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Training: an ocupational, technological and educational issue

The relevance of training, within the labour relations systems of Latin America and the Caribbean, is today an indisputable fact. It suffices to consider the background of tripartite sectoral or national pacts or contracts on employment, productivity and labour relations that introduce training proposals; the growing number of collective agreements that explicitly incorporate training and skills development within their clauses; the development of labour laws referring both to the right to training and its implementation, or the appearance of various instances of dialogue and arrangements -bipartite and tripartite- in this field. The links of training with subjects such as productivity, competition, wages, occupational health, working conditions and environment, social security, employment and social equity, makes it increasingly a key element in present labour systems in the region.

Something similar can be said about the importance of training as a central and strategic component of innovation, development and technology transfer processes. Many vocational training institutions, as well as other fora arising more recently and operating in this field, are not restricted to providing a supply of training alone. Throughout the region it is already frequent to find diverse experiences of technological centres and services which these same bodies establish to offer a broader and more integral range of services, both to firms and to the community at large: laboratories for testing materials, product and process certification services, technology spreading events, specialised publications, data banks for technological resources and consultants in various areas, technical assistance and advisory services, *inter alia.* Likewise, some technological institutes have gone from focusing on the problem of research -development and adaptation of “hard”

technology, such as materials, tools and equipment; and "soft" technology, such as information and computer programmes- to consider also everything regarding the management, development and training of human resources. This convergence is in no way a question of chance. It is already a part of common sense in the productive sphere that "human capital" is a central and defining component within the productivity and competitive strategies of firms and economic sectors. Training, therefore, appears on this scene as a fundamental tool both to develop this new technology and to take advantage of and use efficiently any other.

When we observe the present activities of various training bodies in the region we can see, among other aspects, that a broad and flexible supply of training has developed. One can find, within the curricula of these institutions, from initial training courses, through middle and upper courses, to offers of updating which could even interest university graduates. And, as though this were not enough, there arise countless examples of co-operation with other public bodies, such as Ministries of Education in the fields of middle level technical education, non-university technological education and adult education, with firms and co-operating bodies, with unions, with nongovernmental organisations, and so many other variations which it is impossible to record exhaustively in this document. It can thus be said that training has progressively reinforced an educational component which was always part of it, both through the supply itself of specialised institutions and through a greater interlocking and co-operation with other bodies, agencies and teaching methods at work in this area.

Therefore, labour relations, technology and education are fundamental dimensions of the present reality of training and, furthermore, areas in which the latter plays a decisive role. To analyse these dimensions and fields of action of training in greater depth, each one of them shall be dealt with below: training and labour relations; training and innovation, development and technology transfer processes; training and education throughout life.

1. Training and labour relations

Training is, today, a central and strategic component of labour relations systems. This is confirmed by the interest and growing involvement of firms and workers, of organisations representing the former and the latter, of Labour Ministries through their units specialised in the subject, their training and skills development programmes and the new active employment policies, the most recent labour laws and the increase in collective agreements containing arrangements regarding training.

In fact, training has always been closely linked to labour relations. Even in the pre-industrial stage, when production was crafts-like, there already existed the figures of the master craftsman and the apprentice, where the former gradually allowed and stimulated a progressive accumulation of knowledge and ability on the part of the latter who, finally, became the bearer and continuer of the tradition of the trade. That is to say, even at that time the learning process was completely integrated within those initial labour relations and was a part of the "rules of the game" of production and work of the age.

The development and rise of the industrial era, however, occurred jointly with the trends towards specialisation and greater levels of division of labour in society. Although learning never stopped being something important in work centres, at a certain time the responsibility for training people who were to occupy certain jobs began to be dislodged towards these other arenas, both physical and institutional, which became the training centres.

This latter trend, in Latin America and the Caribbean, occurred parallel to the first industrialising efforts, through the rise of specialised fora which began to take charge of the training function. The apprentice is, typically at this stage, a person, generally a young individual, who attends training courses in an institution for a certain period of his or her life and who becomes a worker when finally hired and located in a job where he applies the knowledge, ability and skills previously acquired. This was, however, a predominant but in no way absolute situation. In fact, already in the mid-seventies, some of the vocational training institutions such as the National Training Institute (INA) of Costa Rica, and Cinterfor/ILO itself, began to worry about delineating and applying strategies that would enable certification of workers who, through their own occupational performance, had reached levels of qualification which deserved formal recognition.

Thus, referring to the stage of industrialisation which occurred at the onset of the development model, it might be said that, in a general way, training played a role which was to a certain extent disguised within the labour relations systems of the times. Although at any place and under any circumstances qualification was an important component of production, the truth is that during that stage, when reference was made to "labour relations", it meant basically talk of facts and processes of negotiation and/or disputes around subjects such as wages, stability and job promotion methods, extension of social benefits, etc.

In that context, training was an activity which rarely was a matter for negotiation; therefore, it was scarcely mentioned within collective bargaining agreements, and in labour legislation was only referred to in some basically declarative ways or specifying the institutional environment in the framework of which its implementation had to be resolved (normally a public and national agency). In several countries labour and employer organizations maintained a significant interest, but in the last analysis it was limited to participation through delegates in the executive arenas of the vocational training institutions.

It was a case, indeed, of labour relations systems inserted in a system in which:

• The State played a central role in several ways, among which were collective negotiations, production and direct provision of services, and protection of domestic production through tariff barriers.

• Firms developed, precisely, in a heavily protectionist context, oriented towards the internal consumption market, and were therefore under no great pressure either from consumers or from the competition.

• Workers and their organisations fought for an extension and deepening of their rights, making a basic assumption, which was shared by the State and employers: production and employment would increase continuously, beyond any possible cyclical crises. Unions were, furthermore, organisations undergoing strengthening, to the extent that it was also believed that both industrial production and contracts based on wages would grow indefinitely and so, therefore, would their platform of representation and their power.

• As a result of the same strategy of "inward" development, the imperatives of innovation and technological development were restrained, life cycles of the products tended to be long, and demands for qualification of the labour force, and particularly for its re-qualification, were not so great in terms of updating with new techniques, tools, materials or forms of labour organisation. The challenge was in any case quantitative: to provide a sufficient number of qualified and semi-qualified workers for industry.

In the last twenty years this reality has changed radically in practically every way, causing, among other consequences, a revaluation of training within the labour systems and an increasing interest on the part of the different players in its regard. Why?

Firstly, because **the international insertion strategies of the economies of the region have changed.** Either by means of unilateral trade liberalisation policies or in the context of regional integration processes, in a more or less drastic fashion domestic production begins to be exposed to other kinds of rules which require urgent action to improve competitiveness. This has led to an intensification of the pace of technological change applied to production, a reduction in the life cycles of products and, therefore, also of skills, generating constant pressure for their updating.

Secondly, **the relative importance of the "knowledge factor" within the new forms of organisation of production and labour has increased markedly.** Information and knowledge control thus becomes strategic, as were of yore land control or control of the means of production. The capacity to generate knowledge, and to manage it within the concept of learning organisations, is considered a key strength for competitiveness and has resulted in a revaluation of human talent. Thus the interest of the different players in accessing decision-making regarding design, execution or financing of training also becomes something vital.

Thirdly, **the assumption of sustained and indefinite growth of production and employment -or rather of the direct relationship between them- has been shown at the outcome to be invalid.**

Although production may continue to grow, as in fact it does, employment generation does not occur in correlation with it and, in many cases, we face the new and worrying phenomenon of economic and productive growth with rising unemployment. Employment growth in the most economically dynamic sectors is not enough to compensate, in many cases, the dismissals arising from the new capital-labour relationship, affected by the introduction of technological innovations and by the closings occurring in sectors incapable of counteracting the competition of goods from abroad. In the old context, it was enough to apply compensatory-type policies in periods of crisis, such as unemployment insurance or emergency employment programmes. At present a new generation of active labour market policies has arisen which invariably considers training and skills development to be their most central and strategic element.

In this new context, the position of the productive and occupational players changes, negotiations become more complex and it becomes increasingly difficult to deal with subjects such as wages or labour stability in an independent manner. Much more attention is paid to the relationships among employment, wages, productivity, production, competition, quality,

etc. It is within this new state of affairs that training appears revalued and begins to be perceived as a strategic subject. It is incorporated into a growing number of collective agreements and also included in labour laws. Experiences of social dialogue and arrangement arise and multiply in the training field, and they prove to have a very large capacity for development and sustainability, even in contexts where conflicts are great.

1.1. Training in national agreements

Training has been incorporated as an important chapter in the different national agreements -generally tripartite although also in some cases bipartite- which have been subscribed in Latin America and the Caribbean during the nineties.

In **Argentina** the following are some examples: the "Acuerdo Marco para el Empleo, la Productividad y la Equidad Social" (Framework Agreement for Employment, Productivity and Social Equity), signed on 25 June 1994 between the social partners and the Government; and the "Acta de Coincidencias" (Record of Coincidences), agreed to on 9 May 1997 between the CGT and the Government. The clause of the latter headed "Participation in vocational training" establishes that "life-long and continuous vocational training shall be fostered, as well as that of the unemployed. In both cases with the active participation of the social partners to increase the efficiency and direction of expenditure and of policies."

In **Chile,** the Framework Agreement of 1990 and the Tripartite National Agreement of 1991 are the two most important precedents on the subject. In the latter, it was agreed to develop, in an agenda of mutual interest, initiatives on skills development and vocational training policies, creating consultative bodies for the Programme for Training and Development of Technical Education, which is managed by the Ministry of Labour and Social Security, and of the National Training and Employment Service (SENCE). More recently, in 1998, the new Training and Employment Statute was enacted which, after a in-depth process of consultation and debate at the political and social levels, introduces important changes in several areas, among which those dealing with the creation of new methods of training management at the firm level, encouraging the participation of workers in the Bipartite Training Committees. Another tripartite body was also created: the National Training Committee.

In **Colombia,** in the "Acuerdo de Productividad, Precios y Salarios" (Agreement on Productivity, Prices and Wages), of 19 December 1994, a tripartite instrument, the establishment of agreements and definitions regarding productivity are dealt with in its Chapter VII. After stating that among the various factors negatively affecting productivity stress is laid on the lack of skills in the labour force, technological backwardness and the deficiencies of science and technology policies, training and qualification of the labour force are defined as a fundamental instrument in which workers and employers must work jointly with the Government in order to achieve the objetives proposed. The parties commit themselves in this regard, making a statement of programme according to which the three parties will develop joint programmes to promote the increase of productivity, among other factors, through training.

In **Mexico,** a country with a long tradition in this type of agreements, the "Acuerdo Nacional de Productividad" (National Productivity Agreement) was signed on 16 July 1990, and includes statements referring to making an educational effort through actions implemented through national programmes aiming at educational modernisation and at training and productivity. In 1992 the "Acuerdo Nacional para la Elevación de la Productividad y la Calidad" (National Agreement for Improving Productivity and Quality) (ANECAP) was entered into, and deems it indispensable to promote, within firms and with the co-operation of the workers and their organisations, life-long training policies a every level, programmes for re-training the labour force, programmes for induction into jobs, new training methods in the rural sector and in medium and small-size firms and the official establishment of new types of registration and reporting of training programmes, in order to promote their greater decentralisation and publicity. The Agreement entitled "Alianza para la recuperación económica" (Alliance for economic recovery), reached in 1995, in its Chapter VII establishes concrete actions regarding training: broadening of the programmes of "Scholarships for unemployed workers" and of "Integral Quality and Modernisation", as well as instructions for the "Consejo de Normalizacion y Certificación de Competencia Laboral" (Labour Competency Certification and Standardisation Council). Finally, the agreement entitled "Diálogo Obrero-Empresarial hacia una Nueva Cultura Laboral" (Worker-Employer Dialogue towards a New Occupational Culture), dated 13 August 1996, a tripartite instrument, also contains important and explicit references to training.

Another example is **Panama,** with the "Pacto de Compromisos para el Desarrollo" (Pact of Commitments for Development), adopted on 6 December

1994 within the framework of Agreements on Concerted Action (Bambito III). In it the enterprise and union players agreed to take on greater responsibility, among other subjects, regarding training, which later resulted in the establishment of the bipartite Labour Foundation which has impelled important initiatives in this matter.

1.2. Training in collective agreements of branches of activity or industry

A recent study on vocational training in collective negotiations, undertaken by Cinterfor/ILO, establishes as its first conclusion *the legal basis of the entry of collective negotiations into vocational training.* It further states that *the circumstances by which training is a subjective right of the worker and an obligation of the employer, and by which it enters into a direct relationship with the other labour rights and occupational conditions, favour the possibility -and the suitability- that it be regulated by collective autonomy.* As an non-exhaustive review of the survey carried out by the same study, it is possible to mention a series of concrete examples in the region.

In **Argentina,** the collective agreement of the gas sector, for example, refers to training as being linked to upgrading the abilities of workers and to maintaining the quality of service. Regarding resources mobilised to promote training, it is standard that firms are in charge of financing the activities, and a significant aspect is that fulfillment clauses are established regarding employers' contributions to Union Funds for Training, or to support Vocational Training Centres, in all the cases analysed. The Insurance Sector Framework Agreement No. 191/92, between professional employers' organisations and the workers' organisation (Insurance Union) includes a clause, entitled Occupational Training Committee, on a really innovative mechanism of participation which aims to achieve the active participation of the parties in the definition of training policies in the sectoral area, targeting the qualification and re-qualification of staff.

In **Brazil,** the Banking Collective Agreement, although it does not stipulate concrete training mechanisms, among its economic regulations provides for the payment to employees of remuneration for educational purposes, called "education-wages", to compensate their first level education expenses, and those of their children, in schools that charge fees, it being further understood that this item is not in the nature of wages. Moreover, granting of special leave for study is also regulated, on the basis that the days involved are actual working days. In the last few years, among the relevant experiences in

this country it is impossible not to point out the Automotive Sectoral Agreement, which includes the collective negotiations in Brasilia (February 1993) between private firms and professional employers' bodies on the one hand, and the workers' organisations represented by the CUT, by Fuerza Sindical and by the Sao Paulo Federation of Metallurgical Workers on the other. A particular aspect of this agreement is that it also includes the Federal Government as a third party, interested in promoting productive investment and employment, through facilities and guarantees acknowledgedly of the private sector. In the list of subjects on which there was agreement and that include increases in production levels, job offers, wage levels and sales, as well as reductions in taxes, profit margins of the production line and consumer prices, some regulations are incorporated regarding technology, quality and productivity. This is done on the basis of broadening the automotive sector area in the "Brazilian Quality and Productivity Programme", especially in that which concerns training and recycling of employed labour. Through the creation of a sectoral technical-scientific body, or the transformation of one of the existing bodies, technical standardisation, quality certification and the implementation of quality, productivity and technology programmes are sought at the national level, including worker representation on the Programme Deliberating Board. This body has been assigned the task of procuring and bringing together the resources and qualifications of the existing technology and quality agencies. Among the working groups created to implement the agreement and promote a continuous agenda there is one that includes aspects related to technology and quality.

In **Mexico,** the collective agreement entered into in 1996 by Ford Motor Company S.A. (Hermosillo Stamping and Assembly Plant) and the National Workers' Union of the firm, includes special provisions on training. The parties agree to encourage the vocational development of the workers through training and skills upgrading programmes, providing adequate means, within and/or outside working hours. For this purpose, staff rotation is promoted in the different operations in the work areas, on or off the line. A Mixed Training and Skills Upgrading Committee is created which must establish training and skills upgrading programmes to foster, especially, ability and respect for industrial safety rules, and adequate plant and equipment must be provided for training activities.

In **Paraguay,** the collective agreement of the National Electricity Administration (ANDE), dated 1993, is one of the first and most complete collective agreements entered into concerning a State agency in this country. The chapter on "Training and Development" establishes some central

principles regarding the institute, particularly the statement that training is, at the same time, a *worker's right and an employer's obligation.* In this respect, one of its clauses states literally that "the parties agree on the importance of training the staff of the institution, whereby the continuity of staff training is established as a workers' right and the firm's obligation, said training being updated technologically and administratively in all its forms." Provision is also made for the creation of skills upgrading centres, research laboratories, courses and scholarships aimed at the life-long training of the workers and development of their skills. The agreement also establishes the participation of Sitrande (ANDE Workers' Union) in training management, and agreement on providing time for training, through recognition of leave for the vocational training of workers.

In **Peru,** a record of understanding was signed in 1995 between the copper company Magma Tintaya S.A., operating in the Departmento of Cuzco, and the workers' union. Through its collective negotiations, a Joint Union-Management Committee was created as a project of shared participation in management. Among its relevant objectives are included employment stability and improvement of the quality of life in the job, within a framework of relations which permit productive operations and competitive costs. With that purpose, the adoption of common actions was sought, involving from the relocation of affected staff and the opportunity for training for new jobs, to a possible placement service when no other possibility is to be found.

In **Uruguay,** according to the collective agreement of the sector, dated 27 June 1997, between the employer and labour parties, the **Fundación para la Capacitación de los Trabajadores de la Industria de la Contrucción** (Construction Industry Workers' Training Foundation) was created, with management and workers meeting on equal terms, with the following aims: a) to finance actions and instruments enabling vocational training of workers and employers of the Construction Sector, and b) to issue, itself or whoever it may appoint, a "certificate of aptitude" certifying that the worker has taken and passed the training course. Its financing stems from contributions on equal terms of employers and workers: 0.5 per thousand are charged to the employers on the liquid wages of the sector and 0.5 per thousand are charged to the workers on their liquid wages, and also from donations, co-operation projects and cost recoveries for services rendered. Another example which may be mentioned in the same country is the pulp and paper sector where an important firm, **FANAPEL, the National Paper Factory,** entered into an agreement, between the firm and the union, to develop a human resource development and training programme based on the occupational competency approach.

1.3. New types of State action in the field of vocational training: the role of Labour Ministries

As a feature within a more general process of restructuring and reassessment of the role of the State in social and economic life, but also regarding the revaluation of training in the field of labour relations, the Labour Ministries (Mintrab) have, in an increasingly generalised manner, become protagonists in the area of vocational training in Latin America and the Caribbean, mainly concerning the definition of the general thrust of policies.

From the former mediation role in the capital-labour relationship, focusing on remuneration, stability and working conditions aspects, these Ministries broaden their competence to deal with, in this regard, training from the standpoint of active employment policies. This is expressed both in regulations and in the institutional structure itself, with the creation and development of secretariats, boards or services specifically addressing vocational training and its relationship with other occupational aspects.

This increasing incumbency began, precisely, when the labour authorities understood that **vocational training is a key feature in the formulation and implementation of active employment policies.**

In the mid-seventies in Chile; approximately ten years later in Mexico, and particularly since the beginning of the present decade in other countries: Argentina, Brazil and Uruguay, to mention a few, the Labour Ministries developed ambitious projects increasing their involvement in the field of public employment policy generation. These programmes, financed with their own resources in almost all cases, reinforced in others by international banking credits, not only acknowledge the relevance of vocational training to achieve results, but also initiate a re-formulation of their traditional institutionality: the training systems which begin to be generated seek definition on the basis of greater attention being paid to the production machinery's **demand for training.** This approach is conceived with a view to overcoming, somehow, the rigidity observed in some national institutions which had become attached to an organizational and programmatic structure which was too closely linked to the available training supply.

Because of this, it can be said that training occupies a central place within the active employment policies which are beginning to be promoted by the labour ministries. Within this approach, the conception developed

plays a role centred on policy and strategy design, generation of financing mechanisms and supervision, monitoring and evaluation of training activities, delegating the function of executing those activities to other agents, both public and private.

As has already been said, the importance assigned to these policies is evident in the major financial resources allocated to carrying out the various programmes and projects. These resources come from different sources: public funds for training established by law; special resources from the public treasury; unemployment funds; as well as the Labour Ministries' capacity to obtain public loans in the field of vocational training (projects together with the IDB and the World Bank, *inter alia*). As a partial review, the following examples may be mentioned, among others:

• In **Brazil,** The National Training and Vocational Development Secretariat (SEFOR) has a Workers' Protection Fund (FAT) administered by a Deliberating Council (CODEFAT) which is tripartite and in which management and workers are involved on equal terms.

• **Chile,** has the National Training and Employment Service (SENCE), in charge of managing the various programmes such as those involving the use of tax concessions, youth employment and training (Chile Joven), among others.

• **Mexico,** executes projects addressed to develop demand for training through ingenious mechanisms to strengthen and consolidate micro-, small- and medium-sized firms, as well as significant resources disbursed through scholarship programmes for the unemployed and an important national effort addressed to establishing a system of standardisation and certification of occupational competency.

• **Uruguay,** takes measures through the National Employment Bureau (DINAE), of the Ministry of Labour and Social Security, and the tripartite National Employment Board (JUNAE), in charge of allotting resources from the Labour Reconversion Fund.

Also important are tripartite actions which, co-ordinated by the Ministries, incorporate employers and workers to discussion and decision-making on policies being considered.

But what merits special mention is the present role of Labour Ministries through the already cited **active labour market policies.** To the extent that

those Ministries participate in the definition of the larger national guidelines involving development and productive transformation strategies, as they begin to act also in the field of strengthening and modernising the supply of training, they are able to act simultaneously and consistently on the different and major aspects of the problem.

The decision to intervene in the labour market through employment policies arises from different reasons: to address transition problems in the process of opening up the economy; to respond to social risk situations through redistribution mechanisms; to correct market defects, both in terms of the link between labour supply and demand and in the training area.

Within the new concept of active labour market policies, a field in which the Labour Ministries have taken, and take, measures of great importance and significance, is that of youth training and employment programmes and projects. Addressed to young people in a situation of structural unemployment and high social risk, they arose as mechanisms for compensating the harsh social effects of the policies of structural adjustment and opening up to international trade of the economies of the region, with their relevant processes of reorganisation of state social services. Through a concentrated and intensive process of services involving skills development, training by psychosocial-type cross-sectional competencies, remedial education and on-the-job training, the programmes aim at increasing opportunities for labour insertion of this population. Some of the main characteristics are: the adoption as an indicator of the relevance of training to the detection of opportunities for on-the-job training in firms; the self-focusing of the target population; and non-concentrated execution regulated by market mechanisms.

The Labour Ministries of the region, in short, are acting decisively in the field of vocational training and contributing to its integration on the basis of higher and national strategies, related to productive transformation and the challenge to increase productivity and competitiveness of firms and economies, in order to ensure environmentally and socially sustainable economic growth.

2. Training and innovation, development and transfer of technology processes

The most innovative experiences at the regional level on the subject of training conceive the latter as part of a set of technology transfer

actions, both of labour and of production, adaptation and innovation. This marks a turning point, both conceptual and methodological, in the action of institutions, training centres and technological education units.

In conceptual terms, these experiences are characterised by specialising to a certain extent towards specific economic sectors (metal mechanical, pulp and paper, leather and footwear, chemistry, construction, etc.), which allows them, among other benefits, a greater degree of technological updating of machinery, equipment and materials, although also regarding knowledge and techniques applied to production. This updating, supplemented by new strategies of approach to and co-operation with the productive sector, is making it possible to offer a series of services which complement the traditional supply of training.

Either as a conceptualisation prior to these changes, or as a practical result thereof, what is certain is that there is also a change in the notion of who the subjets are to which these units, services and centres cater. If previously the main population catered to consisted basically of individual workers, fundamentally young people, to whom it was sought to transmit systematically a body of knowledge, abilities and skills linked to an occupation, today these new experiences also conceive productive units (firms of various sizes and characteristics), their productive links and organisations, and the economic sectors themselves, as part of their primary audience.

Moreover, there is an effort to cater to this new audience in a more integral manner than in the past. Such are the cases of the National Technology Centres, of the SENAI, and the Federal Technological Education Centres, dependent on the Mid-level and Technological Education Secretariat, of Brazil; the Technological Services Centres of SENA; the Technological Nuclei of INA; as well as the activities offered to firms in Peru by SENCICO and SENATI, so that they may access not only training and skills development services, but also research and development, technical assistance and consulting, or technological information services.

Although this diversification of institutional services includes as a component a search for alternative financing, in many cases this is only an emerging component. Its greater potential lies in the processes of strengthening the updatedness, relevance and quality of the training itself. The dovetailing in an appropriate environment of training and education, labour and technology, enables mechanisms to be structured by means of which there is an acquirement of, besides solid technical and technological knowledge, the

values, habits and behaviour inherent to the competencies which present historical circumstances require of workers, technicians and professionals.

A fundamental characteristic of this new conception of training, lies in the incorporation of content and methodologies belonging to what has been called "technological education." Briefly, this involves *recording, systematising, understanding and using the technology concept, historically and socially constructed, to make of it an element of teaching, research and extension, in a dimension that exceeds the boundaries of simple technical applications: as an instrument of innovation and transformation of economic activities, to the benefit of man as worker and of the country.*

Technology itself has exceeded today the purely technical dimensions of experimental development or laboratory research; it encompasses issues of production engineering, quality, management, marketing, technical assistance, purchases, sales, *inter alia,* which transform it into a fundamental vector of expression of the culture of societies. It could be said that the technological process itself is, in and of itself, an exercise in learning which modifies the way the world is "seen", marked by theories, methods and applications. It is also knowledge and maintains, therefore, the constant demands of the "spirit of investigation" regarding the facts generated, transmitted and applied. There then arises a need for closing the distance between the conquests of scientific and technical knowledge and the knowledge of those who apply the technologies, be they students, instructors, researchists or workers, in order to inform them of their role in the technical transformation of production and labour.

In the more integral conceptions in this regard that have been implemented in the region, there has been a move away from the notions restricted to skills upgrading, training and preparation of the labour force as a function of the immediate needs of the labour market. On the contrary, they seek to transmit to the worker different dimensions capable of making him or her able to cope with the scientific-technological evolution of the modern world and, in this manner, allow them to contribute their intelligence, creativity and effort inside the productive unit.

A rough survey of what is happening in the region allows us to see, on the one hand, that a goodly part of the training institutions, both public and private, are dealing with the challenge of establishing a closer link between the supply of training and the processes of innovation, development and transfer of technology. However, on the other hand, there is also a tendency

for technological institutes and agencies related to sectoral employer bodies to begin to deal simultaneously with the subjects of technology and training and the development of human resources. By way of illustration we present below some of the multiple and rich experiences at present under way in the region which are proof of the approaches we have mentioned.

The **SENAI,** in Brazil, is diversifying significantly its institutional mission, broadening the boundaries of its role as a vocational education institution and getting to be acknowledged, also, as an instrument for the generation and dissemination of technology. Technological incubators, islands of technology of production integration and digital information transportation systems are, *inter alia*, some of the institutional initiatives designed to consolidate this function. The incubator projects are considered means to accelerate modernisation, not only by creating new firms, technological or not, but also to rapidly surmount present structures that find it difficult to introduce concepts imposed by present paradigms of the society of knowledge. The basic proposal is to facilitate the long and expensive voyage between the laboratory prototype and the head of the industrial run. Thus the importance of a strengthened infrastructure and of the activities associated with the support provided by orchestration, marketing, trading and disclosure. An incubator makes available to emerging firms physical space, support services - telephone, fax, graphic reproduction, secretarial services, administration, accounting support, computer support - human resources, specialised services, training, technological support, etc. The mechanisms of orchestration, training and technological support developed by the SENAI serve to provide a basis and training for employers so that they may be able to face with greater security the obstacles which arise between the world of research and entrepreneurial reality, where competition -quality, productivity and price- is the factor that determines success.

But perhaps one of the main strategies of the SENAI is the model of the National Technology Centres. Conceived on the basis of the certainty that an increase in productivity and competitiveness on the part of industrial firms is conditioned by investments in technology, these Centres become poles for the generation, absorption, adaptation and transfer of technology, and they work on adding value to the information.

The evaluation system to obtain the National Technology Centre (Cenatec) Award was conceived on the basis of the National Quality Award (PNQ), the structure of which, in turn, is based on the “Malcolm Baldrige National Quality Award.” The Cenatec evaluation systems includes three different versions:

Brazil: CIET/SENAI, a watch-tower of technological change and its impact on vocational training and labour

The International Centre for Education, Labour and Transfer of Technology (CIET) is a joint initiative of CNI/SENAI and UNESCO. Its role is to act, at the national and international levels, as a watch-tower of the effects and changes produced by new technologies regarding vocational training systems, absorption and dissemination of technologies and qualified workers in the productive sector.

In this Centre, research is carried out to analyse the consequences of technological change and new information technologies regarding labour, education and technological development systems. As a watch-tower of transformations under way, the Centre gathers and develops information, seeking to find solutions compatible with the realities of Brazil and, particularly, with the SENAI vocational training system.

The Centre's activities are organised under groups, each of them performing tasks within a specific area of CIET interest. The Information Group is responsible for studying the impact of new information technologies and comunications processes on society, and especially on productive processes. In this regard, the following activities may be used as an example: technical staff training in access to national and international data bases and Internet, installation of electronic networks and gathering information in data bases.

The Education Group gathers and produces information on education, both in Brazil and abroad, contributing to clarify the complex relations between vocational training and productive activity. Thereby, it helps to improve understanding of the Brazilian educational system and to find alternative ways to ugrade it.

Regarding labour, a follow-up is done of the transformations that affect requirements in the training area in the organised segments of the economy, particularly in industry, as well as the unemployment structure and studies on the so-called informal sector. Monitoring of these changes provides information which may be used in the formulation of official policies and in vocational training strategies.

i) A version used to grant the Award in the Bronze Category, which is the simplified version of the PNQ, the result of the reduction in the scope of the items included in each of the seven evaluation categories: leadership, information and analysis, strategic planning, development and management of human resources, process management, business results, focus on the client and the latter's satisfaction.

ii) The evaluation system of the version used to award the Silver Category is more complex and more extensive since, besides increasing the level of requirements regarding Quality Management, it also introduces Cenatec's items of evaluation referring to Technological Content and its results, with a minimum standard of points which must be achieved, as well as the "Support Services" and "Facilitator Effort" items.

iii) Finally, for the third version, the award in the Gold Category, the PNQ Excellence Criteria are used, in their present version, supplemented by the item referring to Technological Content.

An attempt was therefore made to institute a system for the evaluation of increasing complexity and demands, with the aim of introducing in the SENAI units constant effort to improve quality standards, without establishing, despite this, schedules or obligatory participation in the three categories.

The National Technology Centres (Cenatec), reciprocally with the productive sector, with the universitites and with research institutions, exercise simultaneously the functions of education, technical and technological assistance and applied research. The SENAI includes today 32 Centres which have already been certified, located in 11 states of the Federation, in the southern, south-eastern and north-eastern regions of the country, which perform in 23 technological areas.

The Centres train mid-level industrial technicians at the same time as they provide practical technological extension courses, consulting services to firms, dissemination of technological information, quality certification and certification of experimental development of products and processes, addressed to a sector of industrial activity in their area of competence. However, there are already pioneer activities where, through some Centres, the SENAI makes inroads in higher education, as is the case of its course in Textile Industrial Engineering.

The basic philosophy of action of the Cenatec's contemplates a cross-section of disciplines, speed in the circulation of technological information

-with a strong presence of easy accessible information systems- and flexibility in the use of pedagogical instruments, programme contents and curricula, thought out in terms of the constant interaction between technological practices of firms and training activities.

On the basis of experience accumulated through the Cenatec's quality evaluation and accreditation system, the SENAI is also promoting a strategy of expansion to all its operational units of the adoption of management excellence models. In 1997, the certificate of "Vocational Education Model Centre" (CEMEP) was created, conferred in the three categories referring to SENAI units which stand out due to the quality of their services. The expectation is that this system may become an efficient instrument for improving quality standards and operational performance in the majority of the units of the institution. Their main aim is to develop programmes with innovative teaching-learning methodologies and flexible curriculum organisation suitable for the demands of life-long education, stressing the integral training of the individual. But the CEMEP process, besides being an innovation in vocational education, also seeks to improve the quality of the technical and technological assistance provided by the unit to its clients. Together with the International Centre for Education, Labour and Transfer of Technology (SENAI/CIET) and the National Technology Centres, the CEMEP's constitute the National Technology Network of the SENAI.

The **INACAP,** in Chile, has a series of technological centres where training services are provided to workers, technicians and professionals, as well as technological services of different kinds to firms and other bodies related to production, both of goods and of services. Among the INACAP technological centres, the International Telecommunications Training Centre (CINCATEL) stands out. Training courses designed and executed by this Centre are included in a wide variety of specialisations which are being implemented in the telecommunications field, based on market demand and on the feasibility of having the human, material and technological resources necessary to offer a training service which fulfills the demands of its clients. CINCATEL has laboratories for Digital Conmutation, PCM Transmission, Fiber Optic Transmission, Digital Microwaves, External Fiber Optics Plant, Computer Science and Internet, and Communications. It possesses both the infrastructure and the human resources needed to provide advisory and engineering services both to the private and the government sectors.

As examples of trade associations and technological institutes that carry out activities which converge with those performed by training institutions, we can mention, *inter alia:*

The **Chilean Chamber of Construction (CCC),** a body which, together with its normal functions as an employers' association, has a Technological Development Corporation which provides services of: *technological dissemination,* through publications, encounters and seminars, and establishing relations with research and technological development centres in other countries; *transfer of technology*, through technological opportunity detection, co-ordination of business based on technology, advisory services for obtaining funds for technological innovation via contests, and technology transfer cycles; *coordination of technological interest groups*, for drafting technical and informative documents, regulatory documents, stimulating related research and managing technology transfer projects; *promotion of technological studies*, technical studies, sectoral analyses and feasibility studies. This action on the part of the CCC in the technological field is supplemented by the development of an initiative aimed at establishing competency profiles as required in the Chilean construction industry, as a way of guiding both firms in their screening, training and promotion of human resources policies, and the education sector and training system in the curricula they offer.

The **SENA,** of Colombia, has had, in its more than forty years of age, an increasing relationship with productive technological development. From the standpoint of this institution, its main function, to provide complete vocational training for the country's workers, can be defined as a transfer of technology in a training environment, to be applied to the productive processes of firms of all sizes and technological complexities.

Among the specific fields of endeavour of the SENA the focus of which is explicitly the support of technological development, the following services can be singled out: support to sectoral agreements regarding competitiveness; applied research in association with other bodies; and special co-operation agreements. These activities are carried out mainly by 21 training and technological services centres which have comparative advantages to further technological development activities, in which a significant part of the resources of the body's regular budget is invested. These centres possess an infrastructure in equipment and plant which can be used in strategic alliances with firms and technological development and productivity centres to promote activities in the framework of innovation and technological development.

At present that responsibility has been increased by the assignment of a significant part of its parafiscal income to productive technological development projects, in accordance with the provisions of Law 344 of 1996. By applying these resources the following is sought:

• To increase the competitiveness of productive sectors with the aim of promoting exports, improving innovative capacities and raising the level of learning of employers and workers, as support for the basic strategies of employment generation and upgrading the quality of life of the Colombian population.

Colombia: technological development and training

In order to provide support to the Colombian corporate sector in its endeavours to modernise its technology and achieve adequate efficiency, quality and productivity levels, the National Training Service (SENA) has restructured the activity of its specialised centres to turn them into infrastructures for technical support of national production -Vocational Training and Technological Services Centres- by providing technological services and undertaking research activities.

One of these Centres is the Colombian-Italian "Américo Vespucci" Industrial Automation Centre. Created in 1988 through a co-operation agreement with the Italian Government, at the beginning its aim was to develop vocational training programmes in the area of industrial automation processes. Later it extended its activities to include providing technological services and applied technological research.

At present it concentrates on the following:

- Production lines and sectors covered by sectoral competitiveness agreements
- Production lines that are highly dynamic technologically and in terms of their impact on employment
- Production lines with an impact on the quality of life
- New technology areas with a cross-sectional impact on competitiveness and productivity of productive sectors

The technological endowment of the Centre includes the experience and knowledge of its human resources and its technological lines in CAD/CAE design, CNC/CAM manufacture and robotics with technologies for ensuring quality levels and metrological accuracy.

• To provide vocational training in the country, to respond to the needs of the productive sector, in such manner that it be flexible, of good quality and relevant.

• To modernise SENA vocational training centre management systems.

• To initiate the dovetailing of the National Vocational Training System with the National Innovation System, establishing common approaches and strategies which enable the quality of technical and vocational education to be raised, technological innovation in productive sectors to be furthered and the creation of a new institutional culture for long term competitiveness in Colombia.

In a general way, Colombia has sought to structure its efforts regarding science and technology in a process beginning with the enactment of Law 29, of 1990, which provides for the development of scientific research and technological development and grants special powers, *inter alia,* to modify the statutes of official bodies with science and technology functions, including those of changing their appointments and linkages and creating the bodies needed. The Law was broadened and specified in 1996 by three decrees: one establishing rules governing association for scientific and technological activities, research projects and technology creation; another creating the National Science and Technology Council and reorganising the Colombian Institute for Science and Technology Development (COLCIENCIAS); finally, a decree which regulates the specific modalities of contracts for promoting scientific and technological activities.

This legal framework has provided an important base for reinforcing activities related to technological research and development by decentralised agencies such as the SENA, as well as universities and other institutes involved in the subject. In this context, the role assigned to vocational training, and concretely to the SENA, in competitiveness policy is very important, not only as a provider of training services, but also of funds for technological development projects. Together, SENA and COLCIENCIAS constitute the National Technological Development Projects Committee, the purposes of which are, *inter alia:* to propose specific actions for dovetailing the National Innovation System with the Vocational Training System, according to the general policy and guidelines established by the CONPES and the National Science and Technology Council; and to analyse the projects and the concepts of the evaluators and experts and decide on the feasibility of the initiatives that meet the requirements of relevance, quality, employer commitment and technological innovation.

One of the concrete expressions of the results of this strategy are the Technological Development Centres, in some cases managed directly by the SENA and in others by the private sector with the support of this institution. The SENA at present has Centres in different regions and cities of Colombia, to wit: ASTIN Centre for Technical Assistance to Industry; Colombian-German Centre, targeting welding processes and quality control; Metallurgy Centre, working in the field of iron patternmaking and moulding, ferrous and non-ferrous metal melting; Colombian-Italian Centre, in design and manufacturing systems with the aid of computers, applied to metal mechanical processes and products; Industrial Management Centre, in the fields of materials testing for metal mechanical quality control, thermal treatments and metallographic analysis, as well as programming, planning and control of industrial and maintenance processes, and industrial chemistry; Wood and Furniture Colombian-Canadian Centre; Textile Centre; Clothing Centre; Footwear Technological Centre; Hotel, Tourism and Food Centre; Graphic and Related Products Centre (SENIGRAF); Commercial Management and Marketing Centre; Latin American Minor Species Centre, in livestock activities. In order to illustrate these experiences in greater detail, we describe below two examples of SENA Technological Centres and two of private Technological Centres:

• The "Americo Vespucci" SENA Colombian-Italian Centre of Industrial Automation, in Bogotá. The sectors of influence of this Centre, due to its experience, knowledge and handling of the country's industrial policies, are: Automotive Capital Goods in the field of spare parts for that industry, electrical appliances and the furniture and equipment goods industry. The basic technological areas are: design, manufacturing and production, to carry out research, and of metrology and quality as a support for the technological services infrastructure.

• Centre for Technical Assistance to Industry, ASTIN, in Cali, which was the result of an agreement between the SENA and GTZ, of Germany. With an organisational set-up similar to that above, it has different operational areas: electronics and automation; matrix making; plastics; and technological services.

• The Plastics and Rubber Training and Research Institute (ICIPC) includes, within a wide range of members, trade associations, firms, management schools, which have allowed it gradually to broaden its base for inclusion into and establishing a relationship with various productive and scientific-technological sectors. The services offered by the ICIPC are

summarised as follows: open and closed training; advisory and consulting services; laboratory services; advanced training; professional encounters; research and publications.

• The Graphics Industry Technical Training Institute (IFTAG) functions as an operational area of the employer association of this sector (ANDIGRAF), but it is inscribed within a complementation strategy with the SENA regarding financing, infrastructure and human resources. It offers courses on demand and a specialisation in management, as well as consulting services that include visits to plants with a methodology known as "technical plant auditing."

The **INA,** of Costa Rica, has taken on the duties of advising and supporting producers of different sectors, which tasks have been organised in the mould of Training and Technical Services Nuclei. The approach of these nuclei is sectoral and their aim is to strengthen the sectors producing goods and services, providing the firms with options regarding training, transfer of technology, technical assistance, technological information, project and prototype development, *inter alia*, in order to contribute to increasing their quality, productivity and competitiveness levels. These are units that are not technically concentrated; they bring about the convergence of different players and resources, facilitating dialogue and co-operation, at the same time as they make possible a deeper and more systematic awareness of the reality which is to be affected.

SENCICO, in Peru, besides rendering training services in the construction area, takes on other tasks:

• in *research*, seeking new construction technologies and to upgrade native technologies, and undertaking studies related to building, urban development and improvement of the habitat in general;

• in *standardisation*, working out and updating, through Specialised Technical Committees, standards for design and construction, which are incorporated into the National Building Regulations. The Committees are made up of representatives of various research institutions, universities and other institutions related to housing and construction.

• The aim of the *Materials Testing Laboratory* is to provide academic support to some careers linked to the construction sector, and it also renders services to users in the execution of materials quality control tests and soil studies for civil construction.

• Research is also carried out in the field of construction materials and soil technology.

SENATI, also in Peru, has adopted a strategy of diversification of its services towards the technological area which is methodologically different from that of other institutions. Although it does not possess technological centres *per se*, it provides advisory and technological information services, the former through forming *ad hoc* advisory teams upon the demands submitted by firms or groups of firms, and which are made up by the instructors of the institution as well as by external consultants, of which it has an updated and screened register. Technological information has been provided by holding events, one of the most important of which is the recently created "International Industrial Technology Congress,"where employers, professionals, technicians, workers, students and instructors are introduced to the main technological innovations which have arisen for the different productive sectors.

INCE, in Venezuela, has implemented recently an institutional innovation to establish Vocational Training and Technological Services Centres. The Centres are seen as "variability reducers" of productive sector technological demand, establishing the Institute's position for its internal and external audiences, for which purpose it takes account of the demands of the regional universe of firms, as well as the intensive utilisation of installed capacity. In terms of research and development, the INCE has planned the following activities for its Centres: applied research; experimental development; adaptation-adjustment; design; simulation; unbundling of packaged technology; and technological studies or diagnoses. In the line of rendering technological services, it offers: technical assistance; consulting services; information, documentation and dissemination services; laboratory tests and essays; design and standardisation of methods of analysis and sampling; specification, selection, testing and start-up of equipment; and mediation.

The **firms of the SIVENSA group,** also in Venezuela, constituted in mid-1976 the **FUNDAMENTAL Foundation.** Basically aimed at training, skills upgrading , development and advisory services to firms regarding human resources, this Foundation has been increasing its sphere of action to the entire country in what is called the "soft" technologies applied to organization, administration and management of productive labour. Among other services the Foundation provides advice to firms that seek to be certified under the ISO 9000 Standards, a sphere of action dealt with also by some of the training institutions that have obtained, in turn, their international certification.

3. Training and education throughout life

Training is, in the final instance, an eminently educational activity, and both its history and its present status in the Latin American and Caribbean region confirm it. In initial periods, almost all the vocational training institutions of the region made significant efforts to assign priority, on the one hand, to young people not incorporated in the regular educational system, by providing them with training. Moreover, the first institutions which arose in the region had as their main and explicit purpose to structure and manage the training which had so far been a casuistic endeavour, barely regulated, of some expanding industrial sectors. Training was clearly conceived for young people of between 14 and 18 years of age who finished primary education and had no possibility or aspirations to continue in the formal educational system. It was therefore an alternative option to mid-level education, and was initially conceived for the childeren of workers who aspired to follow in the steps of their parents.

Originally, the training thus offered was neither recognised in any way nor did it have equivalencies in formal education levels. It was conceived as a completely independent system of training for employment, with no pretensions to a parallel level in the regular system. However, the development of the situation and coverage of the regular education system did have important effects on vocational training. During its initial years, almost all the vocational training institutions were compelled to provide introductory courses for "prior levelling" to provide elementary knowledge of reading, writing, and mathematics which would give the participants the rudiments needed to take advantage of the training offered. Moreover, in many cases vocational training institutions spent their time implementing literacy and adult education programmes, either of their own or through efforts undertaken by the Ministries of Education. In other words, **the experience accumulated by the attention paid to disadvantaged sectors, plus the mandate received from the highest spheres of government, made it possible for the vocational training institutions to become among the first sectoral public agencies to be called to promote social policies formulated to achieve equity and overcome poverty, through educational endeavour.**

As the result of a substantial improvement of the levels of schooling of the population in general, the vocational training institutions gradually reduced their efforts to implement programmes of prior levelling and adult education, devoting their time to aspects more related to their specific and original mission: training for productive employment. In this sense, the expansion of

the coverage of the regular educational systems at the primary and secondary levels allowed these institutions to gradually change the schooling requirements of their candidates for their programmes, particularly the more formally schooled ones, and move their training levels upward.

Nevertheless, in many of the training programmes of the institutions of the region curricula related to mathematics and language still prevail, and on occasion they are the same as should be provided by the regular educational programmes required as a minimum to access vocational training. Indeed, the problems of approach, poor quality or insufficiency in the formal educational area are reflected when vocational training is applied in practice.

The educational nature of training was not exhausted, however, in the mere circumstance of its relationship to the regular educational system. The training provided by the institutions was never restricted to a mere training for a certain job. On the contrary, it always tended towards an understanding of the meaning of work and the environment in which it is carried out, contributing, as well, to an awareness and appreciation of productive labour, through the development of a taste for the occupation learnt, as well as a sense of dignity and professional pride.

Today, both the regular educational system and the various training systems are faced with a new context which poses challenges of great significance. Among them, probably the greatest is the adaptation and updating of curricular content and the certifications offered for the new occupational profiles arisen as a consequence of the transformations occurring in the productive world and the new employment reality.

No doubt this is a situation which has a greater effect on the regular educational systems than on training, which historically has greater linkages to the productive and labour world. That is one of the causes of the progressive closing of the gap between the two systems, as well as of the rise of some of the most innovative initiatives occurring in the region which tend to standardise the supply of training and education on the basis of present occupational competitency profiles.

In any case, there is today a consensus, both at the political level and at that of society, that it is necessary to restructure the supply of education and training in sufficiently flexible terms to provide an answer to the diversity and mutability of the demands for qualification. No one can expect today that the initial knowledge stored in the minds of young people will last them

their whole life, since the rapid development of the world requires a permanent updating of knowledge, at a time when basic education of youth tends to prolong itself. Education and training are, indeed, mutating; in all areas a multiplication of training possibilities offered by society is to be observed outside the school, and the notion of specialisation in the traditional sense is being replaced in many modern sectors of activity by that of evolving competency and adaptability.

This is a basically qualitative change. If before it sufficed to transmit certain technical knowledge and certain manual abilities for the individuals involved to be given a job that was waiting for them, now it is necessary to deliver a whole range of competencies which were previously insufficiently stressed: initiative, creativity, enterprise, relationship patterns and co-operation. These have to be accompanied, moreover, by the new technical competencies required, which are relatively less specific than in the past: languages, data processing, logical reasoning, capacity for analysis and interpretation of different codes, etc.

It is thus a priority to provide the means for people to be able to manage their own processes of occupational and vocational development: to find a first job, seek a new one, initiate an enterprising venture, re-train themselves through courses, and train themselves permanently, whether employed or unemployed, in the home or at the workplace. **In what seems to be a play on words, at the same time as the concept of "life-long employment" is disappearing, the concept of "life-long training" is emerging.** This change in the conception and practice of training involves a series of consequences which it is necessary to highlight:

• In the first place, unlike some decades ago when the dominant trend was towards specialisation, today it seems to be increasingly necessary to be able to count on a series of basic and general competencies, which serve both to perform in working environments with a lesser degree of control and more unforeseen situations which must be resolved on the spot, and to "surf" in a difficult and competitive labour market. The specific training which continues to be necessary is acquired, increasingly, on the job itself, and firms prefer to be in charge of it. The training bodies, and many programmes, begin to approach, both in terms of content and institutionally, the sphere of general or regular education. As the latter is also in the process of being revised, it benefits from this approach to the extent that vocational training provides it with experience regarding its relationship with the productive sector. Said differently, there is a synergy beneficial to both traditions and institutionalities.

Brazil: SENAC contribution to research and dissemination of knowledge on vocational training

It is well known that, in the regional environment of vocational training, there is a certain (welcome) cupidity regarding research, theoretical and technological aspects. Even if it is difficult to quantify a possible inadequacy of such intellectual production, it is appropriate to inisist on some activities that have become a model of what is demanded, by undertaking and publishing research and texts of high theoretical content.

One example to point out is the *"Boletim Técnico do SENAC,"* (SENAC Technical Bulletin), a publication which has admittedly become, over its 25 years of distribution, "an obligatory source for anyone interested in dovetailing training and labour in the region; it has kept to a level of reflection, professional dependability, graphic presentation and dissemination of ideas which makes it stand out with a personality of its own among the vocational training publications of the region." Its capacity to take "a critical approach to the key topics of meshing didactics and labour, by including scarcely appreciated contemporary sociological currents in the vocational training context, thus enriching its contribution," has been acknowledged. This critical and theoretical approach, and reflection on the peculiarity of the tertiary sector -a sector difficult to deal with because of its heterogeneous nature- allow the *Boletim* to deal with a group of state-of-the-art topics, central to the consideration of decisions on the future of vocational training.

The function of the *Boletim Técnico do SENAC"* is clearly placed within the scope of these considerations. They highlight, besides making correct judgments on its graphics or editorial quality, an intention within the framework of publications which, legitimately oriented towards well-defined objectives, has become a significant contribution in the matter of research, reflection and dissemination of the pioneer function of the SENAC in the tertiary sector that, firstly the institution itself, and later the entire regional training community, celebrates and appreciates.

Cinterfor wishes that its member institutions -and the example above seems to point the way- besides acting together, will also include in their action theoretical aspects based on knowledge of regional realities and the particular realities of each country.

• Secondly, responsibility for training is beginning to be shared and it necessarily becomes an area of arrangement and co-operation. If the people no longer train exclusively in the learning centres, but rather do so also in their homes and workplaces, the responsibility for training is shared among training bodies, employers, governments and the individuals themselves (and the organisations in which they take part and that represent them). Thus tripartite management is revitalised and the rise of new forms of training management also benefits. They do not acknowledge unique models: we may be talking of social or political agreements that allow, for example, the development of alternating methods or dual training, as we can also speak of production training centres congested by chambers of employers or unions. There are foundations managed by unions which are financed by employers, as well as national systems with tripartite management. But whatever may be the form adopted, the truth is that the cases increase in which there is an establishment of alliances which make it possible to take advantage of the resources that societies possess through their diverse players, in order to use them more efficiently and at the service of the ongoing and integral training of its citizens.

• In third place, because of its very nature, for life-long training to be possible there must be an extremely flexible and dynamic supply. The progressive blurring of boundaries between branches of production at the level of basic competencies makes for infinite possibilities in terms of the itineraries covered by individuals to reach the same type of employment. It is difficult to standardise the possible demands of these people and the supply of training, to be at the level of these requirements, must be a kind of "self-service menu" where everyone may fulfill their needs for qualification in the most diverse circumstances and periods, as well as with diverse degrees of depth and different content. Moreover, the demands for training have extended and diversified due to factors such as the greater relative importance of the knowledge factor within production; the entry of great hordes to active life (particularly in the less industrialised countries); the reduction of public employment; the workers displaced from firms that are reconverting or have disappeared; or the emergence of new forms of employment and self-employment. To cater to the entire active population, employed and unemployed, of the modern sector and the more backward sectors, formal and informal, youth and adults, is not a task than can be performed efficiently by a single player, even when it has great financial resources (a situation which is moreover infrequent). There is no other alternative, even here, than to seek the dovetailing of efforts through concerted action among diverse players that, from the standpoint of their own specificity and with their own

resources, may contribute to structuring a training system which is sufficiently broad, flexible and diverse so as to cater to an increasingly heterogeneous demand for continuous training.

In **Argentina** a reform of technical education was begun in 1996, that has resulted in the orchestration of the so-called **"Trayectos Técnicos Profesionales"** (Vocational Technical Journeys) **(TTP)** which are offers of training of an optional nature for all students or graduates of polymodal education. Its function is to train technicians in specific occupational areas the complexity of which requires a thourough grasp of professional competencies that can only be developed through systematic and prolonged training processes. The design itself of the TTP's is an interesting and timely example of the search for integration among the various educational and training systems:

• *With polymodal education,* because the latter is a set of training alternatives aimed at large fields of knowledge and of social and productive action (in a total of five areas), and the election of which allows students to consolidate fundamental competencies in those areas in function of issues linked to their interests and motivations: through the TTP's they access a different and additional option. We are dealing, in this latter case, with vocational initiation through training that prepares the trainee to perform in certain occupational areas that require a thourough grasp of specific technological and vocational competencies.

• *With vocational training,* because the TTP's complement a supply which arose, in Argentina, to target the development of the competencies required to perform in certain occupations and/or as a component of active employment policies aimed at promoting entry of groups with specific needs into the labour and social environments.

• *With life-long and higher training,* given that the function of the TTP's is to introduce the students into a vocational journey, guaranteeing their access to a base of vocational knowledge and abilities that allows them to begin working in a first job within a certain vocational field and to continue to learn during all their active life. What is then sought is that the training provided through the TTP's be supplemented with other educational alternatives in order to allow further levels of development, specification, re-orientation and -possibly- re-conversion of the initial vocation.

In **Brazil,** with the opening up of the international market, the demands for higher product quality levels have increased and, therefore, for worker

qualifications. The **Vocational Training and Development Secretariat (SEFOR) of the Ministry of Labour,** jointly with the ILO, implement a project for the design of a certification system. The variety of the supply of training and the interaction of multiple players on a stage in which training is being carried out not only within the framework of an "S system" (SENAC, SENAI, SENAR, SENAT) institutional base but also through a large amount of other private institutions linked to communities or sectors, generate an environment in which occupational certification can provide transparency and facilitate the mobility of workers and the improvement of the quality of training.

The proposal for the system is considering the multiple experiences in the area of vocational training which exist and are operating from nongovernmental organisations, unions and the "S system." The introduction of the occupational competency approach is one of the critical aspects of the possible proposal; in that regard different international models have been analysed and experiences in Brazilian firms have also been identified and publicised.

The project has its base in a consulting group in which representatives of the Government (SEFOR and the Technological Mid-level Education Secretariat - SEMTEC), of workers (CUT, Fuerza Sindical, CGT), of the SENAI and of the National Confederation of Industry (CNI) participate.

This group, supported by external consultants and through the organisation of various workshops to analyse national and international experiences, is already studying a proposed certification scheme. It is expected that the proposal will be completed this year and, at the same time, some pilot experiences will be developed and other existing experiences will be documented before formulating a final design.

A special feature of this experience arises from the participation of SEMTEC, in an approach to the mid-level technical education and vocational education proposals. The framework created by the new Law on Basic Guidelines for Education enabled SEMTEC to initiate work regarding certification and the introduction of the competencies approach. The aims from the standpoint of education and of labour have much in common and joint action is making possible their alignment.

Another example of integration between the vocational training system and the higher education system is to be found in Brazil, with the creation, in

1997, of the Textile Industrial Engineering Course, through the Chemical and Textile Industry Technology Centre (CETIQT) of the SENAI of Rio de Janeiro. This innovative offer aims to train professionals specialised and skilled for the rapid develpment of knowledge, for working in multidisciplinary teams and for exercising leadership focused as enterprising and management action, as well as for perceiving the importance of environmental control and for understanding organizations and business.

Brazil: the development of higher vocational education

The National Service of Industrial Training (SENAI), of Brazil, is currently consolidating its action at the higher level of technological education through courses like the one on Textile Engineering, imparted at the National Technological Centre of the Chemical and Textile Industry (CETQT), and the course on Graphic Arts and Mechatronic Technology, both conducted by the Sao Paulo SENAI.

The Santa Catarina SENAI has been authorised by the National Education Council to impart a course on Industrial Automation Technology, at its Automation and Information Science Centre (CTAI). The Minas Gerais SENAI and the Euvaldo Lodi Institute (IEL) will start a Master's Degree on Automotive Design in the second half of 1999. This pioneering initiative for Latin America is being jointly developed with the co-operation of the Fiat Company and the Federal University of Minas Gerais (UFMG). Courses will be held at the SENAI Centre for Graphic Design and Technology, at the Design School of the UFMG and at Fiat facilities.

Other high-level courses, either solely SEANI's or in collaboration with universities. await approval by the Ministry of Education. They cover areas like Garment Technology, Teachers' Training, Environmental Management, Cabinet Making, Leather and Footwear.

All these initiatives are the result of a careful process of short, medium and long term policies aimed at placing the CNI-SENAI system in the forefront of changes, in order to meet the demands of the productive sector and society in general, in a permanent search for innovation and improved occupational competencies.

The course added to its curriculum some novel aspects: management, environment, quality, humanities, technical standards, safety, sociology, politics and legislation. Its creation seeks to meet the aspirations of textile line employers: from the rural producer to the manufacturers and distributors, who seek to modernise and increase productivity and competitiveness in the sector in the internal and external markets.

A Graphics Technology course was added, in 1998, to the Textile Industrial Engineering Course. Through the SENAI "Theobaldo de Nigris" School, in Sao Paulo, this course, also a pioneer endeavour in Brazil, is to train professionals by solid development of their scientific and technological skills which will allow them to take part in the management of production, administration and business in the graphics area. Lasting three years and with a workload of 3,200 hours, the project was based on European and North American models for training graphics engineers. Along these same lines, the SENAI is preparing to launch new higher courses in the footwear, paper and food areas.

In **Honduras,** the Programme of Education for Labour (POCET) is a Central American example of this alignment between the regular educational systems, and especially adult education and training as life-long education. It is one of the first and richest experiences of integration between traditions among which historically there was little linkage and, at the same time, an experience of dialogue of those traditions with the new debates and paradigms that have involved cross-sectionally the spheres of education and vocational training, in which the new ideas regarding life-long education and training should be specially highlighted. In this case the Ministry of Public Education of Honduras and the National Vocational Training Institute (INFOP) have acted in an integrated manner, at the same time incorporating methodological approaches which are usually only to be found among nongovernmental organisations.

In this regard, the POCET programme is a central reference point for a whole tradition established around the principles of adult education, with its assistance-providing cast and its orientation towards literacy. POCET signalled the way towards integration of the contributions made at the time by all those linked to various forms of popular education with other currents -such as vocational training- with long experience in the field of education for productive labour. The latter currents are also deeply involved in profound debates arising both from the emergence of new production and labour paradigms and the employment market changes and from the persistence of groups and sectors that are left out.

In the case of **Mexico,** an experience was begun in 1995 by the Occupational Competency Standardisation and Certification Council (CONOCER), the most important initiative with the greatest scope in the field of occupational competencies in the region. It was an answer to interest on the part of the Government in achieving the participation, among other mechanisms, of the players, by stimulating demand with the aim of supporting the design and development of training based on competency standards and their certification.

The occupational competency system which has been applied includes the following main components:

• To define technical occupational competency standards by branch of activity or occupational group, to be implemented by the social partners with governmental support.

• To establish mechanisms for evaluation, verification and certification of knowledge, abilities and skills of individuals, regardless of the way in which they have been acquired, providing they meet technical competency standards.

• To transform the supply of training into a flexible modular system based on competency standards in order that individuals may move among the modules according to their needs.

• To create stimuli to demand, in order to promote the new system among the population and firms, seeking an equitable distribution of training and certification opportunities, and also catering to the needs of the disadvantaged population.

Following the creation of a system of national coverage, greater stress is laid on the definition of standards for the more general functions in the different economic branches, technological languages and occupational areas.

Finally, this initiative is conceived from the standpoint of finding a valid alternative to link the different types of education and training with the country's employment demands. The challenge is to approach the modernisation of educational and training -for- labour systems, not only so that they respond to the exigencies of adaptation to the new conditions of the economy and technology, but particularly to cater to the need to make education and training available to all sectors of the population, with suitable

and relevant content and with the quality required by the labour market. At present there are 45 Labour Competency Standardisation Committees operating in Mexico, 57 pilot projects are being carried out in firms of different sectors of economic activity to foster skill development and training of individuals, and seven certifying bodies and nine Evaluation Centres have been accredited. On 13 December last, the first 120 Labour Competency Certificates were distributed.

In **Uruguay,** the National Employment Bureau (DINAE), with the co-operation of the IDB, is carrying out a project to study, design and prepare the implementation of a standardisation, training and certification system in occupational competencies. To do so, the project is planning to establish a single register of training bodies and is working on four large areas: a comparative survey of competency systems developed in other countries in order to determine whether they can be implemented in Uruguay; information and training activities involving all the players in society; development of pilot experiences of competency standardisation in different economic sectors; design of a technical proposal and possible strategies for the implementation of a National Competencies System.

Moreover, in the same country, an exhaustive educational reform has been under way since 1995, structured on the coordinates of a search for equity and quality upgrading. In vocational-technical education, the reform proposes to achieve coherent interconnected and high quality technical and technological education, which, as well as attending to its specific tasks (to provide efficient and multivalent training to co-operate with the transformation of productive structures and improve the living conditions of workers), dovetails with and complements Secondary Education in an effort to provide the population with thourough basic and mid-level education. With this aim, the **Technical-Vocational Education Council (CETP-UTU)** is restructuring and re-formulating the education it supplies, the main novelties being the implementation of the Basic Technological Cycle and the Technological Secondary School Certificate. The former is divided into two areas: agricultural and technical, and it proposes to internalise technological culture in adolescents and develop competencies on which a later and complementary, broader and more modern, vocational option may be based. The technological secondary school curricula, three years in duration, with the double aim of being an instance of final mid-level education and granting a Technical Assistant certificate, are designed to be the intellectual, technical and manual ability base providing interdisciplinary and cross-sectional content and approaches, around an organising core or nucleus responding to the main

fields of development of the national economy and structured around occupational families. Thus, in 1997, the following disciplines were implemented: Industrial and Basic Chemistry, Thermodynamics, Data Processing and Maintenance, Administration and Services, and Agricultural Technology. The secondary school certificates make possible either entry into university or continuation of technical specialisation studies, in the CETP itself, seeking thus to attend to the training of mid-level and higher technicians according to the training demands of the productive sectors.

The aims of this reform are very explicit regarding developing in young people a solid general education, well grounded in science and technology and with the knowledge, abilities and skills which will allow them to be flexible and adapt quickly to change and to life-long learning. The starting point is a conception of Uruguay as a small country in the process of development and inserted in a world subject to constant economic, scientific and technological change. The belief is that the educational challenge involves preparing its human resources and its economy for a life of uncertainty. It is thus believed that the symbolic languages to be grasped thouroughly go beyond the capacity to express oneself and communicate orally and in writing, and include computer science, telematics, foreign languages and critical evaluation of audiovisual messages. Also indispensable are a mastery of scientific methods and knowledge in order to understand, interpret and handle natural and social phenomena; acquirement of mathematical competencies to acquire methodology and mastery of strategies for identifying problems and solving them; and a change in socio-historical competencies from the standpoint that cultural boundaries and world geography are becoming imprecise and satellite communications modify information-handling radically. And, last but not least, it is necessary to acquire a technological culture that facilitates the integration of youth into the world of production and labour and their understanding of its technical and social dimensions.