methods and are introducing new technologies plan their investments in training as a vital component of their overall investment portfolio, especially when the latter is large. In this type of company, on-the-job training is given preferential treatment through human resources departments or through the services of specialized agencies; these companies seek their own solutions and allocate funds on the basis of their technical requirements.

The situation is more difficult in the case of companies whose production methods are labour-intensive, without much technological innovation in production or management, and the problem is even more complicated if the firms are small or medium-sized. The kind of training schemes used by big motor companies with highly advanced technology are beyond their reach. The fiscal incentives applied in many countries of the region (tax rebates of 1 - 2% of the payroll for training expenses) have not yielded the expected results: often employers do not make use of these allowances even when they recognize that it is desirable to have a well-trained workforce, and the allowances are often used for other purposes.

This situation is an obstacle at least to i) efficient operation of the technologies in use; ii) the introduction of new technologies; iii) reducing the disparity between modern companies and traditional ones, and iv) reducing the disparity between the countries of

the region, on the one hand, and the Southeast Asian and industrialized countries on the other.

If many businessmen either cannot or will not spend 1 - 2% of the payroll on workforce development, even when tax exemptions are obtainable, then it is difficult to imagine what contribution they *would* be prepared to make, and what underlying economic rationale they follow.

Many medium and large-scale enterprises using conventional technologies reduce the training period for basic skills training and on-the-job specialization by using workers who already have some experience in the sector. This strategy allows them to operate with some degree of efficiency, but is not always conducive to the creation of suitable conditions for technological innovation or for bringing productivity levels more in line with those of more advanced sectors inside and outside the country. Moreover, these practices contribute to higher rates of mobility within the workforce. The advantage is that their training costs are reduced, even when they pay higher wages than those of the companies the workers came from. They achieve economies by shortening the training period, they do not need to develop basic skills, and they reduce the initial period of low productivity, while they also limit the waste of materials due to the mistakes characteristic of workers who are novices in the sector. And lastly, they do not need costly human resources departments.

Hiring workers with experience is also a strategy used by large enterprises, sometimes in complementation to others. The most noteworthy case is that of the Ford plant at Hermosillo mentioned earlier. This company changed its hiring policies, and hence its training policies, in response to the high turnover that it experienced in its initial years of operation, which was partly due to its own human resources training strategy. Because of this problem it decided to train older workers, with less formal education but with working experience, and was thus able to cut back basic training from four to two months, spread out over a longer period. No decline in productivity has been observed as a result of this new hiring and on-the-job training strategy.

The Nissan plant at Aguascalientes (Mexico) also employs workers with some schooling and work experience and trains them for a period of approximately two months, obtaining high standards in terms of quality and productivity (Shaiken and Mankita, 1994); it would appear that this strategy offers more advantages for companies than Ford's original scheme in Mexico which was based on intensive initial in-plant training programmes.

The economic value of on-the-job experience is corroborated by profitability estimates: Butelman and Romaguera (1994) estimate that in Chile, working experience provides an average return of around 3% per year, which indicates that the know-how acquired with practice yields particularly high returns. The biggest drawback of policies based on hiring experienced workers is that when such human resources are scarce, all companies are competing for the same workers in a short space of time.

In highly productive, capital-intensive sectors, training costs are higher than in companies that use less advanced technology, but the requirements for previous education are also higher. In the high-technology motor industry, such as the Ford plant in Mexico or Transax in Córdoba (Argentina), the educational level of most workers is appreciably higher than in less technologically advanced companies.

A technologically advanced industry will only decide to invest in training programmes that are specific to its production needs if its workers have a level of schooling equivalent to secondary education. Such specific programmes are quite complex, and generally very costly.

It does not seem efficient to pursue higher levels of productivity solely through specific job training, since the cost-benefit ratio is less favourable than that based on a mass education modality.

In companies with traditional systems of organization and technologies, training is currently quite informal. On the shop floor, it is the supervisors who show the workers how to use machinery and instruments and who teach company procedures. The more limited or poorer a worker's previous schooling, prior job experience or vocational training, the longer the learning process will be.

In companies of this kind within the region, no manuals, textbooks or methodologies are used for systematic training. Often, the training process is simultaneous with production work itself, in which trainees are involved from their first working day. The visible costs of training include workers' wages and wastage of materials due to inexperience, while invisible costs mainly consist of the time devoted by supervisors to the task. Given the informal character of these arrangements, training periods (and hence costs) vary significantly between countries and sectors and even between firms in the same branch.

The factors that affect training costs most directly seem to be the worker's educational level and previous experience, the complexity of the technology used, and the level of wages in each locality. Thus, the training period is shorter in the garment industry than in the woodworking industry, where the more complex machinery usually used requires a longer training period, and moreover it has not been feasible to simplify or mechanize tasks to the same extent as in the garment industry. The level of prior schooling of workers influences the time needed for their training. Another factor that affects training costs, which is not reflected in the figures in table 3, is the wastage of materials. This is particularly important when the materials are not recoverable, as with wood or textiles, but may be somewhat less serious in the metal-working industry, where scrap can be recycled and used as raw material.

Training costs do not necessarily vary in the same direction or the same proportions as labour productivity. Indeed, some of the least productive sectors, such as the leather and footwear industry in Colombia, Panama and Venezuela, have higher training costs. The machinery sector, for which training costs are not available but which are usually the highest of those represented here,[6] does not always post the highest productivity rates.

The available information does not reveal the relationship that must exist between capital structure and training costs. Nor does it allow for an accurate assessment of the true impact of marginal expenditure on human capital training. It does, however, at least allow us to formulate the theory that in the sectors mentioned, which are for the most part labour-intensive, additional expenditure on initial training offers little scope for improving productivity unless, at the same time, there are parallel investments in traditional capital which lead to technical substitution and general development of the workforce within the production unit. It may also be assumed that it is more advantageous to spend money on the development of general basic or sector-specific skills than on an ongoing training process.

In these sectors, it would probably be more worthwhile to improve the *effectiveness* of current expenditure on training rather than increasing such spending. This would mean modifying the informal training structure, improving educational technologies, coordinating business efforts by sector with support from training organizations, and systematically incorporating know-how acquired on the job.

Lastly, consideration should be given to a dimension that has to do with bargaining mechanisms, business practices and macroeconomic factors which are often beyond the control of employers and workers. Some authors[7] point out that in order to ensure that the results of training are reflected in labour productivity, there should be certain understandings, the most important being the principle that employers should offer job stability in return for worker loyalty. In the region, job stability is not usually a matter for collective bargaining, so that many of the agreements on this issue are implicit and hence precarious.

VIII

Vocational training options

The school system's difficulty in establishing links between the content of the training provided and the demands of the production sector can also be observed in the vocational training institutes. Like the schools, these often have an orientation that is determined more by their own supply than by demand, and only the areas of administration and management designed for big business concerns seem sensitive to real demand.

How can one establish a better balance between the demand generated by the production sector and the supply of trainees coming out of vocational training institutes? One alternative is to use the method applied in the United States and Mexico, where studies were

[6] Training periods in this sector are longer than, or at best equal to, those in the woodworking or footwear industries, and wages are higher.

[7] Such as Coriat (1991), Fleury and Humphrey (1993) and Roese (cited in Fleury and Humphrey, 1993).

carried out on skill requirements, through analysis of different types of work. However, this strategy is very costly and its findings only hold good for a limited period of time. Furthermore, it requires the establishment of coordinating and executive bodies.

Another strategy would be to privatize vocational training, to seek optional financial arrangements, and to allow the market forces to regulate supply. INACAP, in Chile, has followed this strategy. One of the most noticeable effects has been the more "elitist" trends in training, since institutes run on this basis tend to focus on technologically advanced sectors and on jobs in the higher brackets.

In outlining a strategy for vocational training institutes, it should be borne in mind that they have greater access to private funding than other types of institutionalized training, their total income and income per student exceed the average levels for technical and secondary vocational training in the region, and they can generate income of their own by selling services.

The dual education modality has characteristics different from those of other types of training. It originated as a variant of technical education within the school system, because doubts as to the effectiveness of this latter type of training led many countries in the region to seek other ways of organizing technical secondary schools. According to some studies, the earning capacity of students from technical schools is similar to that of students from general schools in Lima (Moock and Bellew, 1988), and similar findings were reached by Butelman and Romaguera (1994) in Chile. Schiefelbein and Farrel (1982), in another study on Chile, point out that the lack of incentives in technical schools for students to pursue academic goals adversely affects their performance. Psacharopoulos and Loxley (1985) found that both in Colombia and Tanzania, students graduating from technical schools did not have any advantages over those coming out of the general secondary education system in terms of finding jobs or obtaining better wages. Another series of studies carried out by the World Bank between 1965 and 1988 both inside and outside the region (Haddad, Carnoy, Rinaldi and Regel, 1990) suggests that investment in technical secondary schools is not the best strategy for stimulating economic development and that this form of training is not the most efficient for providing the requisite skills.

It has also been observed that in the majority of countries in the region, technical secondary education is of poor quality. The inadequacies of vocational education are most keenly felt by companies with highly advanced technology and workers trying to enter such firms. On the other hand, artisans, some microenterprises and some self-employed workers who usually use lower levels of technology still benefit to some extent from the know-how and skills developed through this type of training.

The above considerations, and the limited redistributive effect of technical education as imparted in the schools, have pointed to the need to seek a way of restructuring this modality, bearing in mind existing budgetary constraints.

Schools offering dual training represent a possible alternative. In Latin America, no dual training systems have been developed that are comparable with those in Germany. There are dual modalities within the school structure and in some vocational training institutes, but their development is different in the nine countries where this system exists. In Argentina, Guatemala, Paraguay and Venezuela, businesses play an important role, while in Argentina and Venezuela educational establishments are also heavily involved. The training period lasts between one and three years. An exception is Chile, where a four-year programme is being developed within the technical secondary schools and a six to eight month programme for adults.

The experience of Germany, Austria and Switzerland in dual education is valuable for the region, since it has shown that it can be implemented by involving enterprises of all sizes. In Germany, 25.7% of trainees work in companies with less than ten employees, 29.8% in companies with 10 to 49 workers, 16.9% in companies with 50 to 199 employees and only 17.5% in companies with a staff of 200 or more (Greinert, 1993).

Vocational or technical/professional training is probably the educational sector in greatest need of radical modernization. It caters for a sizeable contingent of young people in secondary education: for example, 58% in Argentina, 42% in Brazil, 35% in Chile, 29% in Colombia, 23% in Costa Rica, 35% in Ecuador and 22% in Guatemala (UNESCO, 1992). Dual education is one possible form of organizing this sector.

In 1994, only a fraction of those receiving vocational or technical education in the region were enrolled in a dual system. Currently, this system does not account for the training of large numbers of workers, but it does provide relevant background information and raises issues regarding its possible application in the future.

IX

Conclusions

The available information suggests that there is a close relationship between the basic skills possessed by individuals and the training that they need in order to successfully enter the job market. Basic skills affect training costs and workers' ability to find productive employment, and they help to determine the effectiveness of vocational training and define the environment for technological innovation.

In order to formulate effective strategies and design policy instruments which take account of the relationships outlined in this study, it is necessary to combine an assessment of the available or potential means for achieving these aims with a thorough analysis of the specific demand for human resources generated by the technologies which will make it possible to increase productivity in the various sectors.

This analysis involves determining the degree of development of basic skills in the different categories of the work force –the most important of which would currently appear to be those already involved in production and trainees– and in the young people attending school. Each one of these groups has specific needs and demands.

Based on these observations, a set of measures may be suggested for developing basic skills in workers and in students who will soon be entering the working world. These measures may be translated into separate policies for each of these categories, for the different sectors, and for the different scales of enterprises. The formulation of such policies also implies defining the participation which the State, the private sector and individuals should have in formulating and implementing these measures and securing the resources for making them possible.

i) *Policies affecting school students.* The two most popular strategies are to extend universal school enrolment to eight years of basic education and to improve the quality of the education provided, which entails reformulating study programmes so that they will provide the skills required for modern production processes. The main problem which these strategies come up against is that of obtaining the funds needed to extend the system, while improving the quality and integrating the whole population of corresponding ages. It would appear that the educational technologies currently in use are not the most efficient for achieving this dual objective, so that it is imperative to undertake a review of the functions of educational production that involve an increase in capital-intensiveness (Labarca, 1995).

For practical reasons, and in order to ensure equitable distribution of the benefits of education, the task of improving and increasing education should be implemented or controlled directly by the State, even though the beneficiaries are those who will be attending school and the employers who will have a better-qualified work force.

ii) *Policies affecting trainees.* Bearing in mind that any modification in the educational system aimed at promoting basic skills education will take several years before it has any effect on the work force, it is necessary to formulate two different strategies: one for young people entering the job market who have not gone through the improved school system, and another for those who will have benefitted from the improvements. In both cases, forms of teaching should be sought which link the acquisition of skills and specific know-how at the workplace with education in educational establishments, for a period of two to four years, based on an adaptation of the most successful experiences with the dual system.

It is necessary to emphasize basic skills education and a more direct relationship between on-the-job training and school education, by incorporating specialized and technological training into the school curriculum. Furthermore, the State, employers' associations, or a combination of the two should set up mechanisms for the quality control and certification of education, in accordance with strict norms and standards.

The costs of this training should be borne by the State as far as the school system is concerned, by the enterprises, and by the individuals who stand to benefit. The latter should have access to loans with security from their future provident funds (Ramos, 1994), so that they can help to pay part of the costs of their training. This would mean making changes in the legislation of all the countries of the region.

iii) *Policies that affect workers.* This is the group that poses the most problems with respect to basic skills education. These workers can hardly benefit from changes in teaching and even less from modifications in the school system. Neither the training deficiencies displayed by these workers nor the problems associated with them have been resolved to any significant extent in the region.

There is a need to go beyond the concept of "adult education" as a means of providing education for persons over eighteen years of age who have not completed secondary school. Teaching basic skills to adults can be achieved more effectively through informal corrective systems adapted to actual job requirements.

It is probably more effective to allocate resources for training of this kind in the form of loans to workers rather than as incentives to companies, although the latter system may be retained as a means of complementing suitable policies adopted by the companies themselves.

iv) *In-company policies.* Companies should develop the capacity to formulate their own human resource requirements, not only in relation to specific posts but also in more general terms. This is particularly important in technical substitution processes.

In order to make an accurate assessment of basic skills requirements and evaluate the most pressing needs, it would be desirable to set up local coordinating bodies (at the municipal level) between the education and training systems and companies, giving such bodies the authority to formulate and implement education and training policies within their spheres of competence.

(Original: Spanish).

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